Initial Environmental Examination

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Nepal: South Asia Subregional Economic Cooperation Electricity Transmission and Distribution Strengthening Project

Output 2: Expansion and Augmentation of the Distribution Network in Karnali Province

Volume 1: Main Report

Prepared by Nepal Electrical Authority, Government of Nepal, for the Asian Development Bank (ADB).

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CURRENCY EQUIVALENTS

(as of 10 February 2026)

Currency Unit	–	Nepalese rupee (NPR)
NPR 1.00	=	$ 0.0069
$1.00	=	NPR 144.79

ABBREVIATIONS

ABC	aerial bundled cable
ADB	Asian Development Bank
AF	associated facilities
CC	covered conductor
CEMP	contractor's environmental management plan
CNHA	critical and natural habitat assessment
DFO	district forest officer
DoA	Department of Archeology, Nepal
DTR	distribution transformer
EHS	environmental, health and safety
EHSG	environmental, health and safety guidelines
EIA	Environmental Impact Assessment
EMF	electromagnetic field
EMoP	environmental monitoring plan
EMP	environmental management plan
EPC	engineering, procurement and construction
GRC	grievance redressal committee
GoN	Government of Nepal
GRM	grievance redress mechanism
IBA	important bird area
IBAT	integrated biodiversity assessment tool
ICNIRP	International Commission for Non-Ionizing Radiation Protection
IEE	initial environmental examination
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	key biodiversity area
MOAFEMoAFE	Ministry of Agriculture, Forest and Environment
NEA	Nepal Electrical Authority
NP	national park
OHL	overhead line
PA	protected area
PAI	project area of influence
PCB	polychlorinated biphenyl
PCR	physical cultural resources
PIU	project implementation unit
PMD	project management directorate
POP	persistent organic pollutant
PPE	personal protective equipment
PMC	project management consultant
ROW	right of way
SSEMD	Social Safeguard and Environment Management Department
WHO	World Health Organization

WEIGHTS AND MEASURES

dB(A)	-	A-weighted decibel
amp	-	ampere
ckm	-	circuit km
km	-	kilometer (1000 meters)
kV	-	kilovolt
kVA	-	kilovolt ampere (1000 volt ampere)
kWh	-	kilowatt-hour (1000 watts)
kWp	-	kilowatt peak
LV	-	low voltage
m	-	meter
sqm	-	square meter
MVA	-	mega volt ampere (1000 kVA)
MW	-	megawatt (1000 kilowatts)

NOTES

In this report, "$" refers to US dollars unless otherwise stated.

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EXECUTIVE SUMMARY

I. The Government of Nepal (GoN) has requested the Asian Development Bank (ADB) to finance a project of the Nepal Electrical Authority (NEA) - the South Asia Subregional Economic Cooperation (SASEC) Electricity Transmission and Distribution Strengthening Project. The project has multiple transmission, distribution and distributed solar subprojects and components varying in the significance of their environmental impact. Under Output 2 of the project, subproject (iii) seeks to support the expansion and augmentation of the distribution network (installation of new distribution lines, reconductoring and rehabilitation) in Karnali province of Nepal. The distribution expansion and augmentation subproject of the SASEC Electricity Transmission and Distribution Strengthening Project (the Project) will be implemented in, Mugu, West Rukum, Jajarkot, Kalikot, Salyan and Jumla districts of Karnali province in the Phase I. This initial environmental examination (IEE) covers the Output 2(iii) distribution components (Phase 1) of the Project.

II. ADB will finance the Output 2(iii) distribution components through a project loan and grant. Successful implementation of the subproject will improve the power supply to remote villages/areas, non-electrified villages, rural/isolated residential properties, farmers/businesses and other customers in Karnali province whilst ensuring the power system is climate and disaster resilient. The scope of this IEE study covers the environmental assessment for the Output 2(iii) distribution components (Phase I) only. Under the Output 2(iii) distribution components of the project, the electricity distribution system in the rural/remote, non-electrified parts of the six districts of Karnali province will be expanded/augmented, including:

a) 463.29km of 11 kV covered conductor (CC) (new and rehabilitation) lines;
b) New, rehabilitation and upgradation of 1221.57 km of low tension (LT) lines on aerial bundled cables (ABC);
c) installation of 245 distribution transformers (DTRs) associated with the above distribution lines.

III. These Output 2(iii) distribution components of the project need further environmental assessment and shall be covered in updated IEE. As the current alignment was selected based on the feasibility study, the final route will be determined through the joint survey with the contractor. The IEE will be updated once the route is finalized and before work commences.

IV. NEA will be the executing agency and implementing agency for the Output 2(iii) distribution components of the Project. The Output 2(iii) distribution components will be implemented, supervised and monitored by the Project Management Division (PMD) at NEA, which is headed by the Managing Director. The subproject will be led by a Project Manager, and PMD will be supported by ground/site level by a Project Implementation Unit (PIU) team (Karnali Provincial District Electric Office). A Project Management Consultant (PMC) firm will be hired to support NEA in implementing the Output 2(iii) distribution components of the project. The project will be implemented over eight years, commencing in October 2024 with a completion date of September 2032 but the Output 2(iii) distribution components are anticipated to be completed within 36 months within this window.

V. This IEE study has been prepared in compliance with ADB's Safeguard Policy Statement (SPS), 2009, considering the environment, health and safety requirements of the GoN. As per ADB's SPS, 2009, although the overall Project is categorized as A for environment, this subproject is unlikely to cause significant adverse irreversible, diverse or unprecedented environmental impacts and thus this IEE has been prepared. Also, no major, large-scale civil or structural works will be involved with most works consisting of electrical and mechanical works. Potential environmental impacts were identified in relation to the design,

location, construction, operation and maintenance of the Output 2(iii) distribution infrastructure and mitigation measures have been developed in respect of all temporary and permanent environment impacts identified.

VI. Overall, pre-construction, construction, operation and maintenance of the Output 2(iii) distribution components is likely to give rise to direct, indirect and induced environmental impacts that are mostly moderate/medium to minor/low in magnitude, site-specific, generally reversible, temporary and of short duration and primarily during construction works. Potential impacts and risks are expected to be easily mitigated through the adoption of international good practices for environmental management as set out in the International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) Guidelines, including the General Guidelines, and those on Electric Power Transmission and Distribution, as well as wildlife sensitive design features e.g., avoiding the use of bare conductors and adequate spacing and insulation of conductors and equipment at the distribution poles in order to prevent electrocution.

VII. The selection and design of new equipment will comply with national requirements as well as considering international good practice as per IFC EHS Guidelines, particularly with respect to avoiding the use of polychlorinated biphenyl (PCB) oil in the purchase of new transformers) and the use of all asbestos-containing materials in the associated facilities (construction of two new associated substations). This IEE study has been prepared to document the environmental impacts of the Output 2(iii) distribution components, define the measures required for the mitigation and monitoring of those impacts and includes the environmental management plan (EMP) for implementation.

VIII. The Rara National Park and its buffer (including the Rara Lake Ramsar site) overlaps two of the subproject districts (Jumla and Mugu) and Shey-Phoksundo National Park and its buffer is in Mugu district. There are no other protected areas in the Karnali province. These project districts likely support KBA, IBA and natural habitats. The remaining four districts where works will take place do not contain any protected areas, their buffers, conservation area and hunting reserve as confirmed by the DFOs. Neither do they contain any key biodiversity areas (KBA) or important bird areas (IBA). NEA will also ensure all distribution lines will be outside the National Park and its buffer zone, Ramsar sites, KBA/IBA and protected forest. A few of the 11 kV and LT distribution lines are potentially in community forests area as identified during the feasibility study. **The details of the impacted community forests will be obtained at the time of preparing the draft IEE.** Site walkovers and consultations did not identify any flora or fauna species of high biodiversity value, but this would be subject to confirmation by conducting ecological surveys of all subproject distribution line routes during project implementation. Districts do however potentially support some globally threatened species e.g., Chinese Pangolin, Red Panda, Alpine Musk Deer, Dhole, Steppe Eagle, Red Headed Vulture, Sakar Falcon and Egyptian Vulture. There are also endemic species (four amphibians and a dragonfly) that potentially qualify freshwater and associated habitat in the six districts as Critical Habitat, the potential for critical habitat will need to be reviewed in updating the IEE once NEA has prepared the list of distribution lines. Works at all sites in and within 500 m of areas of high biodiversity value (national parks, their buffers zone, Ramsar sites, KBA/IBA and conservation area) and supporting natural habitat will be carried out following ecological surveys by a qualified ecologist to confirm no species of high biodiversity value are impacted. Routing will seek to avoid or minimize the loss of existing trees. Before any trees are cut, they will be subject to ecological checks for nesting birds etc. Compensatory plantation as per the legal requirements will be implemented.

IX. There are no designated UNESCO sites in Karnali province but two (for cultural values) are tentatively listed – Sinja valley in Jumla district and Bhurti Temple Complex in Dailekh district. The proposed 11kV and LT distribution lines are mostly located outside of the national protected monuments and NEA has confirmed that those lines in these areas have

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been dropped from ADB Project Scope. **Further**, **NEA will ensure that the alignment of the distribution lines (if any) will be routed to avoid all national protected monuments and comply to national regulation and requirements as far as feasible. The list of nationally protected monuments needs to be updated in finalizing the IEE and before the commencement of construction works as the details were not available from the Department of Archaeology, and it needs to be confirmed if the available list is correct and comprehensive and where the site boundaries are located so that it can be determined which routes (if any) will impact them**. Local physical cultural resources may be present, but significant damage and removal will be avoided. Based on the available information and assessment, there is potential for chance finds in all subproject districts. During the construction phase, chance find procedures will be adopted.

X. Once constructed, provided wildlife sensitive design features have been incorporated, the distribution lines will have minimal impact on both biodiversity and cultural heritage resources. Installing covered conductors (CC) and aerial bundled conductors (ABC) during rehabilitation of existing lines shall be helpful in reducing existing electrocution risks to wild animals, although risk of collision for those in proximity to high biodiversity areas will remain.

XI. The detailed route alignments of the various distribution lines will be determined by the contractors upon mobilization, but NEA and their contractors will adopt the following criteria/principles to ensure significant adverse irreversible, diverse or unprecedented environmental impacts are avoided:

a) no lines that require IEE or EIA under national regulations will be taken up under the Output 2(iii) distribution components. For routes with Brief Environmental Study being required due to community forest land, NEA will obtain requisite national permissions to undertake works in the forest land before the commencement of the work.
b) all lines will use only CC or ABC with adequate spacing and insulation of conductors and equipment at the distribution poles in order to prevent electrocution of wildlife.
c) lines and their related equipment in natural habitat will only be installed where site-specific biodiversity assessment demonstrates significant conversion or degradation of natural habitat can be avoided.
d) lines and their related equipment in potential critical habitat will only be installed where site-specific biodiversity assessment demonstrates significant adverse impacts can be avoided.
e) no lines or related facilities in the National Parks, their buffer zones, Ramsar site, KBA or IBA, protected forest areas will be taken up under the Output 2(iii) distribution components.
f) distribution lines or related facilities in forest land (other than protected forest areas) will only be taken up under the Output 2(iii) distribution components after they have been demonstrated to be compliant with GoN forest legislation.
g) for lines or related facilities in community managed forests permission from the community forest user group (or for leasehold or private forest, the applicable user and owner permissions) will be sought.
h) only 11 kV CC and LT ABC lines following existing power line RoWs without minor diversions, or new lines or minor deviations of existing lines remaining in existing road RoWs, and not requiring new access track construction will be taken up in community (leasehold or private) forest land and only after having first received a written no-objection from the Community Forest User Group or equivalent and only as long as site-specific biodiversity assessment demonstrates that any significant adverse impacts can be avoided.
i) no lines or related facilities in the nationally protected monument sites of Nepal Department of Archaeology (DoA) or religious forests will be taken up under the Output 2(iii) distribution components, and if any line with 500m of the tentative UNESCO sites and of nationally protected monuments, no lines or related facilities will be taken up

unless no objection has been received from DoA following site-specific physical cultural resources assessment to demonstrate that any significant adverse impacts can be avoided**.**

j) distribution lines and related facilities will only be installed where significant damage to local physical cultural resources can be avoided, and physical cultural resources do not need to be removed from their current location.
k) avoid or minimize damage to existing trees, especially private/community forest user trees, and before any are cut/trimmed/lopped ensure they are subject to ecological checks for nesting birds etc.
l) avoid or minimize damage to locally important physical cultural resources, crops, properties, and public utilities, especially those encroaching into existing RoWs of lines to be rehabilitated/upgraded, ensuring safety clearances are maintained, with rerouting and micro-siting as needed, and
m) avoiding passing over/near school compounds and playground, with rerouting and micro-siting as needed.

XII. Screening has confirmed that the indicative new and existing 11 kV route alignments comply with the criteria related to the national parks, their buffers, Ramsar sites, KBA/IBA, protected forest, national protected monuments and religious forests. Since they have not been mapped yet, most LT lines cannot be screened yet, but NEA will ensure they and any 11 kV lines are taken out of the subproject scope if any are found to be in, or passing through, these areas once routes are selected. Some 11 kV and LT lines, however, are likely to pass through community forests and natural habitat and here existing power line RoWs will be followed, new lines and any minor deviations of existing lines must remain within existing road RoWs. Once the distribution lines have been mapped by the contractors, those not meeting the criterion and principles (para 77 of this IEE) will be immediately dropped. Distribution lines and their related equipment in natural habitat will only be installed where significant conversion or degradation of natural habitat can be avoided. All storage areas and any labor camps will be located inside the nearest existing substation or on modified habitat at least 500 m outside of the high biodiversity value areas. Since the distribution routes assessed are only indicative, during project implementation site-specific assessment checklist and consultation proformas will be completed by NEA and updated by the contractors. Based on the checklists this IEE and EMP will need to be updated and cleared by ADB with any government clearances or permissions obtained firstly before issue of bid documents and secondly before routings are approved by NEA and works commence.

XIII. For the IEE, site visits (reconnaissance surveys) to sample 11 kV and LT distribution line areas were conducted. Approximately, 56 km (12%) of 11 kV lines out of a total 463.29 km, and 125 km (10%) of 0.4 kV LT lines out of a total of 1221.57 km of low-tension lines in the six districts, including sites for 11 kV and LT lines to be rehabilitated were conducted during June 2024 and May-June 2025.

XIV. The key mitigation measure will be pre-construction ecological checks along all routes for natural habitat and Critical Habitat-qualifying species by an ecologist familiar with the flora and fauna species of Karnali province, followed by re-routing or micro-siting of all infrastructure to avoid such species, prior to tree trimming/lopping/vegetation clearing or earthwork. In addition, mitigation will include prohibiting poaching and firewood collection by construction workers. For all distribution lines, the DFOs will be actively engaged by NEA and the contractors throughout project implementation. A wildlife identification and rescue protocol will be adopted by the contractors, to be developed in consultation with DFOs as per site-specific requirements with all vegetation clearance and earthworks undertaken under ecological supervision.

XV. Though few local physical cultural resources were identified along the sample distribution lines, some locally important temples were observed and can be directly impacted

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if the distribution lines pass near them. However, the works will be supervised with fencing being used, if required, to avoid damage to those adjacent to the route alignments. Many existing distribution lines to be reconducted/rehabilitated, especially LT lines, were observed to be passing over houses/shops/croplands with poles located in private compounds/croplands whilst some were seen to run near school compounds. To uphold safety clearances and minimize community health and safety risks during operation, rerouting (already in project scope) is required as part of reconductoring works to ensure safety clearances are met, including where encroachment has historically occurred, with great care taken and appropriate health and safety measures implemented in dismantling the existing conductors.

XVI. Potential construction impacts relate to disturbance of land in the ROWs of new and existing distribution lines (especially for new lines and those requiring new access tracks) as well as adjacent communities, with pollution, health and safety risks to workers and the community if the construction activities are not well managed by NEA and their contractors. The most significant impacts include traffic congestion on narrow, damaged roads in highly complex terrain, dust (already a major issue in most rural areas due to unsurfaced roads), noise in semi-rural/dense settlement areas, and community health and safety risk. Pollution, health and safety risks to workers, notably health and safety risks due to working at height and with electricity, and the community will remain during operation and maintenance works especially as maintenance of distribution lines by NEA is an issue with many existing poles were also observed to be broken/leaning and non-compliant to safety clearances with lines sagging/low hanging in dense settlement areas, exposing the locals particularly if the person, tree, or structure is near a live line where the safe horizontal or vertical ground clearances are compromised.

XVII. Small informal group community consultations (related to environmental and social concerns) were conducted during preparation of this IEE report along sample distribution line routes under the subproject. In total, 88 participants (30.68% female and 69.32% male) were consulted. The consultations were held in June 2024 and May-June 2025 and included IP areas and remote areas with limited and isolated populations. The major issues identified during consultation were the frequent power failures, voltage drops, non-electrified situation (in many remote villages) hampering livelihood and household works. The presence of poles and power lines in and close to private properties was raised as a concern. No other significant environmental or social concerns were raised, although water availability issues were reported. Overall, all consulted were looking forward to the benefits of improved electricity services and electrification of villages with no power.

XVIII. This IEE report will be made available by NEA to the public and will be disclosed to a wider audience locally (with executive summary translated into Nepalese, Jumli and other local languages) via the NEA website, NEA offices (Headquarters, Karnali Provincial Division and District Electric Offices), both the associated substations and at construction site offices. The consultation will be continued during implementation to ensure all interested stakeholders and affected local communities are fully engaged, have an opportunity to raise any concerns to NEA and the contractors and can be informed of the development and implementation of final routings of distribution lines etc. To address project specific issues from affected persons, a Grievance Redress Mechanism (GRM) will be established by NEA starting at site level, the details of which will be disseminated to local communities.

XIX. An Environmental Management Plan (EMP) has been prepared for the subproject, which includes:

(i) Mitigation measures for managing the environmental impacts of DTR installation;
(ii) Mitigation measures for managing the environmental impacts during distribution line

implementation;
(iii) Environmental monitoring program, including monitoring of health and safety incidents;
(iv) Institutional arrangements, including capacity building; and
(v) EMP budget required during implementation of the Output 2(iii) distribution components.

XX. The responsible entity for mitigation, monitoring, and reporting is NEA. Mitigation measures will be assured by a program of environmental supervision and monitoring to be conducted during the construction and operation stages. Any unanticipated impacts or requirements for corrective action during implementation of the Output 2(iii) distribution components will be reported by the NEA to ADB.

XXI. NEA Project Management Division (PMD) will hire one environment safeguard officer and one health and safety officer for the Output 2(iii) distribution component, as part of the PMD to support EMP implementation, supervision and monitoring from commencement, during construction and operation to closure of the Output 2(iii) distribution component of the project. The NEA Social Safeguard and Environmental Management Department will also support. The PMD project manager will be supported by the project management unit (PIU) having adequate numbers of field staff (district electric office) acting as environment, health and safety supervisors (EHSS) to undertake day-to-day supervision. Given the biodiversity and cultural heritage values involved, NEA will need to adequately budget and ensure they have sufficient environmental expertise available to be able to address all of the EMP requirements. Given the limited capacity of NEA (especially at the PIU provincial level), to assist with site-specific assessment and provide on-site support, as well as capacity building and trainings, a project management consultancy (PMC) firm will include one environmental specialist, ecologist, health and safety specialist with professional certification, labor expert and adequate numbers of residential EHS supervisors. The PMC will also provide expert capacity building and support in relation to specialist topics such as critical and natural habitat assessment, wildlife sensitive design features, etc. The PMC will help NEA to develop standard operating procedures (SOP) addressing the environment, health and safety impacts and risks of its associated operational substations, maintenance of these facilities and the distribution lines, including recording of any occupational and community health and safety incidents. Furthermore, the Engineering, Procurement and Construction (EPC) Contractors will be required to have suitably qualified and experienced, dedicated full time on-site counterpart staff, including an (a) Environment Manager; (b) Pollution Control Expert; (c) Health and Safety Manager with NEBOSH/IOSH certification, supported by several health and safety stewards on-site; (d) Labor Manager; (e) Social and Community Liaison Officer and (f) Ecologist.

XXII. This IEE report, including the EMP are considered sufficient to meet the environmental assessment requirements as per ADB SPS, 2009 for the Output 2(iii) distribution components. However, as the assessment is based on indicative route areas and alignments for only a sample of the new and existing 11 kV and LT distribution lines with routings still to be finalized, it will need to be updated by NEA after mobilization of EPC contractors and finalization of the route alignments and detailed route surveys of distribution lines. The issue of bid documents and commencement of works shall only be taken up upon clearance of the updated IEE (addendum) by ADB. Furthermore, the IEE and EMP will also be updated and revised, if necessary, if there are any unanticipated impacts including a scope or design change. Any changes to the IEE and EMP will be subject to ADB review, clearance and disclosure.

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I. INTRODUCTION

A. Project Background and Rationale

1. The Government of Nepal (GoN) has requested the Asian Development Bank (ADB) to finance a project of Nepal Electrical Authority (NEA) -- the South Asia Subregional Economic Cooperation (SASEC) Electricity Transmission and Distribution Strengthening Project. The project has multiple transmission, distribution and distributed solar subprojects and components varying in the significance of their environmental impact. Under Output 2 of the project, subproject (iii) will support the expansion and augmentation of the distribution network (installation of new distribution lines, reconductoring and rehabilitation) in Karnali province.

2. Under the Output 2(iii) distribution components of this subproject, the electricity distribution system in the rural/remote non-electrified parts of the Jumla, Kalikot, Mugu, Jajarkot, West Rukum and Salyan and districts of Karnali province will be expanded and augmented. Under Output 2(iii) the proposed physical works or supply for goods will be as follows:

a. 463.29 of new 11 kV CC and 1221.57 km of new low tension (LT) lines on aerial bundled cables (ABC).
b. Rehabilitation and upgradation of 30 km of 11 kV lines on covered conductor and 30km of low tension (LT) lines on ABC.
c. Installation of 245 distribution transformers (DTRs) associated with the above distribution lines.

3. All of the Output 2(iii) distribution components need further environment assessment. This IEE deals with the environmental assessment for the Output 2(iii) distribution components.

4. As mandated by the cabinet of GoN, NEA will serve as the executing and implementing agency. The Output 2(iii) distribution components will be implemented, supervised and monitored by the Project Management Division (PMD) at NEA, which is headed by the Managing Director. The subproject will be led by a Project Manager, and PMD will be supported by ground/site level by a Project Implementation Unit (PIU) team (Karnali Provincial District Electric Office). A Project Management Consultant (PMC) firm will be hired to support NEA in implementing the Output 2(iii) distribution components of the project. The project will be implemented over eight years, commencing in July 2026 with a completion date of September 2034 but the Output 2(iii) distribution components are anticipated to be completed within 36 months within this window.

B. Safeguards Categorization

5. Safeguard requirements for all projects funded by ADB are defined under ADB's Safeguard Policy Statement (SPS), 2009, which establishes an environmental screening, assessment and management process to ensure that projects (i) avoid adverse impacts of projects on the environment and affected people, where possible; (ii) minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and (iii) help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks. All ADB projects must comply with the requirements of ADB's SPS, 2009 and Operational Manual (OM) F1, 2013 to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process.

6. For each ADB project, screening and categorization is conducted at the earliest stage of project preparation when sufficient information is available and is undertaken to (i) reflect the significance of potential impacts or risks that a project might present; (ii) identify the level of assessment and institutional resources required for the safeguard measures; and (iii) determine disclosure requirements. ADB uses a classification system to reflect the significance of a project's potential environmental impacts. A project's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the project's area of influence. Each proposed project is scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. For a Category A project, an Environmental Impact Assessment (EIA) including an Environmental Management Plan (EMP) is required. For a Category B project, an Initial Environmental Examination (IEE), including an EMP is required and for a Category C project, an EIA or IEE is not required, although environmental implications need to be reviewed e.g., through preparation of a due diligence report.

C. Justification of Subproject Safeguards Category

7. As per ADB's SPS, 2009, the overall Project is categorized as A for environment, based on the most environmentally sensitive component. However, the Output 2(iii) subproject (expansion and augmentation of the distribution network) is categorized as B for environment safeguards considering the fact its components are unlikely to cause significant adverse irreversible, diverse or unprecedented environmental impacts. This is due to the following facts:

(i) Distribution lines will use only CC or ABC with adequate spacing and insulation of conductors and equipment at the distribution poles in order to prevent electrocution of wildlife;
(ii) No components will be in, or pass through UNESCO sites, protected areas, their buffers, Ramsar, KBA/IBA, forest protection (conservation forests) areas, or national protected monuments of Department of Archeology of Nepal;
(iii) For distribution lines and their related equipment in community managed forests, only 11 kV CC and LT ABC lines following existing power line RoWs without minor diversions, or new lines or minor deviations of existing lines remaining in existing road RoWs, and not requiring new access track construction will be taken after they have been demonstrated to be compliant with GoN forest legislation, and only as long as site-specific biodiversity assessment demonstrates that any significant adverse impacts can be avoided;
(iv) Distribution lines and their related equipment in natural habitat will only be installed where significant conversion or degradation of natural habitat can be avoided, as determined through site-specific biodiversity assessment;
(v) Distribution lines and their related equipment in potential critical habitat will only be installed where site-specific biodiversity assessment demonstrates significant adverse impacts can be avoided; and
(vi) There will not be any major, large-scale civil or structural works with most works electrical and mechanical.

8. Overall, pre-construction, construction, operation and maintenance of the distribution component is likely to give rise to direct, indirect and induced environmental impacts that are mostly moderate/medium to minor/low in magnitude, site-specific, generally reversible, temporary and of short duration, primarily during construction works. Potential impacts and risks can be easily mitigated through the adoption of international good practices for environmental management as set out in the International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) Guidelines, including the General Guidelines, and those on Electric Power Transmission and Distribution, as well as wildlife sensitive design features e.g., avoiding the use of bare conductors and adequate spacing and insulation of

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conductors and equipment at the distribution poles in order to prevent electrocution. The selection and design of new equipment will comply with national requirements as well as considering international good practice per the IFC EHS Guidelines, particularly with respect to avoiding the use of polychlorinated biphenyl (PCB) oil in the purchase of new transformers (subproject DTRs and two new associated substations) and the use of all asbestos–containing materials in new construction.

9. As significant adverse irreversible, diverse, or unprecedented environmental impacts are unlikely to arise, this IEE along with an EMP has been prepared covering the potential adverse environmental impacts and risks of the Output 2(iii) distribution components involving physical works or supply of goods to ensure they are assessed and mitigated in compliance with ADB's SPS, 2009.

D. Study Methodology

10. The IEE study has been undertaken between June 2024 and December 2025 on behalf of NEA by a team of ADB-funded technical assistance (TA) consultants comprised of: (a) Nick Skinner, international environment assessment expert for the overall project; (b) Dibyendu Banerjee, environment assessment expert supporting Output 2(iii); (c) Asish Dhakal, national environment specialist; and (d) Bam Bahadur Thapa, national social expert for socioeconomic surveys.

11. The IEE report describes the direct, indirect, cumulative and induced impacts and risks of the Output 2(iii) distribution components on biological, physical, social and physical-cultural resources in the study area during the pre-construction, construction and operation and maintenance (O&M) phases. The IEE process involves the identification, scoping and assessment of the potential and perceived environmental, social, health and safety risks and impacts of the subproject. It also involves the identification of avoidance and mitigating measures and the preparation of the EMP that shall be implemented and monitored to address the identified risks and impacts of the subproject. The approach and methodology used to conduct the IEE study is as follows:

- The general corridor of potential impacts and risks was taken as a 50m buffer either side of the center line along the distribution line alignments.
- For the Output 2(iii) distribution components, the basis for the assessment was the initial, general scope of work (June 2024) prepared by NEA. This included general locations (areas and villages and indicative line routes) where work is required for 11 kV and 0.4 kV (LT) distribution lines. This preliminary scope of work was confirmed in discussion with NEA during field visits and meetings.
- Review of GoN guidelines, policies, regulations and ADB SPS, 2009 requirements. For standards and measures to adopt, international best practice guidelines, including the World Bank Group-IFC Environment, Health and Safety (EHS) general guidelines and the guidelines for Power Transmission and Distribution were used.
- Site visits (reconnaissance surveys) to sample distribution line alignments (areas/villages) included in the general scope (Table 3.1) were conducted based on the available subproject scope (June 2024 and May 2025) and sensitivities identified through desktop research/review, secondary report/data analysis and Google Earth mapping; the ADB TA consultant visited approximately 56 km (12%) of 11 kV lines out of a total 463.29 km, and 125 km 10%) of 0.4 kV LT lines out of a total of 1221.57 km of low-tension (LT) lines in the six districts, including sites for 11 kV and LT rehabilitation of existing lines.
- Discussions with NEA staff, consultation with other stakeholders and public consultations were conducted. Consultations were held with likely affected persons, persons inhabiting the nearby areas of the new substations and distribution lines

(existing and new/rehabilitation alignments) were conducted. Consultations with the District Forest Officials (DFOs), local/provisional ministers, ward presidents and committee members, were also conducted in June 2024 and May 2025 by the ADB TA consultants along with NEA officials.

- Collection of secondary baseline data (through desktop research/review) for the new indicative distribution lines were conducted. Secondary baseline data were relied on for the distribution lines, on the basis that impacts would be transient with short duration of works at each location.
- Primary smartphone web application-based data and site observations at the sample distribution area/sample line surveys were obtained.
- Integrated biodiversity assessment tool (IBAT) analysis and a preliminary natural and critical habitat screening was attempted for the biodiversity assessment based on site visit observations, consultations with forest officials and locals and desk-based research/screening and mapping.
- PCR identification in subproject areas based on desktop review with screening against planned distribution line areas conducted based on site visits, GIS analysis and consultation with DoA, NEA and locals.
- Socio-economic baseline data was informed by the secondary data and Government of Nepal, 12th National Census 2021, local consultations and observations made during the site visits.
- Identifying, scoping and evaluating the environmental (physical, biological, socioeconomic, and physical cultural resources) risks and impacts at different stages of implementation (pre-construction, construction and O&M) guided by the national and ADB environment safeguards framework. Impact assessment was informed by site visits, secondary baseline data, and discussion with the NEA project officers.
- Development of mitigation measures based on identified impacts and risk to address the potential adverse impacts and develop an environmental monitoring plan (EMoP), budgeting for EMP implementation, grievance redressal mechanism (GRM) (workers and community), institutional strengthening, capacity building, monitoring, supervision, and reporting plan. The EMP, including environmental monitoring plan (EMoP) will be an integral part of all bidding documents and Engineering, Procurement and Construction (EPC) contract documents.

E. Report Structure

12. The IEE consists of nine sections: (i) Introduction, (ii) Policy, Legal and Administrative Framework, (iii) Description of the Subproject, (iv) Description of the Environment, (v) Anticipated Environmental Impacts and Mitigation Measures, (vi) Consultations, Participation, and Information Disclosure, (vii) Grievance Redress Mechanism, (viii) Environmental Management Plan, and (ix) Conclusion and Recommendations. The executive summary is also provided at the beginning of the report. The report is supported by appendices.

13. Following selection of the final alignments, this IEE and EMP will need to be updated and cleared by ADB before the commencement of works. It will need to be updated after mobilization of EPC contractors and finalization of the route alignments and detailed route surveys of distribution lines. The commencement of works shall only be taken up upon clearance of the updated IEE (addendum) by ADB. The IEE and EMP will also be updated and revised, if necessary, if there are any unanticipated impacts, including a scope or design change. Any changes to the IEE and EMP will be subject to ADB review, clearance and disclosure.

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II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

14. This chapter is about the applicability of national and provincial laws and regulations, international agreements and ADB safeguards requirements to the subproject. The chapter also lays out the various permissions required for the subproject from national and provincial authorities. Furthermore, it considers the EHS policies and procedures that are presently available within the NEA, as well as the existing environment safeguards capacity of NEA with respect to EMP implementation.

A. National Environment Regulatory Framework and Standards

15. The environment safeguards framework in Nepal consists of several acts, notifications, rules, and regulations to protect the environment and wildlife as detailed in Table 2.1.

16. **Constitutional Provision and National Policy Framework**: Nepal's Constitution gives every citizen the right to live in a clean and healthy environment and it aspires towards the provision of the necessary balance between environment and development. Article 30 of Part 3 of the Constitution of Nepal states the Right to Clean Environment, according to this article all citizens shall have the right to live in clean environment, and in case if there is injury caused from environmental pollution or degradation, the victim has the right to obtain compensation. In the same way, Article 51(g) explains policies relating to the Protection, Promotion and use of Natural Resources under the Policies of the State. The Constitution in Article 18 (3) 25 emphasizes on equality of the citizens and provisions for the protection, empowerment of women, and indigenous people. Likewise, Article 25 is related to the Right to Property, Compensation to acquired property and socio-economic security to the economically as well as socially backward classes (this includes landless, bonded laborers, tillers etc.).

17. **National Policies:** The national policies relevant to the subproject are National Environment Policy 2019 (2076 BA), National Biodiversity Strategy and Action Plan (2014-2020), National Forest Policy 2017 (2075 BS), National Wetland Policy 2003 (2059 BS), Land Use Policy 2015 (2072 BS), National Land Policy 2019 (2075 BS), National Policy on Land Acquisition, Compensation and Resettlement 2015 (2071 BS), and National Climate Change Policy 2019 (2076 BS).

18. **Environment Protection Act (EPA), 2076 BS (2019):** Nepal has enacted a comprehensive and umbrella type act, the Environment Protection Act, 2076 BS (EPA) which is now enforced through appropriate regulatory measures. The EPA provides a legal basis for the concerned authorities for regulation of environmental impacts. Section 3 of the Act requires a proponent to conduct an EIA/IEE/BES in relation to prescribed proposals. The Act uses the word proposal instead of projects which makes its scope much broader in relation to environmental studies. Proponents include any government, semi government or non-government agency or organization applying for the approval of a proposal and possessing the responsibility to work according to such a proposal or for implementing the proposal.

19. According to the provision in Section 7 of the Act, the relevant agency is empowered to grant approval for the EIA/IEE/BES report, only if it finds that no significant adverse effects will be caused to the environment by the implementation of the proposal. Implementation of any proposal without the approval of the relevant agency is prohibited by the Act. The Act prohibits the implementation of any proposal without receiving environmental clearance from the relevant government agency in the form of an approved EIA/IEE/BES report. BES is required if forest land required is upto 1 hectare, IEE if more than 1 hectare and upto 5 hectare and EIA if more than 5 hectares are used for project purposes.

In case of an EIA, the approval will be given by theMoAFE Ministry of Agriculture, Forest and Environment (MoAFE); whereas, in case of an IEE or BES, the approval can be given by the Ministry of Energy, Water Resources, and Irrigation (MoEWRI) for energy, water resource and irrigation sector proposals or relevant government agency for other sectors. Sections 15 to 20 are related to pollution control, import, production and management of hazardous materials, establishment of laboratories, sample collection and certification on pollution control. Sections 21 to 22 relate to inspection and monitoring, and sections 23 to 28 relate to climate change. Sections 29 and 30 relate to National Heritage and Environmental Protection Areas. It is mentioned that Government of Nepal in consultation with the Provincial Government or concerned local level can declare an Environment Protection Area for such sites that have importance in terms of environment, natural heritage, areas of natural aesthetics, historical sites, cultural sites after publishing it in Nepal Rajpatra (official gazette of Government) e.g., Chure Hills Conservation Area. Clause 12 for environmental examination of projects that have received approval the responsibilities have been changed from Ministry to Department.
Clause 22 sub clause 4 (A) the amount for fine has been changed from NPR 20,000 ($137.73) to 200,000 ($1,377.32) in case the inspector works are hindered to the investigating works. Likewise for subclause 4 (B) changed the fine amount from NPR 15,000 ($103.30)) to NPR 100.000 ($688.66)1 for non-cooperation or providing false information to the environmental inspector for information sought.

20. **Karnali Province Environment Protection Act 2019:** It establishes the fundamental right of residents to live in a clean and healthy environment. It aims to balance environmental preservation with development needs. Addresses climate change challenges and aims to minimize the adverse effects of environmental degradation and pollution on public health. It includes provisions for environmental studies, area designation, and work plans to maintain environmental standards and quality. The Act also emphasizes pollution prevention and control, allowing the provincial government to conduct environmental studies and establish monitoring laboratories

21. **Environment Protection Rules, 2077 BS (2020)**: The Environment Protection Rules (EPR) were endorsed in 2020 and were made under the provisions of the Environment Protection Act. The EPR have been amended several times since then, being re-enacted in 2020. Rules 2 and 3 of the EPR require a project developer to carry out an IEE or EIA for the type and size of projects as listed in its Schedule 2 or 3, respectively. While activities listed under Schedule 1 are required to undergo a Brief Environmental Study, powerline line installation of above 132 kV and outdoor substations tapping from more than a 220 kV transmission line require an IEE. However, if a powerline traverses through/is located at a historical, cultural, archeological (areas with such significance), national parks, wildlife reserve, wetlands, conservation area, or areas that are a source of public drinking water, in such case an EIA is triggered. Power line projects of capacity 66 kV and above going through national and private forest areas need a Brief Environment Study. The Output 2(iii) distribution component of project will not require EIA/IEE. Existing lines should also have forest permission/clearance.

22. The EPA-2019 and EPR-2020 has empowered the provincial and local governments for conducting and approving the proposals to be executed in respective level of local governments.

23. The EPR adopts the environmental assessment criteria[2] mentioned in the EIA

[1] Based on Exchange Rate for February 10, 2026

[2] 1. Utilizing more than 5ha of forest land for other purpose (other than TL); Hydro-project >25MW capacity in BZ, FCA, CA, Environment CA or Ramsar listed wetland. Mostly HP, gas, etc power plant related
Water resources development project permanently displacing >100 person; Wind/Solar projects above 10MW; Any project in NP, WR or HR, etc.

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guidelines of the EPA. However, the EPR establishes the administrative framework for assessment, exhibition and determination of the EIA/IEE/BES, in terms of issues needed to be addressed and the format/layout of the EIA/IEE/BES document.

24. Rule 15 relates to export of Hazardous Substances. Rule 16 Sub-rules 1 to 9 direct on Management of Hazardous Wastes. Likewise, Rule 23 states the Environmental Inspection on projects being implemented and monitoring works and responsibilities.

25. **Forest Act, 2020 BS (2076**) mended 2026: clause 42 (1) of the acts states that if there is no other option than using a part of the national forest to operate a nationally prioritized project, an investment board-approved project, a national pride project, or a mineral-based industry that meets the standards set by the Government of Nepal, and if an environmental study under existing laws shows that operating such a plan, project, or industry will not cause significant adverse effects on the environment, or if adverse effects are expected, necessary risk mitigation measures will be implemented, the Government of Nepal and the Council of Ministers can approve the use of a part of the national forest for operating such a plan, project, or industry. As per sub-cluse 4, the compensatory plantation ration is 1:5 and the project have to deposit the required sum to plant trees and manage plantation site for 5 years to the designated revenue account as prescribed. Similarly, sub-cluse 5 has the provision of depositing the required amount for compensatory plantation of trees on at least the same area of impacted forest and take care the plantation sites for 5 years to a designated revenue account as prescribed for the project proposed by the Central, Provencial or Local government. However, plans, projects, or industries related to basic services and facilities like drinking water, roads, bridges, irrigation, communication, public transport, electricity transmission lines, and health services that are directly connected to the livelihoods of the local people and constructed by the Government of Nepal do not need to deposit the amount under this section for using forest areas. .

26. **Karnali Province Forest Act 2022:** Clause 51 is on designating areas with rich biodiversity and its management to areas important for biodiversity, with historical and cultural heritage in forest and areas outside conservation areas. Clasue 52 gives provincial government to designate wildlife corridors.

Forest Rules, 2079 BS amended 2026: Rule 87 limits the use of national forest area for development projects. In addition, there is a provision to coordinate with the relevant division forest offices when conducting environmental studies as an alternative in areas with less forest. Rule 96 (1) has made it mandatory to implement the measures to reduce damage mentioned in the environmental study report at its own expense. In this way, priority should be given to implementing damage reduction measures in consultation with the forest user groups or local communities affected by the development project. When constructing infrastructure, the development project must build wildlife-friendly infrastructure so it doesn't affect wildlife, their habitats, or movement. Similarly, Rule 102 covers regulations related to tree removal.

27. **Forest Production, Collection and Sales Distribution Guidelines, 2057 BS**: The Clauses 3 to 10 of the Guidelines have specified various procedure and formats for getting approval for vegetation clearance (distribution lines in natural habitats), delineation of lands for vegetation clearance, evaluation of wood volume etc. and government offices and officials responsible for the approval, delineation and evaluation. These provisions have a direct relevance to the development of the subproject and need compliance to these provisions. It is obligation to the Output 2(iii) distribution components of the project for getting approval in view of vegetation clearance and evaluation of wood volume from division forest office prior to the

construction phase.

28. **National Parks and Wildlife Conservation Act, 2029 BS (1973) Amended 2073 BS (2016):** The National Parks and Wildlife Conservation Act, 2029 is enacted to plan for the management of national parks, conservation of wildlife and their habitat and regulation of hunting. It also conserves, promotes,develops, and makes appropriate arrangements for the use of places which are of special importance from the point of view of natural beauty and to maintain good manners and welfare of the general public. As per Article 5 certain activities are restricted (hunting, construction work, clearance, cultivation, settlement, livestock/poultry herding, clearance of vegetation, mining, removal of construction materials, property damage, carrying ammunition and blocking river/streams) without written permission. According to Article 7 damage to forest product, blockage or diversion of river/stream flowing through a national park, wildlife reserve or conservation area or any other source of water, as well as use of explosive materials with no written permission are prohibited.

29. According to Article 10, 26 mammal species, 9 bird species and 3 reptile species of Nepal have been enlisted into the protected categories.[3, 4] Some of these species are likely to be in the Karnali province and subproject districts as discussed in Chapter IV.

30. **National Parks and Wildlife Conservation Rules, 2030 BS (1974**): To implement Section 33 of the National Parks and Wildlife Conservation Act, 2029 BS (1973), the National Parks and Wildlife Conservation Rules, 2030 BS (1974) were prepared. Chapter 2, Section 3 of this rule focused on publishing a notice at least 35 days prior to submitting a tender in the major newspapers for the operation of any service from any bodies of the Government of Nepal inside national parks and reserves. To operate any services or facilities related to construction work within a national park, wildlife reserve or conservation area, the person or entity shall seek prior approval from the Government of Nepal. Except for Government employees deputed for the duty, no other person shall be allowed to enter into the protected area without receiving the written permission from the chief. The permission shall be provided only for scientific research. By the application of selection criteria, no works under the Output 2(iii) distribution components of the project will take place inside any national parks, wildlife reserve or conservation area.

31. **Wildlife Reserve Rules, 2049 BS (1977):** Rule 4 makes the provision for the need to obtain an “entry permission” to enter into any Wildlife Reserve. Rule 6 stipulates activities prohibited within the reserve without a written permission (these include construction works, vegetation clearance, fire, damage, spending night/construction of camps and removal of construction materials). Rule 14 prohibits throwing wastes and Rule 15 prohibits the disposal of hazardous wastes in the Wildlife Reserve. Rule 16 stipulates the rules for driving inside the Wildlife Reserve. No works under the Output 2(iii) distribution components of the project will take place inside any wildlife reserves.

32. **Buffer Zone Rules, 2052 (1996):** Rules described demarcation and management of buffer zones within forest areas and protected area buffer zones. Although final line mapping and alignment routes are not available, it is understood from NEA that no works under the Output 2(iii) distribution components of the project will take place with the Buffer of National Parks, this will be ensured through the application of selection criteria. Distribution lines inside Rara National Park (NP) in Mugu district were confirmed by NEA to be removed from the project scope due to potentially significant irreversible impacts on this NP and Rara Lake Ramsar site.

[3] https://wcn.org.np/the-list-of-protected-species-of-nepal/34/
[4] https://portals.iucn.org/library/sites/library/files/documents/1997-020-En.pdf

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33. **Working Policy for Construction and Operation of Physical Infrastructure within Protected Area, 2065 BS (2009):** This policy describes the terms and conditions required for implementing projects inside the National Park, Wildlife Reserves and Conservation Areas. This policy states that no land will be made available for construction of any development work except of national priority (includes power lines) within the protected area. Implementation of mitigation measures, allocation of royalty for the protection of the National Park, payment for the use of natural resources and monitoring are some of the conditions mentioned in this policy. This policy has made the provision of compensatory plantation of 25 seedlings for every tree or pole lost from the protected areas. By the application of selection criteria no works under the Output 2(iii) distribution components of the project will take place inside any national parks, wildlife reserve or conservation area.

34. **Ancient Monument Preservation Act, 2013 BS (1956):** It was enacted to integrate the conservation and protection of ancient monuments and archaeological properties. The act mentions any ancient monuments and artistic objects of one hundred years old shall be regarded archeologically important objects and Department of Archaeology (DOA) shall preserve such objects.

35. **Solid Waste Management Act, 2068 BS (2011) and Solid Waste Management Rules 2070 BS (2013):** Article 4 lays the responsibility of the solid waste management on the persons or institution that has generated the waste whereas Article 5 mandates reduction of the waste at source. Article 9 makes the institution responsible for transporting the solid waste to the waste disposal facility. The local body (municipality, sub-municipality, city and Village Development Committee) is made responsible for the monitoring of solid waste management as per Article 21. Article 38 stipulates that the discharge of solid waste without the consent of the local body is an offence under this legislation and Article 39 details the provisions for punishment/penalty in case of offense.

36. Rule 5 elaborates on the disposal and management of harmful and chemical wastes. According to sub-rules 1 and 2, disposal by mixing of such waste with other waste is prohibited as such waste requires prior processing. Sub-rule 3 instructs that a permit is required by the individual, agency or organization from the local body for managing such waste. Sub-rule 5 states that the local body will follow-up with the permitted entity as to the appropriate standards and technology for processing. Sub-rule 7 directs that harmful and chemical waste collection, transportation and storage must be done in a safe manner. Sub-rule 8 states that disposal of such harmful waste can be done only after the harmful elementshave been normalized. Sub-rule 9 makes it mandatory for agencies producing harmful waste to abide by prevailing GoN environmental laws.

37. **Karnali Province Disaster Risk Reduction and Management Regulations, 2018:** These regulations include provisions for the establishment of a provincial disaster management committee, arrangements for committee meetings, and the duties, responsibilities, and rights of the committee. The regulations also outline the duties, roles, and responsibilities of the executive committee, provisions related to the disaster management fund, monitoring, and the power to issue operational guidelines and standards.

38. **National Implementation Plan for Stockholm Convention on Persistent Organic Pollutants in Nepal 2017:** Polychlorinated biphenyl (PCB), a persistent organic pollutant (POP), is a compound that was commonly used in transformer oil, capacitor, circuit breaker, industrial equipment, hydraulic fluid, voltage regulator, vacuum pump, turbine, paint, lubricating oil, fire controlling material etc. until it was phased out internationally in the 1980s. The Stockholm Convention demands the phaseout of PCB-containing equipment from its signatory nations by 31 December 2025. Nepal banned its import since 1990 (The Treaty Act 1990 of Nepal mentions that the provisions of conventions to which Nepal is a party are as good as domestic law and in case there is any contradiction with the domestic law, the

provision of the convention will prevail). Existing DTRs, especially those older than the 1990 ban, are considered to be a PCB risk under the Output 2(iii) distribution components of the project.

39. The Action Plan sets out (i) institutional and regulatory measures (formulation of hazardous chemicals management rule); (ii) measures to reduce releases from stockpiles and wastes; and (iii) identification of contaminated sites and their remediation in an environmentally sound manner etc. It reports gaps in insufficient infrastructure and capacity for disposal and reduction of persistent organic pollutants (POPs) such as PCBs. PCBs categorized among the Annex A (Industrial Chemicals, recorded in dielectric fluids and electrical equipment, were dechlorinated and decontaminated between 2011 to 2014 in the national inventory of equipment by March 2014). It states that the other PCB contaminated transformers were not available for decontamination either for not being accessible or because the oil had been replaced.

40. The main regulatory bodies responsible for administration of the environmental policy and legislation pertinent to the Output 2(iii) distribution components are:

a. **MoAFE Ministry of Agriculture, Forest and Environment (MoAFE):**Ministry of Agriculture, Forest and Environment (MoAFE)MoAFEis the apex body to formulate and implement the policies and regulations related to environmental protection, natural resource management, pollution control, and health and safety. They implement their plan and program through their Department of Forests and Soil Conservation, Department of Plant Resources, Forest Research and Training Center, Department of National Parks and Wildlife Conservation, and Department of Environment.
b. **Ministry of Energy, Water Resources, and Irrigation (MoEWRI):** MoEWRI and Department of Electricity Development (DoED) assists the Ministry of Energy, Water Resources, and Irrigation (MOEWRI) to develop and promote the electricity sector and to improve the financial effectiveness of the sector at the national level by attracting private sector investment. DoED reviews national environmental assessment documents (EIA/IEE/BES) for energy related projects and forwards them with comments to MOEWRI for approval in case of IEE or BES, and to forward to MOAFE for review and approval in case of EIA.
c. **Department of National Park and Wildlife Conservation**: The Department of National Parks and Wildlife Conservation is a government agency of Nepal. It is assigned with the responsibilities of conserving the wildlife of Nepal. It is further responsible for managing the protected areas of Nepal, including national parks and conservation areas. The department is also part of the REDD+[5] Group. The department also supports people living within the boundaries of those parks as well as their buffer zones and promotes ecotourism. The department also carries out surveys including annual censuses of endangered species.
d. **Department of Environment (DoE):** The Department of Environment has been assigned responsibility of improving the environmental quality; enforcing environment related acts, regulations, and standards, creating awareness among people and localizing the climate change adaptation and mitigation practices at local level. This is done by monitoring and auditing development projects and industries, writing suggestions for improvement, enforcing the environment management plans, penalizing the projects, developing climate smart villages and community centric workshops and training programs.

[5] Countries established the REDD+ framework to protect forests as part of the Paris Agreement. REDD stands for reducing emissions from deforestation and forest degradation in developing countries. The '+' stands for additional forest-related activities that protect the climate, namely sustainable management of forests and the conservation and enhancement of forest carbon stocks. Under the REDD+ framework, for certain activities, developing countries can receive results-based payments for emission reductions when they reduce deforestation.

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e. **Department of Archeology (DoA):** Protection and maintenance of archaeological sites, ancient monuments including remains of national importance, museum and archive management are the main concern of Department of Archaeology. DoA also regulate all archaeological activities in the country as per the provision of the Ancient Monument Preservation Act, 2013 BS (1956). The act also provides, DoA provision to protect and preserve any individual monuments, group of monuments, sites and even vernacular edifices located throughout the country either private or public having archaeological, historical, artistic and aesthetic values.

Table 2.1 Applicable National Environmental Requirements

Sl. No.	Name of Policy / Law / Regulation	Applicability to Subproject	Remarks
1.	National Environment Policy (2076 BS)	Emphasis on environment conservation, incorporation into development projects.	Responsible Authorities: MoAFE
2.	National Forest Policy (2075)	Subproject components anticipated to be traversing natural habitat/forest areas. There will be impacts on natural habitat/forest areas. Existing and new RoWs may require vegetation clearance/tree trimming – to be confirmed once alignments are finalized.	Responsible Authorities: MoAFE
3.	Nature Conservation National Strategic Framework for Sustainable Development 2015-2030	Applicable as some distribution lines will pass natural habitat although selection criteria will ensure none through protected areas. Under its programmes that need to be given priority by the agencies concerned for nature conservation integration into development efforts making electricity transmission lines passing through the forest area higher than average trees to prevent cutting them as ranked high through harmonization and coordination and facilitation with Environment and Energy Ministries.	Responsible Authorities: Ministry of Energy and MoAFE
4.	National Biodiversity Strategy and Action Plan (2014-2020)	Emphasis on biodiversity conservation, incorporation into development projects. Subproject components anticipated to be traversing natural habitat/critical habitat areas. There will be impacts on flora and fauna. Existing and new RoWs may require vegetation clearance/tree trimming - to be confirmed once alignments are finalized. Electrocution and collision risk to the wildlife.	Responsible Authorities: MoAFE
5.	Working Policy for Construction and Operation of Physical Infrastructure within Protected Area, 2065 BS (2009)	Screening against selection criteria will ensure no subproject distribution lines are in protected areas. This policy emphasis on biodiversity conservation, incorporation into development projects inside protected areas	Responsible Authorities: MoAFE and Department of National Park and Wildlife Conservation
6.	Vulture Conservation Action Plan 2023-27	Applicable as overhead distribution lines planned. The plan has been formulated with the objective of addressing threats from diclofenac and other harmful NSAIDs (Non-Steroidal Anti-Inflammatory Drug) in livestock treatment. To prevent collision and electrocution, the objective 5 on power infrastructure major actions include i) prepare and implement site specific management plans in identified priority areas, ii) update information on previously known current and potential habitats, iii) control cutting of the nesting and potential trees in their nesting habitat, (iv) encourage and support local communities to manage and protect habitat, (v) the awareness campaign, sensitize and aware local forest user groups and other stakeholders, protect the nesting sites from all the possible disturbances, information collection on the distribution of power lines in vulture habitat, sensitivity mapping of threatened vultures against hydropower and transmission lines and employ mitigation measures to prevent electrocution and collision in areas where it occurs.	Responsible Authorities: DNPWC and MoAFE

Sl. No.	Name of Policy / Law / Regulation	Applicability to Subproject	Remarks
7.	National Implementation Plan for Stockholm Convention on Persistent Organic Pollutants in Nepal 2017	Applicable as existing DTRs on the distribution network. The Action Plan sets out (i) institutional and regulatory measures (formulation of hazardous chemicals management rule); (ii) measures to reduce releases from stockpiles and wastes; and (iii) identification of contaminated sites and their remediation in an environmentally sound manner etc. It reports gaps in insufficient infrastructure and capacity for disposal and reduction of POPs. NIP mentions the dechlorination of industrial chemicals (PCBs) in transformers.	Responsible Authorities: MoAFE
8.	Land Use Policy (2072 BS), 2015	No land use change envisaged in the installation of distribution lines although some new RoW to be created requiring land for installation.	Responsible Authorities: Ministry of Land Reform and Management (MoLRM)
9.	National Policy on Land Acquisition, Compensation and Resettlement (2071 BS)	Applicable as some of the new distribution poles may need private land for installation.	Responsible Authorities: Ministry of Land Reform and Management (MoLRM)
10.	National Climate Change Policy 2019	SF6 used in switchgear (in associated substations) is a GHG. The policy was introduced by Government of Nepal as a guidance to different levels and thematic areas for ensuring development of a resilient society achieved with reduction in risk of climate change impacts.	Responsible Authorities: MoAFE
11.	Environment Protection Act (EPA), 2076 BS (2019) and Environment Protection Rules, 2077 BS (2020)	The act emphasis on aspects like provisions of Brief Environmental Study, IEE and EIA under the jurisdiction of local authority, provincial government, and central government. Not applicable for the distribution lines which are exempted from environmental assessment unless in protected areas etc. A Brief Environmental Study must be conducted as per prevailing laws if forest land is to be used for power lines of 66 kV and less.	Responsible Authorities: MoAFE
12.	National Environmental Impact Assessment Guidelines, 1993	Not applicable for the distribution lines which are exempted from environmental assessment unless in protected areas etc. These guidelines provides guidance to project proponent on integrating environmental mitigation measures, particularly on the management of quarries, borrow pits, stockpiling of materials and spoil disposal, operation of the work camps, earthworks and slope stabilization, location of stone crushing plants, etc.	Responsible Authorities: MoAFE
13.	Environmental Guidelines for Selected Industrial and Power Development Projects, Asian Development Bank (ADB) 1990 (2046/47 BS)	The purpose of the guidelines is to facilitate the work of the ADB funded project staff and enable them to incorporate the environmental protection parameters into the project preparation process.	Responsible Authorities: MoAFE
14.	Land for National Priority Project, 2019	Screening against selection criteria will ensure no subproject distribution lines are in protected areas. A Brief Environmental Study must be conducted as per prevailing laws if forest land is to be used for power lines of 66 kV and less, including for 33kV line and if the required forest land is upto 1ha. IEE will be required for 1ha-5ha and EIA for above 5ha of forest land use. Even existing powerlines/Row through forests are to be having required clearences/permission. Provincial Govt/DFO and Ministry concerning to the project should forward necessary documents related to project for approval of using land to MoAFE.	Responsible Authorities: MoWERI and MoAFE

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Sl. No.	Name of Policy / Law / Regulation	Applicability to Subproject	Remarks
15.	Forest Act, 2019 (Amendment July 30, 2025) and Forest Regulation 2022 (Ammended January 22, 2026)	Some distribution lines may be in community forest,/leasehold/private forests although religious forest will be avoided. Distribution lines or related facilities in forest land (other than forest protection (conservation forests) areas) will only be taken up under the Output 2(iii) distribution components after they have been demonstrated to be compliant with GoN forest legislation. For lines or related facilities in community managed forests permission from the community forest user group (or for leasehold or private forest, the applicable user and owner permissions) will be sought. Article 41 is on no change in land use of forest area, but this condition will not be applied in forest land which has already been provided for Infrastructure development projects. Article 42 is on to use the forest land that should be provided for planting trees which Is equal to the forest area used by the subproject, adjacent to the national forest, near the subproject area having similar geographical and ecological features. Clause 42 sub clause 6: Any Transmission, Distribution or communication or for any similar purpose if National Forest is to be used for installing towers the area required as per sub clause 4 (necessary land required for forest management to be ensured, in that land for managing planted trees for 5 years to be ensured by depositing 1% as per clause 45 in forest development fund) designated amount of money's 10% and trees cut along the line or Right of Way in the necessary land needs to be deposited in the forest development funds. Subrule 4 directs for projects under rule 42 to identify and confirm necessary permanent or temporary areas within national forest for Right of Way, security perimeter, green zone, storage areas for construction materials, access road for transportation and muck management, road for produce transportation etc. Subrule 5 states that development projects requiring national forest land that needs environmental assessment need to coordinate with division forest office while doing such assessment. Rule 91 management of compensatory land for the project occupied land in forest area. Rule 92 is of compensatory funds under Forest Act section 42 subsection 4 to be deposited and under chapter A for compensatory plantation of trees impacted by the project in the ratio of 1 is to 5 trees for its growth and care for 5 years. Subrule 3 states that as per Foret Act section 42 subsection 6 for electricity transmission, distribution and communication service projects areas occupied by tower pad in national forest land 10% of the determined cost of the land and cost for trees to be planted in the Right of Way of the transmission line of power line corridor as well as for compensatory plantation cost for trees in the ratio of 1 is to 5 and its caring for 5 years need to be deposited in forest development fund as per Annex-51A. Subrule 4 directs for development project using forest land temporarily needs to deposit the funds as per Annex 38 in Federal Reserve Funds. Subrule 5 states that such forest land once the use is over needs to be reinstated by the development project and handed over to the Division Forest Office or if not possible to provide the costs that is determined by the Department. Rule 94 subrule 1A prior to agreement it requires the project to get approval from the Ministry for the number of trees to be removed by the project. Rule 36 under Management of Trees Posing Risks: In the event that trees originating from forest land, due to natural causes, fall or are displaced and subsequently obstruct public infrastructure—including roads, highways, power lines, drinking water systems, sewer lines, irrigation channels, or rivers—the responsible agency or local authority is authorized to promptly remove the obstructing trees and secure them at a safe location. The divisional forest officer must be notified of such actions without delay. Under Subrule 6 Within forest land, if any tree, its	Responsible Authorities: MoAFE

Sl. No.	Name of Policy / Law / Regulation	Applicability to Subproject	Remarks
		branches, or tips pose a risk to transmission lines, telephone towers, road traffic, or flight safety, the relevant project or agency is authorized to remove the hazardous parts after notifying the divisional forest office.	
16.	Forest Product Collection and Selling Directives 2016 and Forest Produces Collection, Sale and Distribution Guidelines 2000	Some distribution lines may be in community forest, although conservation and religious forest will be avoided. Requires clearing of vegetation in forest land. 5 (6) Valuation of marked trees, volume must be calculated as per Schedule 7 of Forest Rules 10. Except for national priority projects forest entry permits must be given.	Responsible Authorities: MoAFE
17.	National Park and Wildlife Conservation Act, 1973, Amended 2073 BS (2016), and National Park and Wildlife Conservation Rule, 2030 BS (1974),	Screening against selection criteria will ensure no subproject distribution lines are in protected areas. It addresses the conservation of ecologically valuable areas and indigenous wildlife. The Act prohibits trespassing in national park areas, prohibits wildlife hunting, construction works in the national park area, damage to plant and animal, construction of huts and houses in national park area without permission of authorized persons. It lists 26 species of mammals, 9 species of birds, and 3 species of reptile as protected wildlife. Clause 15 C states that government may declare areas outside protected areas as biological corridors.	Responsible Authorities: MoAFE and Department of National Park and Wildlife Conservation
18.	Wildlife Reserve Rules, 2049 BS (1977)	Screening against selection criteria will ensure no subproject distribution lines are in protected areas and Karnali Province has no Wildlife Reserves.	Responsible Authorities: MoAFE and Department of National Park and Wildlife Conservation
19.	Buffer Zone Management Rules, 2052 BS (1996)	Screening against selection criteria will ensure no subproject distribution lines are in protected areas buffer zone.	Responsible Authorities: MoAFE
20.	Control of International Trade of Endangered Wild Fauna and Flora Act, 2017	Screening against selection criteria will ensure no subproject distribution lines are in protected areas. It prohibits purchase, selling, possession, use, planting, rearing, captive breeding, transport or import or export threatened or vulnerable wild fauna or flora or specimens.	Responsible Authorities: MoAFE
21.	Wildlife Friendly Infrastructure Construction Guidelines 2078 BS (2021/22)	Guideline directs on inclusion of wildlife friendly infrastructure in sensitive zones, regulatory permissions, inclusion of experts on study and design of structures and management of structures. Guideline 11 directs on the existing or under construction infrastructure (prior to the publication of the guideline). If it is identified necessary for inclusion of wildlife friendly infrastructure by concerned protector or Division Forest Authority they can recommend the concerned agency to do so and if such recommendation is received the concerned agency as per requirement must conduct study and construct such infrastructure. Subproject will consider wildlife friendly design. Avian protection measured will be adopted. The IEE process and implementation of the EMP will enable this.	Responsible Authorities: MoAFE
22.	Solid Waste Management Act, 2012 and Solid Waste Management Rule 2013	Distribution line construction and operation will generate solid wastes. The SWMA has stipulated the requirements while managing the solid wastes in the city, towns or, industrial as well as the workplaces of projects and their labor camps. The processing and managing harmful waste, health institution waste, chemical waste, or industrial waste subject to the prescribed standards shall be the responsibility of person or entity generating such waste is with the generator. Rule 3 is on segregation of waste which includes harmful chemical waste segregation at the source by the generator.	Responsible Authorities: MoAFE and DoE.

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Sl. No.	Name of Policy / Law / Regulation	Applicability to Subproject	Remarks
23.	Acid and Other Hazardous Chemical Act 2022	Distribution line construction and operation will envisage oil usage and handling. The act is on control of purchase, transport, storage of acid and other hazardous chemical substances. Article 12 elaborates on safety and precautionary measures to be followed while transporting such materials in accordance to permission letter and driver and assistant driver to have training on hazard risk management. It directs on the container standards, chemical substance placement, danger signage on transporting vehicle, cautionary routes for transportation. Article 14 has 7 requirements on safe storage including marking of danger signage. Article 16 is on occupational health and safety requirements for persons using such substances. Article 17 elaborates on disposal rules to be followed. The IEE process and implementation of the EMP will enable this.	Responsible Authorities: MoAFE and DoE.
24.	National Health Care and Waste Management Guidelines, 2002	Waste generated during construction of distribution lines and substations. The IEE process and implementation of the EMP will enable this.	Responsible Authorities: MoAFE and DoE.
25.	Soil and Watershed Conservation Act, 2039 BS	Applicable as distribution lines near rivers/streams and minor changes to soil during pole foundation and substation construction. The Act outlines the essential parameters necessary for proper watershed management. Section 10 specifies prohibited activities in vulnerable land to landslide, floods, soil erosion or soil cutting. To block or collect in any way the water of any stream, canal, rill, lake or reservoir or ground water or divert the blocked or collected water elsewhere or return the same through a ditch, diversion channel, drainage or in any other manner or use such water in any work by so blocking, collecting, diverting, returning or otherwise. To cut or otherwise destroy any such trees, plants or other forest products as that person may deal with according to his/her will pursuant to the prevailing law relating to forests. To cut or otherwise destroy any existing forests, trees, plants, weeds, grasses or other natural vegetations. To carry out any act causing the collection or dumping of stone, sand mud, etc. or any act causing the collected or dumped stone, sand, mud etc. to be swept away. To dig, excavate or take away stone, sand or other kind of soil. To throw away solid wastes or similar other detritus contaminating the environment or build a site for collecting or keeping such solid wastes or detritus. To establish an industry, business or settlement of habitation. The IEE process and implementation of the EMP will enable this.	Responsible Authorities: Permission from watershed conservation officer, watershed conservation office will be necessary in such conserved watershed areas
26.	Disaster Risk Reduction and Management Regulations 2019	Distribution line works will be in disaster prone areas. The regulations direct on organizations Inclusion on disaster preparedness under Rule 9 sub rules 1,2 and 3. Distribution lines to be climate risk/disaster design.	Responsible Authorities: Karnali Province Government
27.	Ancient Monument Preservation Act 2013	Screening against selection criteria will ensure no subproject distribution lines are situated passing a national protected monument. **If any lines in cultural landscape sites (protected valleys), then it will be confirmed in updating the IEE and the selection criteria may be refined in respect of distinguishing between heritage and cultural landscapes with or without existing power lines already present.** The act also becomes applicable if there are any chance finds of physical cultural resources during pole excavation for construction. This act defines all archaeological objects other than under private ownership is to be under the custody of Department of Archaeology. Destruction, removal, changed, use it in unauthorized way and any type of damage to It Is subject to legal punishment. The IEE process and implementation of the EMP will enable this.	Responsible Authorities: Department of Archaeology
28.	Ancient Monument Preservation Rules 1989	Screening against selection criteria will ensure no subproject distribution lines are situated passing a national protected monument. Otherwise, the act will only become applicable if there are any chance finds of physical cultural resources during	Responsible Authorities: Department of Archaeology

Sl. No.	Name of Policy / Law / Regulation	Applicability to Subproject	Remarks
		pole excavation for construction. Rule 4.1 directs on obtaining permission through application to the Department of Archaeology for installing electricity or any other infrastructure, digging the land for drinking water or sewerage, construct or repair road, celebrate festival and fare, conduct musical dance program, park vehicles, place poster or photograph. The IEE process and implementation of the EMP will enable this.	
29.	Electricity Act 1992	Applicable as 33 kV, 11 kV and 0.4 kV overhead distribution lines will be laid. It is related to surveys, generation, transmission and distribution of electricity. Article 24 states that these activities need to be carried out avoiding substantial adverse impact on environment from soil erosion, flood, landslide, air pollution etc. The IEE process and implementation of the EMP will enable this.	Responsible Authorities: Nepal Electricity Authority
30.	Electricity Rules 1993	Applicable as 33 kV, 11 kV and 0.4 kV overhead distribution lines will be laid. A Right of Way is required for laying new overhead distribution lines. The applicable ROW for 0.4 kV, 11 kV, 33 kV power lines are nil, 5 m and 7 m respectively. Rule 50 and Schedule-13 of the Rule defines the minimum distance to be maintained on either side of the electric wire, transmission and distribution lines and associated safety clearance corridors (double insulator system shall have to be used for installing electric line of more than 11,000 volt across the road in a densely populated area). No electric lines should be carried out above a house, provided that the lines of up to 400/230 volt may be carried out above a garage, cottage, or fence and such electric lines shall be installed at a height which shall not be less than three meters from the highest point of such garage, cottage or fence.. Rule 66 is regarding restrictions on the utilization of buildings and land under power lines (transmission as well as distribution lines). Chapter 6 is assigned to safety provisions for electrical works. The IEE process and implementation of the EMP will enable this.	Responsible Authorities: Nepal Electricity Authority

Source: ADB's TA Consultant

41. The GoN also prescribed standards such as National Ambient Air Quality Standards 2082 BS, National Standards for Sound Pressure Levels, 2012, Emission Standards for Diesel Generators, 2012, Drinking Water Quality Standards, 2006, Nepal Vehicle Mass Emission Standards, 2012, Vehicle Emission Standards, 2012 for in use vehicles, Generic Standard I: Tolerance Limits for Industrial Effluents to be discharged into Inland Surface Waters, 2001. The details of these standards are presented in **Appendix 1**.

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Table 2.2 List of Environmental Consents and Work Permits Required

Sl. No.	Clearances / Permissions / NOC	Authority	Responsible Party	Status as of June 2024
1	Forest clearance and/or no objection for works in community forest a) distribution lines or related facilities in forest land (other than protected forest will only be taken up under the Output 2(iii) distribution components after they have been demonstrated to be compliant with GoN forest legislation. b) for lines or related facilities in community managed forests permission from the community forest user group (or for leasehold or private forest, the applicable user and owner permissions) will be sought.	MoAFE and Provincial DFO/CFUG	NEA	If applicable to be obtained by PMD prior to commencement of work.
2	Tree felling/trimming permissions	MoAFE		To be obtained prior to construction by PMD
3	Consent for works in IP areas	Ward President and Committee		If applicable to be obtained by PMD prior construction works
4	NOC for establishing temporary construction camps (if outside NEA land area)	Karnali Provincial Ministry and District Ward Committee/Local government	EPC Contractor	To be obtained prior to construction by contractor
5	Labor Work Permits	Department of Labour and Occupational Safety		To be obtained prior to construction by contractor
6	Vehicle permits for construction vehicles	Department of Transport Management		To be obtained prior to construction by contractor

Source: ADB's TA Consultant

B. National Health and Safety (Labor) Regulatory Framework and Standards

42. The health and safety framework in Nepal consists of several acts, notifications, rules and regulations as detailed in Table 2.4. The key national authorities are discussed below:

a. **Ministry of Labor and Social Welfare**: Before the establishment of the Ministry, the Department of Labor was established in 2028 BS under the Ministry of Industry to look after labor-related matters. The Ministry has been working for the creation of employment

through dignified and safe management of labor in Nepal, development of skilled manpower required for employment, promotion of social security and occupational health and safety in the field of labor, and prevention of child labor. It is also the responsibility of the Ministry to make foreign employment safe, dignified, and systematic and to promote internal employment through the use of skills, technology, and capital acquired from foreign employment.

b. **Department of Labour and Occupational Safety:** Maintaining the implementation of the law and policy related to the labour by creating secured, decent and healthy working environment for the labour force providing new technology and market in accordance with the national manpower to reduce unemployment. The main objectives regarding labour are as per given below:
   - To eliminate unemployment by preparing skilled and competitive manpower in accordance with the national and international labour market.
   - To provide the labour force with safety and healthy working environment in the industrial occupation and informal region
   - The approach of people falling in the criteria of woman, youth, native, madhesi, muslim and war-effected are ensured in the employment.

c. **Nepal Electricity Authority**: NEA was created on August 16, 1985, under the Nepal Electricity Authority Act. 1984, through the merger of the Department of Electricity of Ministry of Water Resources, Nepal Electricity Corporation and related Development Boards. NEA is responsible to remedy the inherent weakness associated with fragmented electricity organizations with overlapping and duplication of works. Merger became necessary to achieve efficiency and reliable service. The primary objective of NEA is to generate, transmit and distribute adequate, reliable and affordable power by planning, constructing, operating and maintaining all generation, transmission and distribution facilities in Nepal's power system both interconnected and isolated. NEA is also responsible for the enforcement of safety clearances across all types of power line.

43. As defined in the Nepal Electricity Act 2050 BS (1993) under Rule 50 and Schedule-13, minimum distance to be maintained on either side of the electric wire, which in fact defines the RoW for transmission and distribution lines and associated safety clearance corridors (Table 2.3). Rule 66 is regarding restrictions on the utilization of buildings and land under power lines (transmission as well as distribution lines). Rule 68 to 74 are related to safety measures relating to electrical works. Rule 87 is related to compensation for the affected property and Rule 88 is related to the compensation fixation committee. The Output 2(iii) distribution components are required to adhere to the safety regulations and standards as prescribed by the NEA.

Table 2.3 Right of Way (ROW) and Safety Clearances as per Electricity Rules

Parameter	33 kV line	66 kV Line	132 kV Line	220 kV Line
Right of Way (ROW)	7m (3.5m either side)	12m (6m either side)	18m (9m either side)	30m (15 m either side)
Ground Clearances	Minimum 6.1m at the maximum sag condition. • Road - 7m • Power cable with voltage - 3.5m • Communication line crossing - 3.5m • Residential area - 7m • Power line above/ below - 3.5m • Phase to phase - 3.75 m			
Horizontal Clearance	Minimum distance from a tree or a house. • For 230/400 to 11,000 V - 1.25 m • For 11,000 to 33,000 V - 2 m • For more than 33,000 V - add 0.305m for each 33,000V on the above distance			

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Source: Nepal Electricity Rules, 2050.

Table 2.4 Applicable National Health, and Safety Requirements

Sl. No.	Name of Policy / Law / Regulation	Applicability to Project	Remarks
1	Labor Act 2017	This is applicable as all Output 2(iii) distribution components will involve labour and workers. According to this Act - no person shall employ any labour in forced labour, directly or indirectly; no person shall so employ a child in any work as to be contrary to law; no employer shall discriminate any labour on the ground of religion, colour, sex, caste, tribe, origin, language, ideological conviction or other similar ground; no employer shall employ labour to work more than eight hours a day and forty-eight hours a week. According to Chapter 12 Section 69 -the duties of the employer towards the labour in respect of occupational safety and health shall be as follows: (a) to make safe environment for work by making appropriate safety and health arrangements at the workplace, (b) to make provision for the use, operation, storing and transportation of chemical, physical or biological materials or equipment so that it would not adversely affect the safety and health, (c) to provide necessary information, notice and training relating to the safety and health to the labour, as required, (d) to provide necessary training and information in an appropriate language to the labour in relation to the use and operation of the equipment or chemical, physical or biological materials related to the work.	Responsible Authorities: Department of Labour and Occupational Safety
2	Labor Rule 2018	This is applicable as all Output 2(iii) distribution components will involve labour and workers. As per the rule, employers are required to maintain an occupational health and safety policy such as safety and security, health, probable accident in workplace, precautions on handling chemical substance. A Safety and Health committee needs to be formed in entity engaged with more than 20 workers. Environmental cleanliness, passage of fresh air, proper light and temperature, solid waste management, sound control measures, 15 cubic meter space to employees to the extent possible as per the nature of work, healthy drinking water, bathroom or modern toilet, tobacco free zone, mandatory medical checkup for the entities undertaking health hazardous activities are Included. Childcare Center for more than 50 female employees' workplace. Rule 16 states that based on nature of work all workers needs to be clarified on the time table of work. According to Rule 17 women workers having child below three years of age needs to provide feeding site, additionally women pregnant women workers need to be provided additional half an hour of resting time (can be in one slot or divided into different resting slots). Rule 39 elaborates on special provision of health and safety. 39(A) is on protection measures for eyes such as PPE, regular eye checkup for working conditions such as mirror, magnets, plate, iron, concrete, cement, lime, smoky environment, welding etc. activities. 39(B) is on safety working conditions under harmful chemical	Responsible Authorities: Department of Labour and Occupational Safety

Sl. No.	Name of Policy / Law / Regulation	Applicability to Project	Remarks
		substances or radiation needs to have necessary safety measures. For protection with regular health checkup. Rule 39(C) is on safety measures from fire; use of PPE, provision of ample amount of water for extinguishing fire, emergency fire exit with its passage always kept open, fire exit signage (fire alarm/siren), blasting materials, Inflammable substances, or harmful chemicals to be placed away from dense settlement areas and Its transportation or usage to be executed by qualified personnel. Rule 39(D) states that to reduce lethargy in workplace (especially for workers requiring more mental exertion of working with computers) as feasible working environment needs to be created. Rule 46 for a workplace requiring minimum workers of 50 at a time to have resting place, canteen. Rule 49 details on first aid provisions, kits for workers in case of accidents. Rule 50 for information on accident, injury or death to the Labor Office needs to be notified of such incidents within seven days (this does not apply for minor injuries that can be addressed through first aid)	
3	Child Labor (Prohibition and Regulation) Act, 1999	Applicable as it prohibits the employment of children under the age of 14 by the contractors or NEA.	Responsible Authorities: Department of Labour and Occupational Safety
4	Infectious Disease Act 1964	Applicable as influx of laborers for the construction works may lead to transmission of HIV/AIDS and other infection disease. Act aims to prevent transmission amongst workers and protect the rights of the infected. Deals with the responsibility of the employer to maintain machinery and work site in good and safe conditions. The Act deal with any infectious disease which may develop or spread on animal and human beings throughout Nepal. It establishes that the Government of Nepal may take necessary action to root out or prevent that disease and may issue necessary orders applicable to the general public or a group of any persons. The Government may designate any official and confer necessary powers to such official to make necessary arrangements in order to root out or prevent any infectious disease that has been developed or spread or is likely to spread on human beings. Without prejudice to the generality of sub-section (1) or (2), the Government of Nepal may issue necessary orders for the purpose of conducting examination of any animals, birds being transported on foot or by any means of conveyance or of any passengers and holding any passengers by the official designated for examination in quarantine.	Responsible Authorities: Department of Labour and Occupational Safety and concerned authority- Ward/Municipal heads

Source: ADB's TA Consultant

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C. International Agreements Applicable to the Subproject

44. International agreements pertinent to the Output 2(iii) distribution components include multilateral environmental agreements (MEA) and conventions of the International Labor Organization (ILO) related to worker safety and welfare. Nepal is a party and signatory to several international and regional environmental treaties, agreements, and conventions, to which the MoAFE is the national focal point. Table 2.5 provides the key international agreements to which Nepal is a signatory with potential applicability to the Output 2(iii) distribution component.

Table 2.5 List of Relevant International Agreements

Sl. No.	Name	Date of Ratification	Applicability	Remarks
1	Convention on International Trade in Endangered Species of wild Fauna and Flora (CITES 1973)	Accession on 18 June 1975	Risk of illegal wildlife activities by workers outside of working hours.	Deals with protection of endangered species from illegal trade
2	Rio de Janeiro Convention on Biological Diversity, 1992	1994	Some loss of flora and habitat of fauna due to tree felling, RoW clearance is envisaged for distribution lines.	Deals with biodiversity conservation, sustainable usage of natural resources and habitat preservation.
3	Convention on Migratory Species of Wild Animals Bonn, 1979	Signatory October 22, 2008	Ensure potential impacts on any migratory species supported by the subproject area of influence assessed and managed.	Deals with conservation of wildlife and habitats and the conservation of migratory species of wild animals worldwide
4	Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat, 1971	Accession December 17th 1987	Two Ramsar site is present in Karnali Province. One Ramsar site in subproject district planned for Output 2(iii) distribution components. The nearest distribution lines may be about 15 km from the Rara Lake Ramsar Site.	Deals with conservation and sustainable use of wetlands
5	Convention for the Protection of the World Cultural and Natural Heritage, 1972	Acceptance June 20, 1978	The protected areas of Karnali Province include two National Parks and their buffers and two Ramsar Sites and no designated Natural World Heritage Sites although one is on the tentative list. Screening against selection criteria to ensure no Output 2(iii) distribution components are situated within any such sites.	Addresses nature conservation and preservation of cultural properties
6	Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property 1972	June 23rd, 1976	Screening against selection criteria to ensure no Output 2(iii) distribution components are to be situated passing national protected monument. May be applicable if there is an unanticipated impact (chance finds) during project implementation.	The convention defines cultural property as property on religious or secular grounds designated in terms of archeology, prehistory, history, literature, art or science and which belongs to the eleven different categories
7	Basel Convention on The Control of Transboundary Movements of	Accession October 15, 1996	Applicable if transboundary movement of hazardous waste is planned given lack of	This aims to reduce the amount of waste produced by signatories and

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Sl. No.	Name	Date of Ratification	Applicability	Remarks
	Hazardous Wastes and Their Disposal, 1989		waste management facilities within Nepal	regulate the international traffic in hazardous wastes including PCBs which may be present in existing DTRs
8	Stockholm Convention of Persistent Organic Pollutants (POPs) 1972	March 6, 2007	Transformers and other equipment procured must be PCB free. Existing DTRs and other oil containing equipment may be contaminated with PCBs which must be removed by 31st December 2025 to comply with the Stockholm Convention	Lists PCBs as one of the pollutants.
9	United Nations Framework Convention on Climate Change, 1992	May 2, 1994	It is applicable as new equipment such as circuit breakers in substations (associated facilities) may contain sulfur hexafluoride (SF6) although vacuum circuit breakers are planned as an insulating medium.	Deals with reductions of greenhouse gases (GHG) to achieve 1.5°C target.
10	Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997	2005		
11	Paris Agreement under the United Nations Framework Convention on Climate Change,2015	2016		
12	International Labor Organization (ILO) Fundamental Conventions:[6] Forced Labor, Equal Renumeration, Abolition of Forced Labor, Minimum Age, Worst Forms of Child Labor	1966	Construction and operation will involve workers whose fundamental rights per the ILO need to be protected.	Labor laws of Nepal are compliant to the ILO conventions that Nepal is a signatory of.
13	Indigenous and Tribal Peoples Convention 1989 (No. 169) ILO Convention 169	August 22, 2007	Distribution works will be undertaken in tribal/IP areas	To ensure no discrimination against indigenous or tribal people

Source: ADB's TA Consultant

D. Borrower's Environment and Social Policies, Procedures and Capacity

45. NEA is a semi-government entity entrusted to generate, transmit and distribute adequate, reliable, and affordable power by planning, constructing, operating, and maintaining all generation, transmission and distribution facilities in Nepal's power system - both

6 https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:102691

interconnected and isolated. Currently, NEA has no internal environmental and social management system, guidelines, or standards for managing environmental and social impacts of its projects. In case of projects funded by international financial institutions (IFIs), NEA primarily applies the relevant standards of the institutions to guide its approach to managing project safeguards risks. This approach varies from project-to-project based on the requirements of the lending agencies.

46. ADB projects of NEA are managed by the Project Management Directorate (PMD) of NEA. Current capacity of PMD who are dedicated to managing ADB projects of NEA is limited to deal with the environmental and social risks associated with NEA operations. PMD normally sign an MOU with the environment and social studies department (ESSD) of NEA to implement field level environmental and social safeguard monitoring and community development programs. PMD has also established a Social Safeguard and Environmental Management Department (SSEMD) for ADB projects, headed by director level with a few safeguards staff (environmental, social and gender) to support PMD in safeguard compliance and periodic reporting.

E. Asian Development Bank's Safeguards Policies and International Good Practice

47. The ADB SPS 2009[7] broadly consists of three policy components: (i) Environment Safeguards, (ii) Involuntary Resettlement Safeguards, and (iii) Indigenous People Safeguards. The objectives of Environment Safeguards principle are to (i) avoid adverse impacts of projects on the environment and affected people, where possible; (ii) minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and (iii) help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

48. Under SPS 2009 projects are categorized A, B, C according to the likely significance of impacts:

(i) Category A: Projects with potential for significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA) is required.
(ii) Category B: Project with some adverse impacts, but of lesser degree and / or significance than category A. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE) is required.
(iii) Category C: Projects that are likely to have minimal or no adverse impacts. No EIA or IEE required, although environmental implications are still reviewed.

49. To achieve the desired results, safeguard requirements will be incorporated into the process which needs to be realized during the processing and implementation of the projects that ADB shall finance. Table 2.6 presents a comparision and gap analysis of the ADB SPS 2009 for a Category B environment project and Nepal national requirements.

[7] https://www.adb.org/sites/default/files/institutional-document/32056/safeguard-policy-statement-june2009.pdf

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Table 2.6 ADB's SPS 2009 and Government of Nepal environmental requirments gap analysis

Project Stage	Nepal Requirements	ADB's SPS (2009)	Gap Analysis
Screening and Categorization	• Proponent refers to the Environmental Protection Rules (EPR) 2077 B.S., 2020), Schedules 1, 2 and 3 for the required environmental assessment (BES, IEE or EIA) to carry out. • ERP 2020 has defined thresholds for environmental assessment under 3 categories: Brief Environmental Study, IEE and EIA. It has defined the roles of the provincial government and the local government as well in the process of environmental assessment of development projects.	• As per ADB's Safeguard Policy Statement (2009) screening and categorization is required for all projects • Assigns categories based on potential impacts into either: i. Category A - EIA required (significant irreversible, diverse, or unprecedented adverse environmental impacts) ii. Category B – IEE required iii. Category C – no environmental assessment required but a review of environmental implications iv. Category FI – Environmental and Social Management System required	• Based on EPR 2020, 33 kV and below powerline not passing through protected area are exempt from environmental assessment • distribution lines or related facilities in forest land (other than protected forest will only be taken up under the Output 2(iii) distribution components after they have been demonstrated to be compliant with GoN forest legislation . • for lines or related facilities in community managed forests permission from the community forest user group (or for leasehold or private forest, the applicable user and owner permissions) will be sought. • ADB's SPS requirements fulfilment is done with the IEE.
Environmental Assessment	• Based on EPR 2020, 33 kV and below powerline not passing through protected area are exempt from environmental assessment	• Identify potential impacts on physical, biological, physical cultural resources and socioeconomic aspects in the context of project's area of influence (i.e., primary site and related facilities, associated facilities etc.) • Assess potential transboundary and global impacts, including climate change.	• Major gap, ADB SPS requirements fulfilment is done with the IEE.
Analysis of Alternatives	• Based on EPR Rules, 33 kV and below powerline not passing through protected area are exempt from environmental assessment	• Projects with significant impacts are required to carry out alternative analysis. • Alternatives to the project's location, design, and technology are to be examined and rationale for selecting the project location, design, and technology to be documented.	• No gap, as components are unlikely to have significant irreversible, diverse, or unprecedented adverse environmental impacts but consideration has been given to alternatives as part of the environmental assessment.

Project Stage	Nepal Requirements	ADB's SPS (2009)	Gap Analysis
		• Also "no project" alternative must be assessed.	
Environmental Planning and Management	• Based on EPR Rules, 33 kV and below powerline not passing through protected area are exempt from environmental assessment	• Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts • Key considerations include mitigation of potential adverse impacts to the level of "no significant harm to third parties", the polluter pays principle, the precautionary approach, and adaptive management. • Prepare EMP addressing the potential impacts and risks identified by the environmental assessment which should include the proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.	• Major gap, but this IEE including an EMP has been prepared to meet ADB's Safeguard Policy Statement (2009) requirements
Meaningful Consultation	• Based on EPR Rules, 33 kV and below powerline not passing through protected area are exempt from environmental assessment	• Meaningful consultation starts early and continues during implementation phase. It is undertaken in a conducive atmosphere and is inclusive of gender, vulnerable and indigenous groups such that the project incorporates all relevant views and concerns of affected persons and other stakeholders.	• Major gap, ADB SPS requirements fulfilment is done with the IEE.
Information Disclosure		• ADB will post in its website the following: a. Draft IEE prior to appraisal b. Final or updated IEE upon receipt c. Environmental monitoring report submitted by borrowers upon receipt • Local disclosure is also required	• Major gap, ADB SPS requirements fulfilment is done with the IEE.
Grievance Redress	• Based on EPR Rules, 33 kV and below powerline not passing through protected	• Establish GRM to facilitate resolution of grievances or complaints received in the project	• Major gap exists and GRM to be established as per ADB SPS 2009

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Project Stage	Nepal Requirements	ADB's SPS (2009)	Gap Analysis
Mechanism (GRM)	area are exempt from environmental assessment • NEA have hotline for power cut complaints (functional) and website (less functional).		
Monitoring and Reporting	• EPR 2020 requires MoAFE can carry out monitoring and inspection, Likewise Provincial Government or local level may as well carryout similar activities. • However, based on EPR Rules, 33 kV and below powerline not passing through protected area are exempt from environmental assessment	• Borrowers are required to prepare and regularly submit periodic monitoring reports on the progress of EMP implementation to ADB for review and disclosure • Prepare and implement corrective action plan if non-compliance is identified	• Major gap exists in monitoring and monitoring measures will be carried out in accordance to ADB SPS 2009
Biodiversity	• Forest Act and Forest Rules have made provision of compensation for forest and forest land occupied by development projects as an offset for tree loss. • Entry onto the forest for construction works are limited to the certain season of the year and declaration of special protection zone and wildlife corridors are ensured in national acts and well as provincial acts. • National Park and Wildlife Conservation Act protects and prevents hunting of protected species, • Control of International Trade of Endangered Wild Fauna and Flora Act prohibits purchase, selling, use, plantation, rearing, captive breeding, transport, import or export of threatened or vulnerable flora and fauna • Wildlife Friendly Infrastructure Construction Guidelines directs at development of infrastructure to consider incorporating best practices to mitigate adverse impact on wildlife	• ADB's Safeguard Policy Statement 2009 requires that the borrower assess the significance of project impacts and risks on biodiversity and natural resources as an integral part of the environmental assessment process. • It also requires that the assessment focus on the major threats to biodiversity including destruction of habitat and introduction of invasive alien species, and on the use of natural resources in an unsustainable manner • Borrowers are required to avoid, minimize, or mitigate potentially adverse impacts and risks and, as a last resort, propose compensatory measures, such as biodiversity offsets, to achieve no net loss or a net gain of biodiversity. • ADB's Safeguard Policy Statement 2009 also lays down procedures for implementing projects in natural habitats, critical habitats, and Legally Protected Areas	• Natural and Critical Habitat is found outside protected areas in areas that may not have strict monitoring and conservation initiatives hence major gaps major persists and to comply through ADB SPS 2009 EIA has been prepared considering biological Impacts.

Project Stage	Nepal Requirements	ADB's SPS (2009)	Gap Analysis
Pollution	• The Environment Protection Act has made living in clean and healthy environment a fundamental right and directs to provide victim with compensation for damage caused by environmental pollution. • The National Ambient Air Quality Standard have provided nine environmental parameters standards. • Noise quality standards for different types of environments have been specified to be maintained day and night. • Water Quality Standards for Effluent from Industry to surface water, drinking water quality standards have been designated • Acid and Hazardous Chemical Act have been enacted to control purchase, transport, storge and disposal of hazardous substances. Occupational Health and Safety on handling such materials are also mentioned. • Nepal Vehicle Mass Emission Standards are in place to control tail pipe emissions. • Solid Waste Management Act on management and disposal of solid waste generated.	• Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phaseouts. • Refers to WBG EHS Guidelines for international good practice standards and measures for pollution control and prevention. If national regulations differ, more stringent will usually be followed. If less stringent levels are appropriate in view of specific project circumstances, provide full and detailed justification.	• The air quality guidelines for WHO are more stringent than national standards. • The noise standard is similar to WHO but area not receptor based. • No specific provision for soil pollution levels and specific soil quality assessment guidelines • As a compliance for ADB SPS 2009 IEE has been prepared to address pollution
Health and Safety	• Labor Rule, Acid and Other Hazardous Chemical Act, Electricity Rules are some regulatory requirements that have directly expressed directions on health and safety measures.	• Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. • Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities. • Refers to WBG EHS Guidelines for the occupational health and safety guidelines to be followed	• Health and Safety standards reflect that of international practice. National regulation do not have specific provisions for ensuring EMF exposure levels. Gaps on EMF exposure levels and prevention are observed

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Project Stage	Nepal Requirements	ADB's SPS (2009)	Gap Analysis
Physical Cultural Resources	• Protection of national heritages: (1) it shall be the duty of all the concerned agency to protect national heritages. (2) for the purpose of the protection of national heritages, the concerned body shall prepare and maintain an inventory, and such an inventory shall also include the objects or places within Nepal which are listed in the World Heritage List. (3) the objects, places, plants, animals, environment etc., included in the inventory referred to in sub-section (2) shall be protected as prescribed. • In making any road, building, river management or other physical infrastructures, the Government of Nepal may, in coordination with the concerned body and by a notification in the Nepal Gazette, specify any specific area as an open or green area with a view to protecting the environment of such area. (3) Prohibition may be imposed on any such act as prescribed within the environment protection area maintained pursuant to sub-section (1) or open or green area specified pursuant to sub-section (2). • Ancient Monument Preservation Act (DoA is given authority in protection of cultural heritage), Local Administration Act (Chief District Officer) is also given responsibility for heritage conservation and management.	• ADB's Safeguard Policy Statement (2009) states that the borrower is responsible for siting and designing the project to avoid significant damage to physical cultural resources. It requires that such resources that may have direct, indirect, cumulative, and induced impacts are identified and assessed by qualified and experienced experts using field-based surveys. If such resources are impacted consultations with affected communities shall take place to identify the importance and to incorporate the views of the affected communities besides consultations with relevant national or local regulatory agencies. Appropriate mitigation measures ranging from avoidance to full site protection to selective mitigation, including salvage and documentation be provided in case of impacts. • For projects that are located where physical cultural resources are expected to be found as per the environmental assessment, procedures for chance finds shall be included in the EMP and such finds shall not be disturbed until assessed by a competent specialist • Movement of physical cultural resources shall be done only when no alternatives exist, overall benefits of the project substantially outweigh the anticipated cultural heritage loss and the removal is in accordance with relevant national and international laws and uses the best available techniques	• As a compliance for ADB SPS 2009 IEE has been prepared

Source: ADB's TA consultant

50. The project will follow national as well as international good practice guidelines related to EHS, including those set out in the:

a. IFC EHS General Guidelines, 30 April 2007
b. IFC EHS Guidelines for Electric Power Transmission and Distribution, April 2007
c. International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for Limiting Exposure to time-varying Electric, Magnetic, and Electromagnetic Fields (UP to 300 GHz)
d. International Labor Organization (ILO), Safety and Health in Construction, 2022 and worker accommodation guidelines.

51. Section 4 on construction and decommissioning of the IFC EHS General Guidelines (30 April 2007) will be applicable for the distribution component. In addition, the IFC EHS Guidelines for Electric Power Transmission and Distribution (30 April 2007) shall also need to be considered while designing the associated substations and distribution line components and undertaking the environmental assessment. It requires consideration of terrestrial and aquatic habitat alteration, electric and magnetic fields, hazardous materials, occupational health and safety, and community health and safety. The project is required to comply with these guidelines regarding assessment of potential impacts and management measures, performance indicators and monitoring guidelines. NEA shall follow the IFC EHS Guidelines for this project and shall also ensure that all appointed contractors and their subcontractors follow them.

52. The applicable international good practice standards and guidelines from the above-mentioned guidelines are set out in **Appendix 1.** Where international good practice standards or guidelines are more stringent than national, it is the most stringent that applies, unless otherwise justified in this IEE report.

53. ADB's prohibited investment activities list (PIAL) will also apply. Thus, any use of CFCs, PCBs and asbestos containing materials will be prohibited. In relation to child labor, considering capacity for supervision, no workers under 18 years of age will be permitted to work on the construction site or operational areas due to the hazardous nature of work involved.

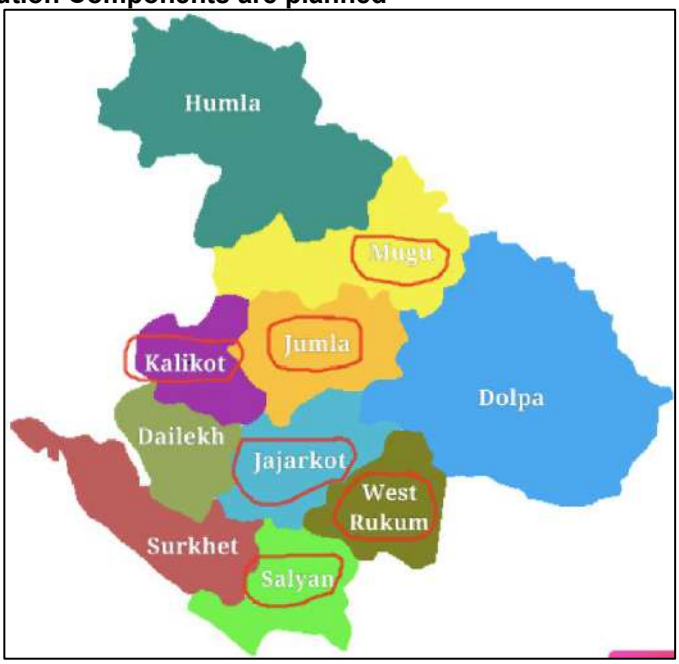
54. **Environmental and Social Standards (ESSs):** Guidance Notes is effective January 1, 2026. ADB has released non-mandatory guidance notes for Environmental and Social Standards (ESSs) to help borrowers, clients, agencies, consultants, and practitioners interpret and apply the Environmental and Social Framework (ESF). For ESS1–ESS10, the notes present policy provisions in grey boxes with clarifying text, while the guidance on financial intermediaries and corporate finance uses a narrative format tailored to Sections J and K of Part IV of the ESF, reflecting its different structure. The ten standards covered are: ESS1 (Assessment and Management of Environmental and Social Risks and Impacts), ESS2 (Labor and Working Conditions), ESS3 (Resource Conservation and Pollution Prevention), ESS4 (Health, Safety, and Security), ESS5 (Land Acquisition and Land Use Restriction), ESS6 (Biodiversity Conservation and Sustainable Natural Resources Management), ESS7 (Indigenous Peoples), ESS8 (Cultural Heritage), ESS9 (Climate Change), and ESS10 (Stakeholder Engagement and Information Disclosure).

III. DESCRIPTION OF THE SUBPROJECT (OUTPUT 2(iii) DISTRIBUTION COMPONENTS)

A. Subproject Components and Locations

55. The Output 2(iii) distribution components are based in Karnali province of Nepal. Karnali province is divided into 10 districts, which are further sub-divided into 25 municipalities and 54 rural-municipalities with 718 wards (works shall be in 6 of these districts). The distribution lines are planned in the Jumla, Kalikot, Mugu, Salyan, Jajarkot and West Rukum districts. The administrative map of Karnali province highlighting districts where works will take place is given in Figure 3.1. Karnali province shares an international border with the People's Republic of China (PRC) in the north. Karnali province shares internal borders with Gandaki province to the east, Sudurpashchim province to the west, and Lumbini province to the south. Among the project districts, Mugu shares an international border with PRC and Sudurpaschim province, West Rukum with Lumbini province, and Kalikot and Dailkh with Sudurpaaschim province.

Figure 3.1 Administrative Map of Karnali Province showing (pink circle) districts where Output 2(iii) Distribution Components are planned



Source: Nepal Gazette

56. The subproject will finance expansion and augmentation of the distribution network by installation of new 11 kV covered conductors (CC) and conversion of existing bare 11 kV lines to covered CC and new 0.4 kV low tension (LT) lines to aerial bundled cable (ABC) and conversion of existing bare LT lines to ABC and installation of 245 DTRs, for capacity enhancement and voltage improvement, and grid extension to bring remaining off-grid electricity consumers (remote villages) in the surrounding area to the national grid. Distribution line installation and rehabilitation including new poles and DTRs will involve civil works in the public domain and may result in potential adverse environmental impacts and risks and are thus considered within the IEE study. The subproject components shall be implemented through EPC contracts awarded by NEA. All

Output 2(iii) distribution component works will be required to follow the EMP for this subproject.

57. Distribution line works under Output 2(iii) compromise of installing and upgrading 1684.86 km of 11 kV and low-tension distribution lines and installation of about 245 related DTRs (Table 3.1). The 11 kV and 0.4 kV LT lines are all falling under the Karnali Provincial Electrical Office of NEA. For the IEE, site visits to sample 11 kV and LT distribution lines were conducted. **Appendix 3** shows sample surveyed distribution lines mapped, approximately 56 km (12%) of 11 kV lines out of a total 463.29 km, and 125 km (10%) of 0.4 kV LT lines out of a total of 1221.57 km of low-tension lines in the six districts.

58. Some of the alignments of the 11 kV lines and LT lines in scope and visited were mapped broadly (area wise) as detailed scope (line wise) is not available from NEA yet. The scope of works includes new 11 kV lines (high tension) using covered conductors and new LT lines using ABC, rehabilitation (moving the existing line from private property or croplands to road sides) of bare 11 kV distribution lines using covered conductors, and rehabilitation and conversion of bare LT to ABC lines plus DTRs. New ROWs are planned for all the three types of distribution lines. Figure 3.2 provides examples of the existing overhead lines (OHL) with bare conductors and ABC in Karnali province.

Table 3.1 Summary of distribution works scope

No.	Scope	District	Municipalities	DTR	11 kV (CC)	LT Lines (ABC)
1	HT and LT Lines Extension	Salyan	Sarada, Bagchaur, Chatreshwori , Tribeni, Kapurkot , Siddhakumakh , Kumakh, Darma and Bangad Kupinde	114	146.59	456.72
2	HT and LT Lines Extension	Jajarkot	Junichande, Kushe, Barekot, Bheri, Chhedegaad	73	197.4	508
3	HT and LT Lines Extension including rehabilitation of Old System	Jumla, Mugu, West Rukum, Kalikot	Chayanath Rara, Mugu Karmarong, Soru, Musikot, Aathabiskot, Chaurjahari, Tribeni, Sanibheri, Bafikot, Khandachakra, Patarasi	58	89.3	226.85
4	Rehabilitation and Upgradation of feeders and LT Lines	Jumla	Chandannath		30	30
			Total:	245	463.29	1221.57

CC = covered conductor; ABC = aerial bundled cable; HT = High tension lines; LT = Low tension lines.
Source: NEA

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Figure 3.2 Examples of the existing distribution lines in Karnali Province

Bare 11 kV Line and DTR in Jumla

ABC LT lines in Kalikot

Bare LT Line in Jumla

Source: ADB's TA Consultant

B. Construction Actitivies having Environmental Impacts

Design Principles and Construction Activities

59. All districts of the Karnali province lie in medium to high risk zone, with earthquakes frequent in Nepal. The last event in Jajarkot district occurred in 2023. Poles of the overhead distribution lines can be toppled due to earthquakes, landslide/mudslide as well as strong winds causing disturbances in the distribution network. New poles and ground mounted equipment shall be installed on foundations having proper seismic design conforming to Nepal National Building Code – NBC: 105:2020 and conform to 7. Summary features of the distribution components

involved with respect to construction are given in Table 3.2.

60. For the distribution line works, once a contractor is selected following ICB tender process, the works on 11 kV and LT overhead distribution lines shall involve detailed GPS survey of existing and proposed line routes, site-specific environmental assessment including ecological surveys of the routes, and design as per Nepal Electricity Regulatory Commissioning Rule 2018 and Electricity Rule 2050 (1993) guidelines and safety clearances, establishment of the construction site, storage area and labor camp, and sourcing of materials and equipment. This will be followed by tree cutting (if applicable) or trimming and clearing of the Right of Way (RoW) wherever required, staged transportation and supply of poles, conductors, and other accessories to the work sites as per the logistics plan of the EPC contractor, , erection of pole structures (single or double) with stays and struts, unrolling of cables, cable stringing, earthing and installation of accessories on the distribution line and finally commissioning when the distribution line will be connected to existing/new transformers at the start and end point.

61. For the 11kV and LT lines, the construction for 1 km new length shall be approximately 30-45 days (approximately 5 days for digging and erection of poles, 5-10 days for the installation of accessories, 20-30 days for stringing and 1 day for commissioning). For the rehabilitation and upgradation of existing 11 kV lines to covered conductor and 0.4 kV lines to ABC, dismantling of existing wooden/steel poles/multi-pole structures and old conductors shall require approximately 5 days besides another 20-30 days for erection to commissioning of 1 km line (total 25-35 days for 1 km). Replacement of conductors on existing poles will be quicker, only 7-10 days for stringing (keeping in mind the complex terrain). To connect to existing transformers, NEA will shut power for consumers during works for approximately 4-6 hours. However, many of the remote villages under the project scope are not electrified so here there will be no power supply to interrupt. Although it will vary depending on the plan of the EPC Contractor, about 10 unskilled and 3-4 skilled laborers shall be required for 1 km of new overhead covered conductor or ABC line which will be installed in a transient manner. If only stringing is needed for rehabilitation and upgradation, only 5-7 unskilled and 2-3 skilled laborers shall be required. However, this may vary as per EPC Contractor's plans.

62. The general steps involved in undertaking the site survey and finalizing the routes are listed below:

- Survey of Right of Way (ROW) - during line survey various types of crossings i.e. road/highway crossing, river/stream, telephone lines, other power lines are to be considered. If possible, highway crossings shall be avoided.
- In finalising the route, the following technical parameters are considered:
    - Shortest route possible.
    - As close as possible to the road for easy approach during the construction and maintenance.
    - Maintain the safety requirements as per regulations and GIIP - all lines included in distribution components to meet horizontal and vertical safety clearances from buildings, crossing other power lines etc.
    - Route should be in the direction of possible future load.
    - Angle points should be less.
- While locating poles on lines, the following general principles are considered:
    - Keep spans uniform in length as far as possible.
    - Locate to have horizontal grade.
    - If locating the poles on high places, short poles can be used to maintain proper ground clearance at the middle of the span. As most of the project area is in complex terrain with unpaved/damaged roads, poles are located on ridges thereby

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increasing the spans without greatly increasing the pull on the conductor. This is possible because the sag can be made very large by maintaining the required ground clearance.

- Poles are to avoid private properties and croplands. The rehabilitation of 11 kV and LT lines under this project will relocate lines in private properties and lands to the roadside.
- Poles should not be placed along the edges of cuts or embankments or along the banks of rivers or streams.

63. **Appendix 2** shows the general arrangements and sample photographs of the existing overhead lines in Karnali province. There may be dense vegetation adjacent to ROWs and so felling or lopping of branches may be required to provide sufficient ROW and access for maintenance. The EPC contractor shall ensure that alignment of distribution lines complies with safety clearances. Temporary pedestrian and traffic diversions at road crossings shall be put in place as per an approved traffic management plan in consultation with NEA. Scaffold and safety net below the distribution lines shall be used whenever conductors are being removed or works are in the settlement areas, across roads, or waterways, or as per the requirement of NEA to manage health and safety risks.

64. The exact number of poles required is to be defined by the EPC contractor based on the type of line (as per NEA approximately 20-25 poles per km for 33 kV lines, 30 poles per km for 11 kV lines and about 25-35 poles per km for LT lines). There shall be minimal excavation and soil removal only for installing new poles. Digging of any foundation pits is done manually using auguring tools, concrete mixture for foundation is cast, and poles are unloaded for erection which is done using chain and pulley blocks. Once the erection is done, the cross arms and pin insulators are mounted, and stringing of new wires is done manually with correct sag.

65. Similar exercise shall be taken where old bare 11 kV and LT conductor lines shall be rehabilitated or upgraded with covered conductors or ABC and for other 11 kV and low-tension lines that will make use of existing poles and for rehabilitation to road sides on new poles. The major difference shall be that all the existing poles (mostly tubular steel and some wooden poles) shall be replaced for the 11 kV covered conductor lines and ABC with galvanized steel poles structures which can bear the higher weight while for other lines they shall only be replaced where required. Major rerouting of the distribution line may be required for lines to be rehabilitated, to avoid sensitive receptors (due to encroachment on vertical and horizontal statutory clearances of the existing lines) or site conditions. If the existing pole is removed, measures will be taken not to damage the pole during removal. They will be removed by pulling the complete structure from the ground; not cut off at the ground level. Pole structure will then be cleaned, and any material attached (including concrete) removed. Unused pits will then be backfilled and compacted completely with enough backfill piled above grade to prevent depressions being created by natural compaction. For new pole/multi-pole locations this is done as for the new lines.

66. As part of the LT line works, there will be the additional installation of new 11/0.4 kV pole mounted distribution transformers. Civil works for the new DTR to include excavation of pole foundations as above. Pole mounted DTRs will be installed on existing/new or double 11 kV line poles (as existing practice of NEA) with transformers mounted on the pole itself (with switch gear and an enclosed control panel).

Table 3.2 Summary construction features of works involved

Key Features and Design		Components/Sub-components
		Distribution Lines
Land ownership and footprint	Permanent works	• Existing distribution line works including poles are mainly following existing alignments, although rehabilitation will move some existing lines/poles from private lands/houses onto road ROWs. Many existing alignments do not comply with safety clearances with poles inside private property. • New ROWs to be created for areas which are non-electrified. • Private land shall be avoided to the extent feasible, but if agriculture fields or other private land is unavoidable, then compensation for structural damage/trees/crops during installation shall be paid at the market value during construction per the prepared RIPP entitlement matrix.
	Temporary works e.g., construction camp, material storage site	• Within the ROW of the distribution line, for day-to-day storage or nearest NEA substation for longer term storage requirements.
Constructio n	Construction method	• Per the construction method statement of EPC contractor. • Manual construction with the involvement of powered mechanical equipment for OHL. • Piling and blasting is not envisaged
Access	Access for construction	• Existing road network is available but many lines are along valley/hills with no direct access. • New/rehabilitated lines shall be aligned mainly along the existing roads for easy access for maintenance. • Many lines are crossing private land, settlements, houses/business without road access.
	Transportation of materials and equipment	• By existing roads as per the logistics plan of EPC contractor. Many of the lines in very complex terrain/remote and roads are completely broken and will require skilled/trained local drivers and 4x4 (all-wheel drive) vehicles in those areas.
Constructio n Plant	Equipment	• EPC Contractor would bring their own construction equipment and machineries including transport vehicles for workers and equipment, heavy materials handling facilities like mobile crane, forklift, etc.
Materials required		•
		•
		•
	Electrical, Mechanical and Instrumentatio n Parts	• Galvanized Steel Tubular Poles - from original equipment manufacturers (OEM) and as approved by NEA. • Conductors - direct from OEM or authorized distributors and as approved by NEA. • Accessories - direct from OEM or authorized distributors as approved by NEA. • DTR to be installed should be certified as PCB free
	Power	• Not required

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Key Features and Design		Components/Sub-components
		Distribution Lines
Other Resources	Water	• EPC contractor will determine if they source canned/bottled drinking water from an existing supplier (as the preferred option) or provide treated water for workers; all drinking water provided will be regularly tested and confirmed to meet Nepal National drinking water standards 2005, if the EPC contractor provides their own supply, permissions shall be obtained from authorities with the agreement of local communities. • Other construction water to be obtained from existing local ground/surface water sources depending on site conditions to be determined by the EPC contractor, permissions for which shall be obtained from authorities with agreement of local communities and ward members.
Labor	Workers camps	• If required, construction labor camps/overnight accommodations near distribution lines to be determined by EPC contractor (land/accommodation availability is scarce in remote areas) • Per design approved by NEA labour camps/accommodation to contain all basic requirements (beds and beddings, mosquito nets, artificial lights, natural lights, windows and ventilation, fans, emergency exits, firefighting equipment, lockers, kitchen and dining halls, mobile charging points, toilets and washing facilities, potable drinking water, recreational space). • Design of labor camps (if required) shall conform to IFC EHS guidelines, ILO's guidance on worker accommodation[8] and regulations of Government of Nepal.
	Construction staffing	• Most of the works required are manual labour with the involvement of powered mechanical equipment • The exact size of the workforce including the number of unskilled, semiskilled, and skilled shall be determined by the EPC contractor based on the project scheduling which shall be approved by the NEA. • Local labor to be used to the extent possible but for working with electricity and at height only suitably qualified and experience labor will be used • Both local and external laborer shall be utilized for which the EPC contractor shall obtain labor licenses and workmen compensation Insurances
Wastes	Specific type of waste generated	• All the old bare conductor lines and any poles or transformers shall be handed over to NEA or transported to designated NEA store/warehouse as per the direction of NEA and not stored along roads.

8 https://www.ilo.org/wcmsp5/groups/public/@ed_emp/@emp_ent/@multi/documents/publication/wcms_116344.pdf

C. Existing Facilities

67. The Output 2(iii) distribution components of the project do not include any existing facilities.

D. Associated Facilities

68. The Output 2(iii) distribution components of the project do not include any associated facilities.

E. Alternatives Analysis

1. No Project Alternative

69. Alternative analysis included consideration of the 'no Output 2(iii) distribution component' option. The 'no project' alternative for the Output 2(iii) distribution component would have no direct negative environmental impacts since no construction works would be involved. However, socioeconomic benefits (especially many of the villages under project area are non-electrified) would not be realized. Many lines/poles will still remain inside private property and croplands if rehabilitation is not taken up. The existing distribution network is aged, overloaded, low voltage due to long distances and remote locations, goes inside settlement areas/private lands and uses antiquated technologies making its operation and maintenance challenging. Further, conversion of existing bare conductors to covered conductors and ABC lines shall also be helpful in reducing existing electrocution risks to both human beings (many reported) and wild animals including avian fauna. Overall, the 'with-project' alternative was preferred over the 'no project' alternative.

2. With Project Alternative

Alternative design, locations and routings

70. Distribution line areas were preliminarily selected by NEA. Since the alignments are yet to be finalized by NEA (individual distribution lines list not prepared by NEA) the assessment is based on indicative route areas and sample survey. It will need to be updated once routes are selected by NEA, before any bidding documents are issued and contracts awarded, and further updated before any works commence.

71. **Existing distribution lines**. The preliminary route selection for rehabilitation/upgradation of the existing 11 kV and LT lines shall be along the existing RoW therefore no alternative analysis of routings needs to be done although minor diversions of overhead lines may be required where lines will be rehabilitated from private lands to road ROWs. For any minor diversions the criteria/principles for new lines will be followed. Reconductoring only involves covered conductors and ABC. No bare lines are planned in favor of covered conductor and ABC.

72. Once NEA have prepared the individual distribution lines list and the contractors are on board, during project implementation site-specific assessment checklist and consultation proformas will be completed by NEA and updated by the contractors for the existing lines, then this IEE and EMP will need to be updated and cleared by ADB with any government clearances or permissions obtained firstly before issue of bid documents and secondly before routings are approved by NEA and works commence. Once the existing distribution lines have been mapped

by NEA and the contractors, any found to not be meeting a criterion will be immediately dropped. For those routed in community forest, critical and natural habitat, site-specific biodiversity assessment and management planning will be undertaken as part of updating the IEE, existing 11 kV and LT lines will then also be dropped if they will result in significant adverse impacts on biodiversity. Similarly, for those mapped in the tentative UNESCO sites or within 500m of nationally protected monuments site-specific physical cultural resources assessment will be undertaken and the lines dropped if they will result in any significant adverse impacts on physical cultural resources.

73. Rehabilitation of existing lines will only be permitted close to if school compounds and playgrounds are not crossed, or minor rerouting takes place to avoid them. Rehabilitation of existing lines and related facilities must minimize damage to existing trees (avoiding cutting of trees) and properties whilst ensuring horizontal and vertical safety clearances are maintained in all cases.

74. **New Distribution Lines.** For new lines, the start and end for 11 kV and LT lines are not yet available. The preliminary route selection for new lines shall be mostly along the existing road RoWs. No bare lines are planned in favor of covered conductor and ABC.

75. As with existing lines once NEA have prepared the individual distribution lines list and the contractors are on board, during project implementation site-specific assessment checklist and consultation proformas will be completed by NEA and updated by the contractors for the existing lines, then this IEE and EMP will need to be updated and cleared by ADB with any government clearances or permissions obtained firstly before issue of bid documents and secondly before routings are approved by NEA and works commence. Once the existing distribution lines have been mapped by NEA and the contractors, any found to not be meeting a criterion will be immediately dropped. Among the indicative lines mapped by NEA and visited, one LT line (Figure 3.4) were passing Rara National Park/Buffer Zone and Ramsar site and were subsequently removed from scope of work following initial screening. For those routed in community forest, critical and natural habitat, site-specific biodiversity assessment and management planning will be undertaken as part of updating the IEE, new lines will then also be dropped if they will result in significant adverse impacts on biodiversity. Similarly, for those mapped in the tentative UNESCO sites or within 500m of nationally protected monuments site-specific physical cultural resources assessment will be undertaken and the lines dropped if they would result in any significant adverse impacts on physical cultural resources.

76. The route surveys shall be conducted by NEA/PMC and the EPC contractors who will be responsible for determining the route alignment (including considering alternative routes) such that the project criteria and route alignment principles are followed. The criteria and principles that have been/will be adopted by NEA for selection of route alignments for the distribution lines are:

CRITERIA

i. No lines that require IEE or EIA under national regulations will be taken up under the Output 2(iii) distribution components[9].
ii. All lines will use only CC or ABC with adequate spacing and insulation of conductors and

[9] For routes with Brief Environmental Study being required due to community forest land NEA will obtain requisite national permissions to undertake works in the forest land before approval of the updated IEE prior to issue of the bid documents.

equipment at the distribution poles in order to prevent the electrocution of wildlife.

iii. Lines and their related equipment in natural habitat will only be installed where site-specific biodiversity assessment demonstrates significant conversion or degradation of natural habitat can be avoided.

iv. Lines and their related equipment in potential critical habitat will only be installed where site-specific biodiversity assessment demonstrates significant adverse impacts can be avoided.

v. No lines or related facilities in the National Parks, their buffer zones, Ramsar Sites, KBA or IBA, forest protection (conservation forests) areas will be taken up under the Output 2(iii) distribution components.

vi. Distribution lines or related facilities in forest land (other than forest protection (conservation forests) areas) will only be taken up under the Output 2(iii) distribution components after they have been demonstrated to be compliant with GoN forest legislation with no objection received from Department of Forests (DoF) and local government.

vii. For lines or related facilities in community managed forests permission from the community forest user group (or for leasehold or private forest, the applicable user and owner permissions) will be sought.

viii. Only 11 kV CC and LT ABC lines following existing power line RoWs without minor diversions, or new lines or minor deviations of existing lines remaining in existing road RoWs, and not requiring new access track construction will be taken up in community (leasehold or private) forest land and only after having first received a written no-objection from the Community Forest User Group or equivalent and only as long as site-specific biodiversity assessment demonstrates that any significant adverse impacts can be avoided.

ix. No lines or related facilities in the nationally protected monument sites of Nepal Department of Archaeology (DoA) or religious forests will be taken up under the Output 2(iii) distribution components, and in the tentative UNESCO sites and at all sites within 500 m of nationally protected monuments no lines or related facilities will be taken up unless no objection has been received from DoA following site-specific physical cultural resources assessment to demonstrate that any significant adverse impacts can be avoided.

x. Lines and related facilities will only be installed where significant damage to local physical cultural resources can be avoided, and physical cultural resources do not need to be removed from their current location.

PRINCIPLES

a. New lines resulting in the significant conversion or degradation of natural habitats as defined by ADB SPS, 2009 or which occur in areas with presence of potential ADB Critical Habitat-qualifying biodiversity and have been demonstrated through a site-specific assessment not to comply with ADB's Safeguard Policy Statement 2009 requirements, shall not be taken up under the Output 2(iii) distribution components.

b. Lines and poles will adopt a "wildlife sensitive design" such that, at the poles, all equipment will be adequately spaced, and live infrastructure insulated in 2m of any earthed infrastructure.

c. New and rehabilitated/upgraded lines must meet all horizontal and vertical safety clearances with minor rerouting of existing lines taking place if it is required, no lines will cross over houses or other regularly occupied properties.

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d. Lines will not be laid across school compounds, playgrounds, or other areas where children as vulnerable members of the community assemble without parental supervision; if adjacent “guarding nets” will be installed.
e. Lines will not be laid across areas where community groups regularly assemble such as the grounds of temples unless it is agreed with the representatives of user groups.
f. Removal or rehabilitation of existing lines must minimize damage to existing trees and properties with “guarding net” put in place during conductor removal.
g. Lines and related equipment must avoid or minimize damage to trees, especially private/community forest user trees, whilst ensuring horizontal and vertical safety clearances are maintained, and before any are cut/trimmed/lopped ensure they are subject to ecological checks for nesting birds etc.
h. Lines and related equipment must avoid or minimize damage to locally important physical cultural resources, property including structures (e.g., buildings) and roads, crops, public utilities, etc. whilst ensuring horizontal and vertical safety clearances are maintained. Any compensation payments for damages to private property must be undertaken by NEA in accordance with the social safeguards entitlement matrix before the works commence.
i. Lines and related equipment must create minimum disturbance to existing pedestrian and traffic routes in terms of blockages or diversions.

Alternative equipment design and construction installation

77. The principle that will be adopted for the selection and design of new equipment is to comply with national requirements as well as considering international good practice per the IFC EHS Guidelines, particularly with respect to avoiding the use of PCB oils in purchase of transformers (in associated facilities) and the use of all asbestos containing materials in new construction.

78. **Distribution Poles.** There are many materials that can be used for distribution poles. This includes wood (some existing in project area), concrete, reinforced concrete and steel poles including tubular and rail poles. Table 3.4 compares the various pole types. NEA shall use galvanized iron tubular steel poles. Since, the use of steel poles increases the risk of electrocution to wildlife compared to the use of wood or cement poles, mitigation measures like bird and wildlife friendly design will need to be adopted to counter this risk. The distribution poles will follow IFC’s bird safety design[10]. The safety principles focus on conductor configuration, insulation, spacing, and equipment placement to prevent birds from simultaneously contacting energized and grounded components.

79. Power poles shall be designed to avoid configurations that place energized conductors in close proximity to grounded structures. Upright pin insulators mounted on steel or concrete crossarms are considered unsafe in the case of the bare conductor because birds perching on them can bridge the distance between the energized conductor and the grounded crossarm with their wings, creating a high risk of electrocution. For this reason, pin insulators on only covered conductors are used,

80. Jumper wire routing is a critical safety consideration. Jumper wires shall be routed below the crossarm wherever possible. Jumper loops routed above the crossarm create hazardous perching locations and increase electrocution risk. If jumper wires must be installed above the crossarm due to design constraints, they shall be fully insulated to prevent direct contact by birds.

81. Adequate physical separation between energized and grounded components is required to account

[10] https://www.ifc.org/en/insights-reports/2026/preventing-electrocution-risks-for-birds-on-distribution-lines

for the wingspan of large bird species. Minimum horizontal clearances of approximately 150 cm and vertical clearances of approximately 100 cm are maintained to prevent birds from bridging gaps while perched or in flight. These distances may be adjusted based on the size of local bird species to ensure effective protection.

82. Retrofitting and maintenance are essential to long-term safety performance. Existing poles may be upgraded with insulator caps, conductor covers, and jumper wire insulation where hazardous configurations cannot be fully eliminated. All insulation materials used in retrofits shall be UV-resistant and compliant with applicable IEC or IEEE standards. Regular inspections are conducted to identify degraded insulation, and replacement schedules are maintained to ensure continued effectiveness.

Table 3.4 Alternatives analysis of distribution poles

Type	Wood	Plain Cement Concrete (PCC)	Reinforced Cement Concrete (RCC)	Tubular Steel	Steel Rail
Material	Usually, seasoned Sal wood	Concrete	Reinforced concrete	Galvanized Steel	Steel
Suitability	Up to 11 kV	Up to 33 kV	Up to 33 kV	Up to 33 kV	Up to 33 kV
Life Span	18 to 25 years	The life span of the PCC pole is more than wooden poles	Longer life than wooden poles but less than steel poles	40 years and can be increased further by painting	40 years and can be increased further by painting
Strength	Not strong as compared to other poles	The tensile strength is higher than wooden poles	Have greater mechanical strength than PCC but less than steel poles	Steel pole has higher mechanical strength than wooden, RCC or PCC poles	The rail pole has high mechanical strength than wooden, RCC or PCC poles
Span	Shorter spans up to 50 m	80-100 m	80-200 m	60 – 80 m	60 – 80 m
Areas used	Used in Karnali (by NEA) and rest of the country (by distribution entities)	Streets of cities	Both in cities and rural areas	Both in cities and rural areas	Overhead lines above the railway tracks
Height	10 m	7 - 8 m	6 – 17 m	7 – 16 m	11 – 13 m
Cost	Maintenance cost of the wooden pole is very high	Less than RCC	High cost of transport and installation	Installation and the cost of the pole are very high	Installation and the cost of the pole are very high
Advantage	• Suitable for lines of the moderate cross-sectional area • Natural insulating property • Such supports are cheap, easily available, provide insulating properties and, therefore, are	• This type of pole can be used for a longer span • Cheaper than other poles • Require little	• The holes in the poles facilitate climbing of poles and at the same time reduce the weight of line supports	• Easy to transport • Normally cast ex situ, thus ensuring good quality control • Higher load-bearing	• Easy to transport • Higher load-bearing capacity than wood poles and RCC poles • Long life span

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Type	Wood	Plain Cement Concrete (PCC)	Reinforced Cement Concrete (RCC)	Tubular Steel	Steel Rail
	widely used for distribution purposes in rural areas as an economic proposition	maintenance. • Good insulating properties	• Require little maintenance. • Good insulating properties	capacity than wood poles and RCC poles • Long life span	
Disadvantage	• Wooden poles generally tend to rot below the ground level, causing foundation failure • Double pole structures of are required to obtain a higher transverse strength and hence non economical • This type of pole is suitable for a shorter span • Difficult to obtain naturally • Pressure on forests and is presently discontinued	• Weigh more than wood and steel poles • Easily breakable	• High cost of transport owing to their heavy weight • Normally cast in situ, thus quality control can be an issue • Requires extra care in handling and erection	• Needs to be painted to avoid corrosion thus increasing cost and weight • Inadequate spacing in cross arms can be fatal to birds who may get electrocuted while trying to perch	• Very high cost • Mainly used in railway crossings • Needs to be painted to avoid corrosion thus increasing cost and weight

PCC = Plain Cement Concrete, RCC = Reinforced Cement Concrete
Source: ADB's TA Consultant.

F. Climate Risk Assessment and Adaptation Measures

83. Nepal is the one of the 20 most disaster-prone countries in the world. The country is exposed to multiple hazards, most prominently earthquakes, floods, landslides, windstorms, hailstorm, fire, glacial lake outburst floods (GLOFs) and avalanches[11]. The key aspects are provided below:

- Global warming in Nepal is projected to be higher than the global average. By the 2080s, Nepal is projected to warm by 1.2°C–4.2°C, under the highest emission scenario, RCP8.5, as compared to the baseline period 1986–2005. The range in possible temperature rises highlights the significantly lower rates of warming expected on lower 21st century emissions pathways.
- Rises in maximum and minimum temperatures are expected to be stronger than the rise in average temperature, likely amplifying the pressure on human health, livelihoods, and ecosystems. Temperature increase is expected to be strongest during the winter months.
- Climate change is already having significant impacts on the environment in Nepal, species' ranges are shifting to higher altitudes, glaciers are melting, and the frequency of precipitation extremes is increasing.

[11] https://www.preventionweb.net/files/50366_50366nepdip003riskhazardandvulnerab.pdf

- Natural hazards such as drought, heatwave, river flooding, and glacial lake outburst flooding are all projected to intensify over the 21st century, potentially exacerbating disaster risk levels and putting human life at risk.
- Modelling has suggested that the number of people annually affected by river flooding could more than double by 2030 as a result of climate change. At the same time the economic impact of river flooding could triple.
- The vulnerability of Nepal's communities, particularly those living in poverty, in remote areas, and operating subsistence agriculture, increases the risk posed by climate change.

84. The Karnali province, named after the Karnali river, annually faces an array of hydro-meteorological and other disasters – floods, droughts, landslides, lightning, and fires. Kalikot district is one of the landslide hazardous districts of Mid-Western Region. Its altitude ranges from 738 to 4,790 meters above sea level. Frequent landslide disasters and land subsidence are common in the district. Out of 30 VDCs in Kalikot district, 14 VDCs are most vulnerable with devastating landslide events in 1996, 2008 and 2010. During 1985 to 2011 (25 years of time), 50 people died, 36 injured, 139 houses destroyed and 155 damaged, with 1510 people relocated in the Kalikot district.

85. **Climate vulnerability of Karnali province**[12]: Among other climate vulnerable sectors of the province, forests are a key climate sensitive sector on which majority of population depends for income and livelihood. Observed phenomenon such as changes in the water discharge of the rivers, torrential rains and flooding with increase in landslides occurrence, droughts, increasing water-poverty and decreasing food-security are challenges in the province's forest sector, all these trends are compatible with climate change effects. The mid hills and mountain districts of the province exhibit high to very high climate vulnerability for the forest and watershed sector. In terms of exposure of forests and watersheds to climate change, the high mountain districts of the province exhibit very high exposure, the mid hill districts exhibit moderate exposure and the lower terai districts exhibit high exposure. Similarly, the physiographic regions of the province represent moderate to very high sensitivity to climate change because of climate-sensitive vegetation types, negative changes in forests and high landslide-prone areas. Mountain distribution component districts (Mugu, Kalikot and Jumla) have very low adaptive capacity in forest, biodiversity and watershed sector, whereas mid hill and inner terai districts (West Rukum, Salyan and Jajarkot) have low adaptive capacity.

86. **Distribution upgradation and rehabilitation**. Increasingly variable weather and potentially stronger storms would affect the integrity of the distribution system and its equipment in various ways:

(i) Strong winds (over 100 km/hour) can damage electric wires and other distribution components (many existing already impacted and damaged based on site visit observations). Distribution infrastructures can also be impacted by landslide (especially in rainy season), stone falls and some through tree damage during strong winds.

(ii) Provided they remain below damage levels, stronger winds cool overhead lines by increasing heat convection. Lines can then carry a larger electric load while staying within temperature limits, which is usually 80°C at conductor surface.[13]

[12] https://www.greenclimate.fund/sites/default/files/document/28220-building-climate-resilience-forest-dependent-communities-through-enhanced-livelihood.pdf

[13] European Commission. 2011. *The Impact of Climate Change on Electricity Demand*.

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(iii) Distribution networks, including DTRs and switching stations, can be affected by heavy snow, ice, and moisture.[14] Line integrity can be reduced[15] due to line sag.

(iv) Distribution lines with capacity constraints can suffer from load management issues, particularly during summers and winters when the demand for cooling and heating are at their peak, decreasing the amount of power that can be delivered through the network.[16]

(v) Distribution infrastructure can suffer from increased risks of flooding, landslides, and other natural hazards, with equipment mounted at ground level in substations especially susceptible.

(vi) High temperature limits the power rating of overhead lines, and transformers but does not cause immediate faults.[17] Network losses can increase by 1% if temperature increases 3°C in a network with initial losses of 8%.[18]

(vii) During extended periods of heat and drought, dust can build up on conductors. Lighting can also affect reliability.[19]

87. The impacts of climate change on the project's Output 2 (iii) distribution components in Karnali province are presented in Table 3.5 whereas adaptation measures for the NEA Output 2 (iii) distribution components are provided in Table 3.6.

Table 3.5 Potential Impacts of Climate Change on Distribution Component

Climate Variable	Impacts	Physical component	Level of Impact
Wind Speed and Storm	Wind and storm damage	Overhead lines Poles	Moderate to high
	Increasing heat convection	Overhead lines	Up to 20% capacity increase for each m/s rise in wind speed
Increasing Temperature	De-rating	DTR	–1% load per 1°C rise
	Decreased conductivity	Overhead lines	Resistance rises ~0.4% per 1°C degree rise –0.5 to –1% line load capacity per1°C rise
	Sag	Overhead lines	4.5 cm per 1°C rise*
Extreme Rainfall/ Flooding	Structural damage	Poles	Up to 100% loss of supply locally
Landslides	Structural damage, Cable breakage	Poles	Up to 100% loss of supply locally

[14] B. Rothstein and G. Halbig. 2010. *Weather Sensitivity of Electricity Supply and Data Services of the German Met Office*. In A. Troccoli (ed.). Management of Weather and Climate Risk in the Energy Industry. Dordrecht (The Netherlands): Springer Science.

[15] World Bank. 2008. *Europe and Central Asia Region—How Resilient is the Energy Sector to Climate Change*. Washington, DC.

[16] World Bank. 2009. *Climate Vulnerability Assessments : An Assessment of Climate Change Vulnerability, Risk, and Adaptation in Albania's Energy Sector. Country Energy Sector Vulnerability Assessments Program.* Washington, DC.

[17] United Kingdom Department of Energy and Climate Change. 2011. Wave and Tidal Energy: Part of the UK's Energy Mix.

[18] J. Neumann and J. Price. 2009. Adapting to Climate Change: The Public Policy Response: Public Infrastructure. Resources for the Future Climate Policy Program. June.

[19] Electric Power Research Institute. 2008. *Joint Technical Summit on Reliability Impacts of Extreme Weather and Climate Change*. EPRI, Palo Alto, CA; NERC, Princeton, NJ; and PSERC, Tempe, AZ: 2008. 1016095.

cm = centimeters, m/s = meters per second
*at conductor surface for 35°C ambient temperature and span of 400 meters
Source: *The Impact of Climate Change on Electricity Demand*.

Table 3.6 Risk and Mitigation Measures for the Output 2 (iii) Distribution Components Design

Climate Change Events	Impacted Project Component	Possible Risks	Adaptation Measures
Increased ambient temperatures	DTR and distribution lines	• Reduced ratings of distribution lines and transformers. • Sagging of distribution lines.	• Reconductoring of distribution lines with larger size conductors. • Improvements in line designs to minimize sags and improved safety.
Increase in precipitation/ flooding and increased isokeraunic level	DTR, and distribution lines	• Damaged pole footings due to soil erosion • Flooding at substations • Increased power outages and downtime due to precipitation and lightening. • Safety clearance issues in power lines. • Increased flood levels in some areas affecting safe clearance with distribution lines. • Sliding away of the supporting soil which might cause the disruption to poles	• Concrete foundations for poles and stays in overhead lines. • Use of polymeric insulators for distribution lines. • Use of covered conductor lines for medium voltage distribution. • Use of insulated cables instead of open wires. • Earthing of pole structures. • Use of outdoor pole mounted type fuse switch disconnectors for low tension ABC line protection. • Installation of auto-recloses and sectionalizes to automatically restore line failures due to transient faults and to isolate sections with permanent faults. • Installation of Fault Passage Indicators in overhead lines for detection and quicker restoration of faulty sections. • Site infrastructure away from heavily wooded areas/rigorously prune trees.
More frequent/ severe extreme events - cyclones, high winds and gust	Distribution lines	• Damaged poles/power lines • Damaged lines and substation infrastructure • Prolonged and costly power outages • Safety issues due to damaged power lines.	• Robust line design for new lines to withstand specified maximum wind and gust (wind zone 6) as per IS 802 – Part 1. • Use of steel poles with heavy grade steel (540 MPa tensile strength) for 11kV distribution lines. • Use of 2 / 3 / 4 poles structures in line design for

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Climate Change Events	Impacted Project Component	Possible Risks	Adaptation Measures
			additional strength and wind stability.

Source: ADB's TA Consultant

IV. DESCRIPTION OF THE ENVIRONMENT

88. To establish the baseline setting of the project's Output 2 (iii) distribution components, desk studies and site visits (reconnaissance surveys) together with secondary baseline data analysis have been carried out for the project area of influence (PAI) of the 11 kV and low tension 0.4 kV distribution lines. Studies and site visits have been confined to the PAI as defined in ADB's SPS, 2009. The general corridor of potential impact was taken as 50m buffer (on either side) along the distribution line alignments, but direct impacts will be confined to the right of way (ROW) of distribution line alignments (ROW for 11kV is 5m and for low-tension distribution lines no ROW is prescribed). However, for internationally and nationally important biodiversity areas or physical cultural resources, those within up to 10km were identified given their greater significance, although they are unlikely to be directly impacted if falling outside the PAI.

89. The baseline setting was established for various environment components, including biology, soils, water, air, noise, socio-economic aspects including occupational and community health and safety, and physical cultural resources. In this section, as the project activities are spread over 6 districts of Karnali province, the setting of the components as well as the general environmental setting of the concerned province is presented. No primary baseline data was collected to supplement the secondary data for the indicative distribution lines.

11 kV Distribution Line Settings

90. The 11 kV distribution line baseline is discussed below based on sample surveys that have been conducted. For the IEE study, site visits (reconnaissance surveys) to sample 11 kV distribution lines were conducted. Approximately 41 km (51%) of 11 kV lines out of a total 463.29 km, in Jumla, Kalikot, Mugu, and Dailekh districts were visited.

- 463.29 km of 11 kV distribution line on covered conductor are planned in the districts of Jumla, Kalikot, West Rukum, Jajarkot, Mugu, and Salyan in Karnail province and shall pass through mostly modified habitats.
- The new lines are proposed to be mostly along the existing alignments of old 11kV/LT lines (which will be dismantled) and will connect into the new DTRs.
- The lines to be rehabilitated will be moved to existing road ROWs where they are passing through private lands/over houses.
- Although no land acquisition is involved for the 11 kV lines, some poles are/will be installed adjacent to houses/private lands.
- Though only indicative alignments of some 11 kV lines are available now, through the application of selection criteria by NEA none of the 11kV lines proposed will be in or pass through protected areas or their buffer zones. Only Mugu and Jumla districts have National Parks and buffer zones/KBA and IBA/Ramsar/Conservation Forests but this needs to be confirmed once routes are determined. Some sections of the Mugu Karmorang 11 kV lines (refer Table 4.3), Kimri, Takha and Karti screened against secondary maps/consultee information available, are passing through buffer zone of newly declared Chayanaath National Park (ward number 2 and 4), ensure Soru ward number 9 Line does not cross into ward number 8 which is buffer zone of Rara National Park. However, Mugu supports KBA/IBA so attention will be needed to ensure all avoid. Likewise, lines in Jajarkot District (Barekot - barekot 05, Barekot - barekot053, Barekot - barekot 052, Line 03 - L1, Line 03 - T3-B1, Line 03 - T3-B2, Line 03 - T3-B3, Line 03 - T3-B4, Line 03 - T3-B5, Line 03 - T2-B1, Line 03 - T1-B1, Line 03 - T1-B2, Line 03 - T1-B3, Line 03 - T1-B4, Line 04 - T2-B1, Line 04 - T2-B2, Line 04 - T2-B3, Line 04 - T1-B1, Line 04 - T1-B2, Line 04 - T1-B3, Line 04 - T3-B1, Line 04 - T3-

-B2, Line 04 - T3-B3, Line 04 - L2, Line 04 - L1, Line 06 - L2, Line 06 - L3, Line 06 - L1, Line 06 - T4-B2, Line 06 - T3-B1, Line 06 - T3-B2, Line 06 - T3-B3, Line 06 - T3-B4, Line 06 - T1-B1, Line 06 - T1-B2, Line 06 - T1-B3 and Line 06 - T1-B4) falls inside the Barekot IBA among these some some are inside the proposed Barekot-Kuse-Mahawai Conservation Area (Barekot - barekot 05, Barekot - barekot053, Barekot - barekot 052, Line 03 - L1, Line 03 - T3-B1, Line 03 - T3-B2, Line 03 - T3-B3, Line 03 - T3-B4, Line 03 - T3-B5, Line 03 - T2-B1, Line 03 - T1-B1, Line 03 - T1-B2, Line 03 - T1-B3, Line 03 - T1-B4, Line 04 - T2-B1, Line 04 - T2-B2, Line 04 - T2-B3, Line 04 - T1-B1, Line 04 - T1-B2, Line 04 - T1-B3, Line 04 - T3-B1, Line 04 - T3--B2, Line 04 - T3-B3, Line 04 - L2 and Line 04 - L1).

- There are no designated UNESCO sites, but two are tentatively listed – Sinja valley in Jumla district and Bhurti Temple Complex of Dailekh district. No sections of any 11kV line is with 2km of tentative UNESCO sites. **If any lines in cultural landscape sites (protected valleys), then it will be confirmed in updating the IEE and the selection criteria may be refined in respect of distinguishing between heritage and cultural landscapes with or without existing power lines already present.**
- Among all the project districts – Mugu, where the 11 kV lines are planned, supports an ecoregion which potentially qualifies the district as Critical Habitat.
- Districts also potentially support some globally-threatened species e.g., Chinese Pangolin, Red Panda, Alpine Musk Deer, Dhole, Steppe Eagle, Red Headed Vulture, Sakar Falcon, Egyptian Vulture and Golden Mahseer
- NEA confirmed that no trees will be felled for the 11 kV installation. Only trimming/looping will be undertaken. If after final route alignment, the laying of these lines may potentially require some felling of trees, especially while installing the distribution poles, then NEA will first, as a principle, try to avoid felling. Tree species observed in the ROW during sample survey were few and included *Quercus sp, Pinus sp, Shorea robusta*, *Zizyphus sp, Albizia sp.,* and others.
- The terrain across which the 80 km of 11 kV lines will pass on covered conductor is all complex terrain across rural areas with remote villages which are not presently electrified (although RoW are present as 11kV lines passes through the areas or in some cases LT for Solar Power is present. Road conditions are very poor and risky to drivers as they are mostly damaged and broken especially on the curves.
- Surveyed lines across all areas were high to severely dust polluted due to wind-blown dust that was observed along unpaved road alignments. Noise was quite low for most lines as they are passing along remote roads and settlements.
- Low volume garbage and wastes were recorded dumped in some alignments.
- Some river/stream crossings were recorded.
- Land use in the PAI mostly includes some natural habitat/forest lands, croplands, settlements and open fields/vaccant lands.
- Many of the existing lines, although along roads, are passing close to entrances/front porch of private properties and houses.
- Many of the existing lines cross the rooftops of houses/shops; there may have been encroachment of properties after the lines that were originally installed by NEA. Some of the 11 kV lines visited were positioned at reduced height over houses and accidents including causalities have been reported. For these overhead lines, vertical and horizontal clearances will need attention.
- Poles inside residential compounds/gardens were observed on some of the lines visited. The rehabilitation scope of project will cater to this and move these lines/poles from private land to road ROWs.
- Multiple road crossings were recorded along existing and new alignments.

- Further baseline details of the sample 11kV distribution lines visited are provided in **Appendix 3** along with maps of the indicative routes in **Appendix 4** and photographs of general arrangements in **Appendix 2**.

Low Tension Distribution Line Settings

91. For the IEE study, site visits (reconnaissance surveys) to sample LT distribution lines were conducted. Approximately 72 km (8%) of 0.4 kV LT lines out of a total of 1221.57 km of low-tension lines in Jumla, Kalikot, Mugu, Salyan and Dailekh districts were visited. The LT distribution line baseline is discussed below based on sample surveys conducted.

- The 1221.57 km of proposed overhead low tension (0.4 kV) distribution line including new ABC lines and rehabilitation of bare line to ABC, are spread across the six districts and pass through mostly modified habitats and settlements but also some natural habitat/forests. These lines shall pass along the existing and new rural roads ROWs, besides many lines passes/will pass through/entering private lands and settlements.
- New lines will be on new alignments along road ROWs to villages without electricity and will spread across the area through hills/valleys.
- Some existing lines to be rehabilitated in settlement areas visited (refer Table 4.2) pass over the rooftops of houses and through gardens/croplands in rural areas; there may have been encroachment of properties after the lines were originally installed by NEA.
- The low-tension lines will start from new or existing 11/0.4 kV distribution transformers (DTRs) and move in various directions across different land uses in the area to supply consumers. Most of these lines have not been mapped, but it has been confirmed by NEA that the selection criteria will be followed, and no LT lines will pass through protected areas and their buffer zones/KBA and IBA/Ramsar/Conservation Forests but this needs to be confirmed once routes are determined. Similarly, the lines will not pass through nationally protected monuments of Nepal Department of Archaeology or religious forest. None of the indicative LT lines (refer Table 4.2) screened against secondary maps/consultee information available, are passing through protected areas or buffer zones or Ramsar site except some sections in Mugukarmorang lines which falls in newly declared Chayanaath National Park's Buffer Zone in Mugu District. However, Mugu supports KBA/IBA so attention will be needed to ensure all avoid.
- There are no designated UNESCO sites, but two are tentatively listed – Sinja valley in Jumla district and Bhurti Temple Complex of Dailekh district. No sections of any sampled LT ABC line is close to or passing through tentative UNESCO sites. **If any lines in cultural landscape sites (protected valleys), then it will be confirmed in updating the IEE and the selection criteria may be refined in respect of distinguishing between heritage and cultural landscapes with or without existing power lines already present.**
- Among all the project districts – Mugu (in and surrounding Rara area), where the LT lines are planned, supports an ecoregion which potentially qualifies the district as Critical Habitat.
- Districts also potentially support some globally-threatened species, Chinese Pangolin, Red Panda, Alpine Musk Deer, Dhole, Steppe Eagle, Red Headed Vulture, Sakar Falcon and Egyptian Vulture, and Golden Mahseer.
- The low-tension lines should not require felling of trees, unless minor rerouting (for the lines to be rehabilitated) to meet safety clearances is needed, as poles that are damaged/wooden are proposed to be replaced in the existing pole location. However, lopping / trimming of branches may be involved.
- The terrain across which the LT lines shall pass is complex terrain across rural and remote areas.

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- Surveyed lines in rural area were moderate to severely dust polluted due to wind-blown dust was observed along unpaved road alignments. Noise was low for most lines as they are passing along road and settlements. Noise was relatively quiet in remote and non-electrified areas.
- Garbage and wastes were recorded dumped in few alignments.
- No river/stream crossing were recorded among those sampled, but as per NEA some LT will cross water bodies.
- Further baseline details of the sample LT distribution lines visited are provided in **Appendix 3** along with maps of the indicative routes in **Appendix 4** and photographs of general arrangements in **Appendix 2**.

A. Province Specific Baseline

1. Biological Setting

92. Nepal is on the first administrative level, divided into seven provinces. Each province is further subdivided into districts and each district is subdivided into municipalities. The Output 2(iii) distribution scope of work will be implemented in Karnali province, which is the largest province in Nepal. Karnali province covers a part of the western Himalaya. The western Himalaya has a drier climate with a preponderance of conifer forests consisting of pine, spruce, cedar and cypress. The entire Himalayan has been regarded as a biodiversity hotspot due to high species diversity, endemism and burgeoning conservation threats (Brooks et al., 2002). Karnali province consists of mountain landscape, with 47% of an area located above 4000 m, which is sparsely settled by humans. Birendranagar, the province headquarters, is situated in the south of the province. The middle part of the province forms spectacular alpine meadows at an altitude between 3500 m and 4500 m. For Output 2(iii) distribution component lines are planned across six districts of Karnali province – Jumla, Kalikot, Mugu, Jajarkot, Salyan and West Rukum. As the routes are not fixed, the baseline for these districts in the context of Karnali province is disused in this section.

a. Protected areas

93. **UNESCO Natural World Heritage Sites:** There are no UNESCO sites in Karnali province; there are no 'natural' sites on the tentative world heritage list. Two Cultural UNESCO tentative sites are discussed in the PCR section of this chapter.

94. **Protected Areas and Buffer Zones:** Clause 3 of the National Parks and Wildlife Conservation Act 1973, empowers the Government of Nepal to establish protected areas (PA) such as strict nature reserves, national parks, wildlife reserves, hunting reserves, conservation areas, and buffer zones within four boundaries in any part of the country through gazette notification. The Act also allows the government to withdraw from the protected areas and to hand over ownership or modify the boundaries through similar notifications.

95. Karnali province covers three protected areas - Shey-Phoksundo National Park (SNP), Chayanaath National Park and Rara National Park (RNP). These three protected areas (Refer Figure 4.2) are administered by the Department of National Parks and Wildlife Conservation, a division of the Ministry of Forest and Environment (MoAFE). These protected areas, including buffer zones, cover 17.23% area of Karnali province. The details of the protected areas in Karnali province is provided in Table 4.1 and maps in Figure 4.2.

96. Under the Buffer Zone Management Regulation 2052 (1996). The fourth amendment of the National Park and Wildlife Conservation Act in 1992 made the provision of buffer zone for protected areas considering buffer zone, an area of 2km in the vicinity of the park could benefit from park revenue (30-50 percent) and in return the community is supposed to participate and assist in park management activities. Between 1996 and 2010 Government of Nepal demarcated buffer zones of 12 protected areas covering a total area of 5602.67 square kilometres in 83 VDCs and two municipalities of 27 districts where benefiting human population is over 0.9 million.

- User means the direct beneficiary people, living in the buffer zone, from forest resources use and the projects to be implemented for the local people's community development.
- Users Committee means the users' committee formed under Rule 8.
- Buffer Community Forest means the buffer community forest handed over to the users' committee under Rule 21.
- Buffer Religious Forest means the buffer religious forests handed over to the religious body, group or community under Rule 22. Wood, firewood located in buffer religious forest can be used only

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in religious events. Provided that tree shall not be cut to be caused negative impact to environment or public damage or soil erosion in the watershed area.

- Buffer Private Forest means the buffer private forests planted in private land within the buffer zone under the Rule 23. The owner of buffer private forest may transport sale or distribute freely the forest resources of buffer private forest in the buffer private forest. The owner of buffer private forest needed to transport, sale or distribute the forest resources of buffer private forest outside the buffer zone should apply with description of species, kind, and quantity of the forest resources to the warden.
- Buffer Zone Forest means the forests under Rule 25 excluding buffer community forest, buffer religious forest and buffer private forest within the buffer zone as prescribed in Section 3a of the Act.

Table 4.1 Protected Areas in Karnali Province

Name and Type and code	District	Area	Year	IUCN Category	Ramsar Site	Biodiversity
Rara National Park Site code: 806 (HMGN/MFSC, 2002	Mugu and Jumla encompassing nine Village Development Committees (VDC)	Rara National Park (106 km2) and buffer zone (198 km2)	Established in 1976; Declaration of buffer zone in the Park in 2006	National Park II, and Buffer zone VI	Rara Lake inside NP	• Twenty-six species of mammals found in the Park are protected by CITES • Eight species of mammals and two species of birds are protected under Appendix I of NPWC Act 1973 • Mammal species symbolic of RNP are the snow leopard (*Uncia uncia*), musk deer (*Moschus chrysogaster*), red panda (*Ailurus fulgens*), and Himalayan black bear (*Ursus selenarctos thibetanus*) • Bird species are the Impeyan pheasant (*Lophophorus impejanus*), Cheer pheasant, Koklas pheasant, White crested kalij pheasant (*Lophura leucomelanos)* and Chukor partridge (*Alectoris chukar*) • Of the six endemic fish species found in Nepal, three species of 'Asala' (snow trout) are recorded only in Rara National Park; they are *Schizothorax macrophthalmus, Schizothorax nepalensis* and *Schizothorax raraensis*.

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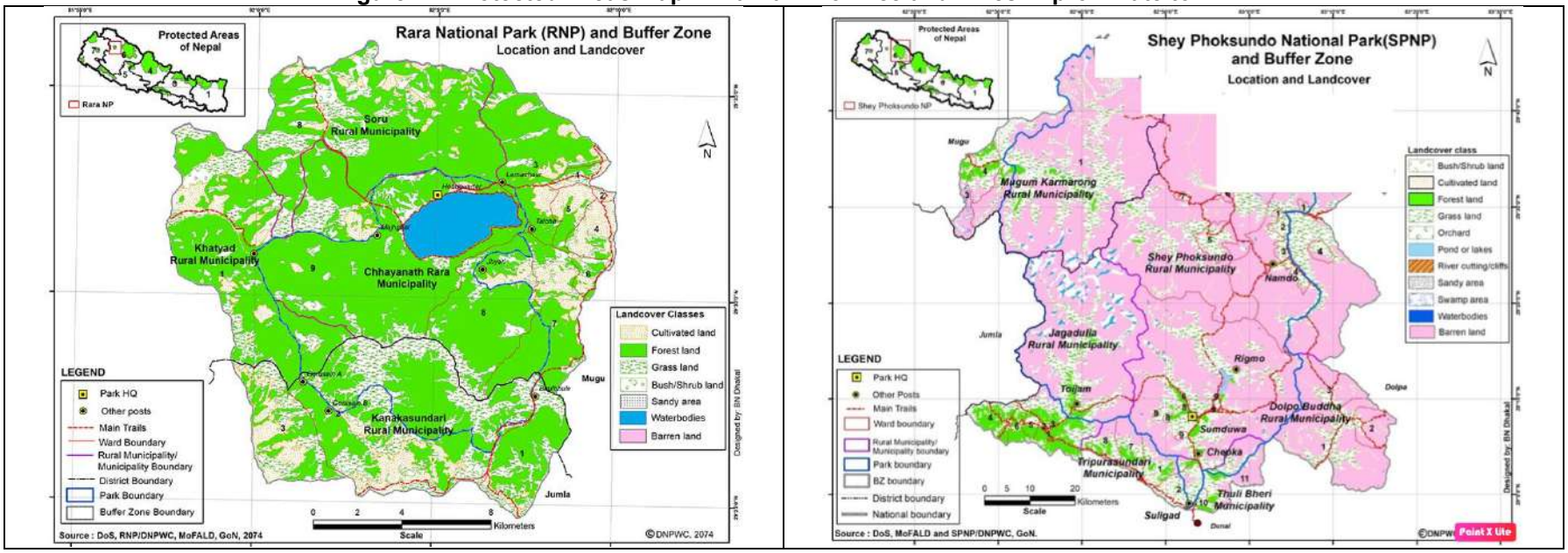
Name and Type and code	District	Area	Year	IUCN Category	Ramsar Site	Biodiversity
Shey Phoksundo National Park Site code: 7952 Site code: 313457 (DNPWC, 2002a	Districts of Mugu and Dolpa encompassing 11 VDCs, with a few VDCs inside the Park area	Shey-Phoksundo National Park (2,712 km2) and buffer zone (1,170.1 km2)	Established in 1984; Declaration of buffer zone in the Park in 1998	National Park II, and Buffer zone VI	Phoksundo Lake inside NP	• Nineteen species of mammals found in the Park are protected by CITES • Ten species of mammals, and two species of birds are classified as endangered and protected under Appendix I of NPWC Act 1973. • Thirty endemic species of flowering plants have been recorded from the Park (Shrestha and Joshi 1996). • The Park supports prime habitat for the highest number of Snow leopard (*Uncia uncia*), Tibetan wolf (*Canis lupus*), Musk deer (*Moschus chrysogaster*), and Blue sheep (Regmi, 2003). • Mammal species symbolic of the Park are the Snow leopard (*Uncia uncia*), Blue sheep (*Pseudois schaeferi)*, Musk deer (*Moschus chrysogaster*), wild dog (*Lycaon pictus*), and Tibetan wolf (*Canis lupus*) • Bird species symbolic of the Park are the Himalayan griffon, White breasted/throated dipper, Monal pheasant, and Cheer pheasant.
Chayannaath National Park	District of Mugu covering Mugum Karmarong Rural Municipality	Chayannaath National Park covers 843km2 Buffer Zone: 177.37km2	Declared in August 29, 2025			

Source: ADB's TA Consultant

Figure 4.2 Protected Areas Map in Karnali Province and Lines in proximate to NP



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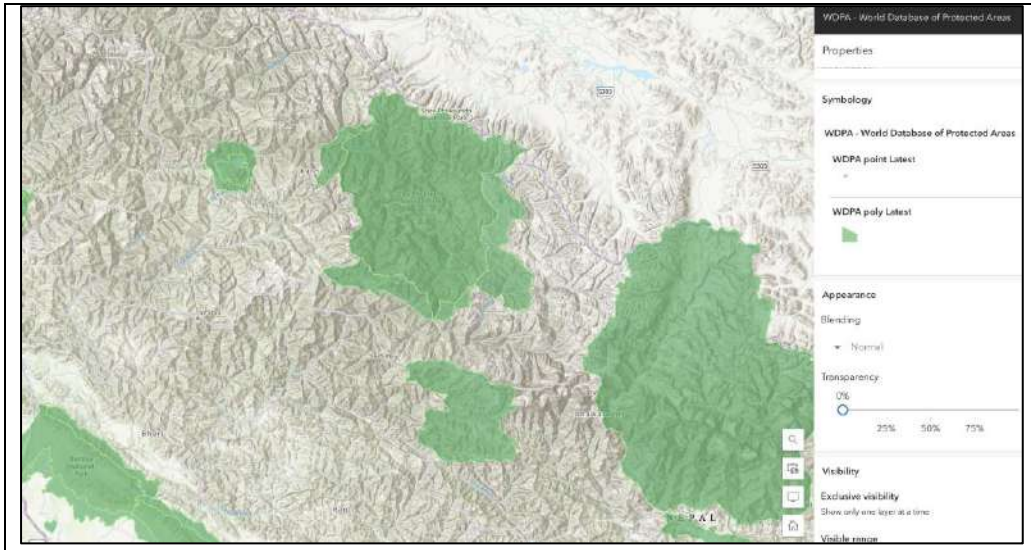
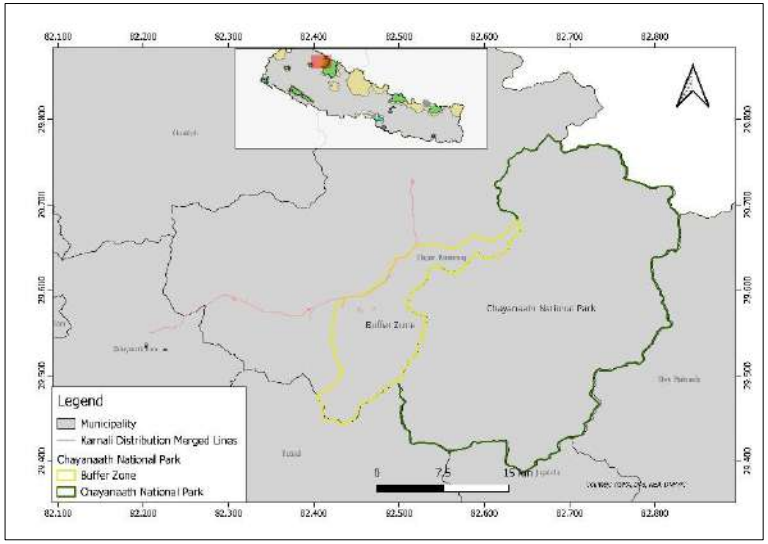


Source: https://www.arcgis.com/apps/mapviewer/index.html and ADB's TA Consultant



b. Forests

97. There are 4483 community forests, 861 leasehold forests, 10 religious forests and one conservation forest in Karnali province (KPPC, 2020).

98. The community forest is a part of government forest, where day-to-day management rests with forest-user communities. This enables communities to make better use of knowledge and needs to promote more efficient, equitable, and sustainable multifunctional landscapes. **The details of community forests need to be obtained in finalizing the IEE so that it can be determined which routes will impact them.**

99. Kankri Bihar Protected Forest, an archaeological site, and adjoining areas covering an area of 175.5 hectares, is the only protected forest located in Karnali province and the first one in Nepal. It was established on May 13, 2002, to protect the archeological site and promote the ecotourism. Kankri Bihar PF is in Surkhet district where no distribution lines are planned.

100. A great variation in topography and climate makes Karnali province a unique region that comprises of various vegetation types, including tropical lowland forest (*Shorea robusta*), temperate oak forests and conifers in the mid-hills to dwarf rhododendrons and alpine meadows in the higher regions (MoFSC, 2014). The vegetation of Nepal has been classified differently by different researchers (Dobremez and Shakya, 1975; Stainton, 1972). Stainton (1972) delineated phyto-geographic boundaries based on climate, vegetation and floristic composition and classified the Nepal's forest into 35 types. Dobremez et. al (1972) identified 118 ecosystems and classified Nepal into 4 domains and 11 sub-levels based on following bio-climatic zones:

- Tropical (below 1,000 m altitude)
- Sub-tropical (1,000 m to 2,000 m),
- Temperate (2,000 m to 3,000 m),
- Sub-alpine (3,000 m to 4,000 m),
- Alpine (4,000 m to 5,000 m),
- Nival (above 5,000 m).

101. **The alpine zone**: This is characterized by open grassland consisting of sedges and grasses, including colorful alpine flowering plants belonging to the families of Primulaceae, Ranuculaceae, Rosaceae, Gentianaceae, Polygonaceae, Campanulaceae and Saxifragaceae etc. The alpine region of Karnali province is dominated by the xerophytic/mesophytic patchy vegetation as compared to the central and eastern Nepal. *Caragana* sp. and *Astragalaus* sp. occur abundantly forming a mat/cushion. Plants of high medicinal value (Aconitum, Nardostachys, Sedum etc.) are also found here.

102. **The Sub Alpine region:** This is distributed between the upper limit of tree vegetation (e.g., timberline) and region that supports silver fir (*Abies spectabilis*). This zone is known for birch and fir including several species of rhododendrons.

103. **The Temperature Zone**: This is an intermediary region between the sub-alpine zone at a higher elevation and the sub-tropical zone toward the foothills and the midhills. This zone is rich in forest ecosystems and dominated by both conifers and broadleaved species. Rhododendrons, maples and laurels are important associates. This zone lies between 2000 m-3000 m where the upper region (2500 m-3000 m) is dominated by khasru oak, and the lower region (2000-2500m) is consisting of several species of oaks.

104. **The Subtropical Zone**: This zone lies at an altitude between 1000m and 2000 m. This

bioclimatic zone is warm, sub-humid to humid. Geographically, it covers parts of upper portion of Siwalik, lower portion of Himalayan range and middle portion of the Mahabharat range. The Tropical zones extends throughout the Terai, the Bhabar and flat floors of Dun valleys. Besides, low lying river areas in the midlands and Himalayan mountains correspond to this ecological zone.

105. The forest map of Karnali province is provided as Figure 4.3.

Table 4.2 Forest Area Statistics of Karnali Province – Output 2(iii) distribution component districts

District	Administration	Name	Total Area	Forest Area	Forest Percent
			In ha.	In ha.	In %
Jajarkot	Rural Municipality	Barekot	57526	33734	58.6%
		Junichande	34472	22320	64.7%
		Kuse	27285	20409	74.8%
		Shiwalaya	13367	7726	57.8%
	Municipality	Bheri	21888	11843	54.1%
		Chhedagad	28299	15402	54.4%
		Tribeni Nalagad	38599	21834	56.6%
Jumla	Rural Municipality	Guthichaur	42541	20386	47.9%
		Hima	13175	7653	58.1%
		Kanakasundari	22444	15458	68.9%
		Patrasi	81105	27961	34.5%
		Sinja	15263	9393	61.5%
		Tatopani	52341	24025	45.9%
		Tila	17474	10308	59.0%
		Chandannath	10162	5228	51.4%
Kalikot	Rural Municipality	Kalika	9685	7416	76.6%
		Mahawai	32065	24747	77.2%
		Naraharinath	14316	10364	72.4%
		Pachaljharana	16615	10582	63.7%
		Palata	31741	24845	78.3%
		Sanni Tribeni	13604	9332	68.6%
	Municipality	Khandachakra	13266	7642	57.6%
		Raskot	5945	2470	41.5%
		Tilagufa	26139	16910	64.7%
Mugu	Rural Municipality	Khatyad	27988	19551	69.9%
		Mugum Karmarong	209952	40968	19.5%
		Soru	36424	26500	72.8%
	Municipality	Chhayanath Rara	47874	31609	66.0%
Rukum West	Rural Municipality	Banfikot	18972	10548	55.6%
		Sani Bheri	13328	5379	40.4%
		Tribeni	8519	4474	52.5%
	Municipality	Aathbiskot	55835	34568	61.9%
		Chaurjahari	10694	3927	36.7%
		Musikot	13559	5821	42.9%

Source: DFRS, 2018. Forest Cover Maps of Local Levels (753) of Nepal. Department of Forest Research and Survey (DFRS), Kathmandu, Nepal.

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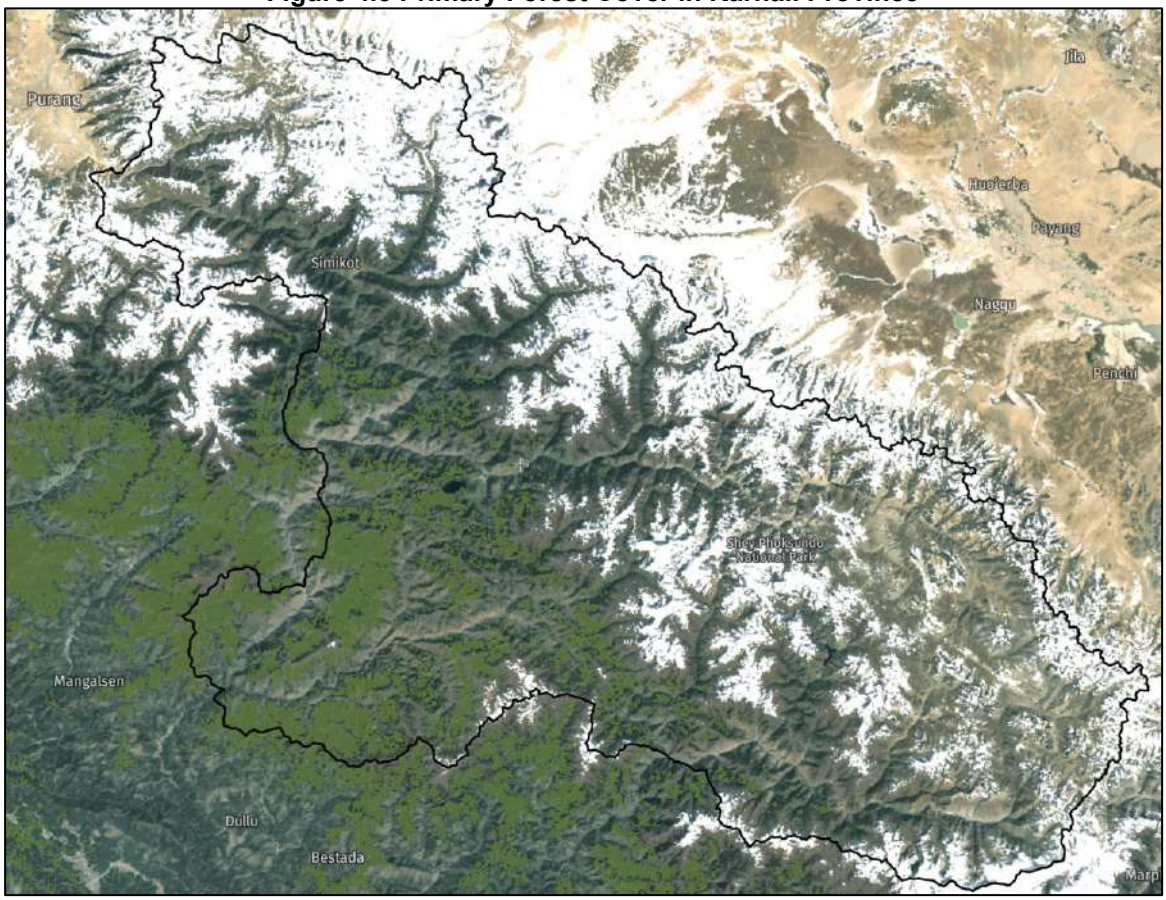
Figure 4.3 Primary Forest Cover in Karnali Province



Source: https://www.globalforestwatch.org/map/country

c. Rangelands

106. Grasslands, pastures and scrubland are commonly and collectively referred to as rangelands. Rangelands include tropical savannah, temperate grasslands, and subalpine and alpine meadows, and are critical biodiversity repository and resources for people's livelihoods. Grassland covers nearly 12% of Nepal's total area, much of them (70%) are found in the western Nepal. Karnali province covers a disproportionately high proportion of high-altitude rangelands. These rangelands serve water sources to downstream, and support people who rely on animal husbandry for livelihoods. The higher elevation belt (3800 − 4200 m) is the richest in endemic flowering plants (Tiwari et al., 2019). However, most of the rangelands are being degraded rapidly due to infrastructure development and over exploitation. Alpine rangelands are also being desiccated due to rapidly changing climate (Miller 1993). Some of the notable rangelands of Karnali province include:

- Guthi Chaur: This is a large meadow in the southern Jumla, famous for sheep pasture.
- Kuse-Junichade and Barekot pastureland: These stunning rangelands in northern Jajarkot are rich in wildlife population and medicinal plants.

d. Wetlands

107. Karnali province is rich in wetlands and includes two Ramsar sites: Phokshundo Lake and Rara Lake. Phokshundo is the deepest and Rara is the largest lake in Nepal. The province has an extensive network of water tributaries that feed mainly three rivers: Karnali, Bheri and Babai.

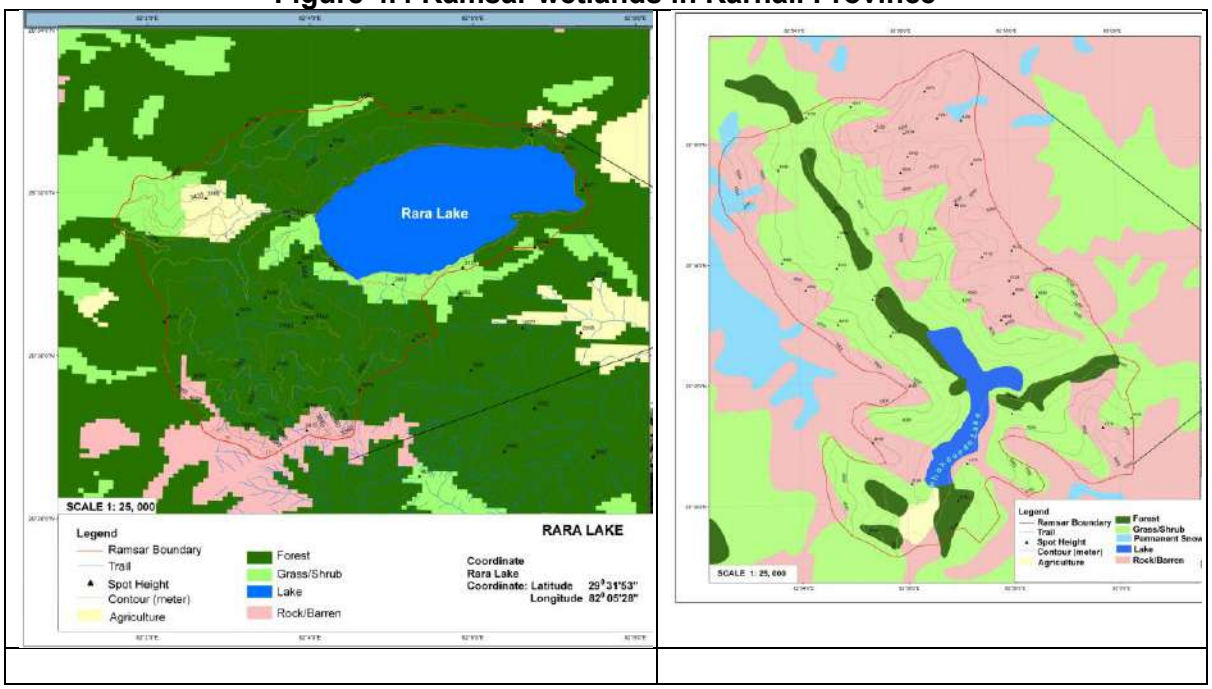
108. Ramsar, identifies wetlands of international importance, especially those providing

waterfowl habitat. Ramsar aims to promote conservation and wise use of wetlands through local and national actions and international cooperation. A total of 10 wetlands of Nepal have been listed as Ramsar sites. Karnali province covers 2 out of 10 Ramsar sites of Nepal: Phokshundo lake and Rara Lake. Both of them are situated within the national parks. The Ramsar maps are shown as Figure 4.4.

109. Phoksundo Lake is situated within Shey Phoksundo National Park. It occupies 494 ha and was designated as Ramsar site on 23rd September 2007. The lake is a source of freshwater for downstream, with a waterfall (167m) located 500m from the lake. The lake, alpine meadows and bogs provide habitat for several rare and vulnerable plants and animals, including the Snow Leopard (*Uncia uncia*), Musk deer (*Moschus chrysogaster*) and Grey or Tibetan Wolf (*Canis lupus*). The site has a great cultural and religious importance.

110. Rara lake is the largest lake in Nepal and is situated within Rara National Park. The lake is famous for clear waters and the panorama of the surrounding mountains. The lake and surrounding area have unique assemblages of flora and fauna, including endemic and globally threatened species. The lake is home to three endemic fish species (*Schizothorax macropthalus, S. nepalensis,* and *S. raraensis*).

Figure 4.4 Ramsar wetlands in Karnali Province



Source: https://rsis.ramsar.org/RISapp/files

e. Internationally Recognized Areas

111. **Ecoregions:** Karnali province consists of five ecoregions (Figure 4.5): (a) Himalayan subtropical broadleaf forest, (b) Himalayan subtropical pine forests, (c) western Himalayan broadleaf forests, (d) western Himalayan subalpine conifer forests and (e) western Himalayan subalpine scrub and meadows. Rock and ice areas cover a small area of the province (3%).

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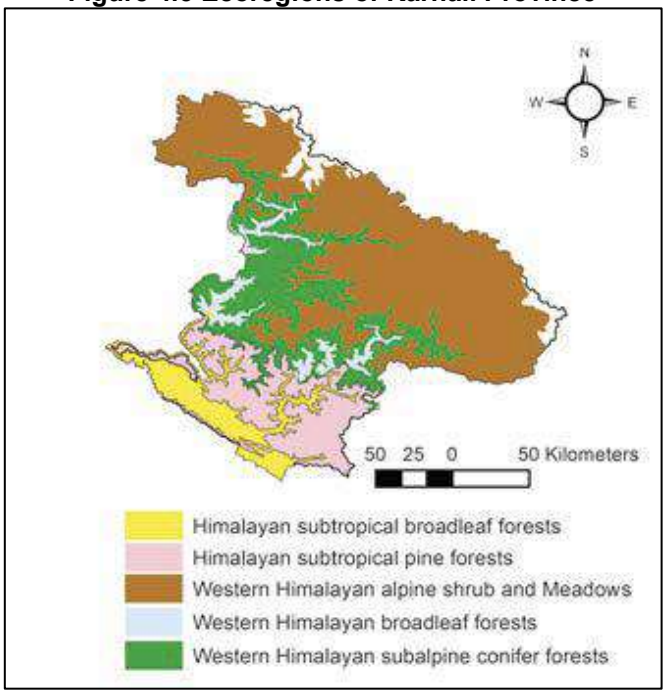
Figure 4.5 Ecoregions of Karnali Province



Source: https://www.researchgate.net/figure/Ecoregions-in-Karnali-province_fig4_346424393

112. **Important Plant Areas and Non-Timber Forest Product:** Hamilton and Radford (2007) determined 54 important plant area complexes in Nepal, which include 230 IPAs. IPAs are sites of international significance for the conservation of global plant diversity based on three standard criteria: the presence of threatened species, species richness and the presence of threatened habitats. Karnali province[20] overlaps with 10 IPA (2 IPA in Jajarkot and Rukum – Upper Bheri and Rapti; 3 IPA in Dailekh, Surkhet and Dailan – Lower Bheri and Rapti and 5 IPA in Humla, Jumla, Mugu, Dolpa, Kalikot – Karnali IPA) complexes and harbors at least 48 IPAs, which make up nearly 21% of IPAs determined in Nepal.

113. **Botanical Garden:** Karnali province has two botanical gardens: (a) Mulpani Botanical Garden, Salyan, established in 1998 (Non project district) and (b) Dhitachaur Botanical Garden, Jumla (about 300m from neraest Jumla LT line), established in 1998. In this garden, 47 economically important plants are conserved, including many other high Himalayan species.

114. **Key Biodiversity Areas and Important Bird Area (KBA and IBA):** Karnali province has three KBA and IBAs: Rara National Park (Mugu and Jumla districts), Shey-Phoksundo National Park (Mugu and Dolpa districts), and Barekot (Jajarkot district). The sites (Refer Figure 4.6) qualify as a KBA of international significance because they meet one or more previously established criteria and thresholds for identifying sites of biodiversity importance (including Important Bird and Biodiversity Areas and Alliance for Zero Extinction sites). IBA is an area of high conservation significance for birds.

[20] https://www.researchgate.net/figure/Important-Plant-Areas-IPAs-of-Nepal_tbl4_339720026#:~:text=View-,...,%5D%20%5B35%5D%5B36%5D.

Table 4.3 Internationally-recognized areas overlapping, or falling within, Karnali province

Name of KBA/IBA	Type	Also a protected area (PA)	Critical Habitat-qualifying site as a KBA	Biodiversity
Barekot	IBA	No	Yes	Birds: Also home to various endangered avian species, such as the Cheer pheasant (*Catreus wallichii*), Red-headed Vulture (*Sarcogyps calvus*), and Egyptian Vulture (*Neophron percnopterus*); the nationally threatened Satyr Tragopan (*Tragopan satyra*), Bearded Vulture (*Gypaetus barbatus*), Himalayan Griffon (*Gyps himalayensis*), and Brown Fish Owl (*Bubo zeylonensis*); and the Himalayan Monal (*Lophophorus impejanus*)Barekot is home to many threatened species, including the Himalayan red panda (*Ailurus fulgens fulgens*), Himalayan black bear (*Ursus thibetanus*), musk deer (*Moschus spp*.), northern red deer (*Muntiacus vaginalis*), Himalayan tahr (*Hemitragus jemlahicus*), common goral (*Naemorhedus goral*), Himalayan serow (*Capricornis thar*), and blue sheep (*Pseudois nayaur*).[21]
Rara National Park	KBA, IBA criteria met: A1, A2, A3 (2005	NP	Yes	Birds: the national park could be especially important for Cheer Pheasant, a globally threatened and restricted-range species; a survey for the species in the park is being carried out in spring 2005 (Budthapa in prep.). The park is also important for White-throated Tit and Kashmir Nuthatch, two other restricted-range species from the Western Endemic Bird Area, which are both resident in the park. The lake is a valuable staging post for migrating wetland birds; around 40 species have been recorded so far, although only small numbers are involved. Rara National Park has large temperate forest and alpine zone areas. These support significant populations of characteristic species of the Sino-Himalayan Temperate Forest and Eurasian High Montane biomes respectively. Non-bird biodiversity: Globally threatened mammals include the Red Panda *Ailurus fulgens*, Asiatic Black Bear *Ursus thibetanus* and Himalayan Musk Deer *Moschus chrysogaster* (Hilton-Taylor 2000). The lake has some endemic fish species
Shey-Phoksundo National Park	KBA, IBA criteria met: A1, A2, A3 (2005)	NP	Yes	Birds: it is important for its populations of Kashmir Nuthatch and White-throated Tit, two restricted-range species from the West Himalayan EBA. The globally threatened Wood Snipe has also been recorded in the breeding season. A total of 178 species has been found (Prieme and Oksnebjerg 1995), but the park is very under-recorded. There are large temperate forest and alpine zone areas that support significant populations of

[21] https://austriaca.at/0xc1aa5576%200x003d81c6.pdf

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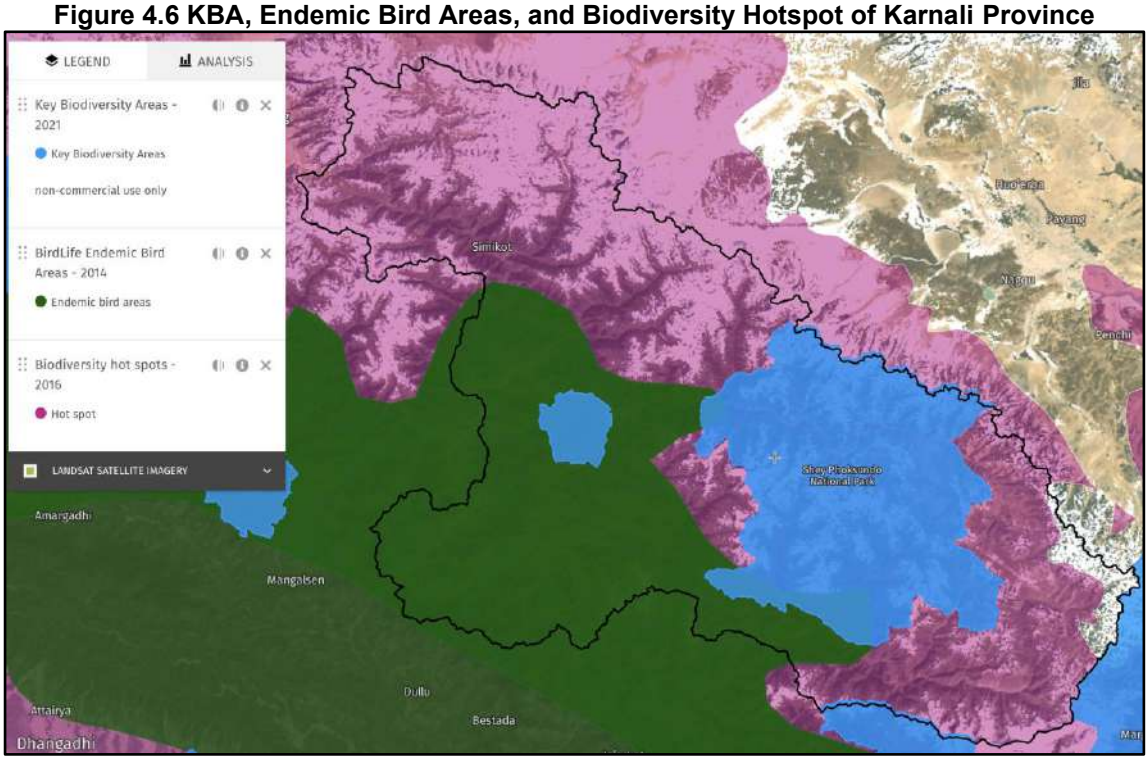
Name of KBA/IBA	Type	Also a protected area (PA)	Critical Habitat-qualifying site as a KBA	Biodiversity
				characteristic species of the Sino-Himalayan Temperate Forest and Eurasian High Montane biomes respectively. Non-bird biodiversity: Several globally threatened mammal species are found here including Asiatic Black Bear *Ursus thibetanus*, Bharal *Pseudois nayaur*, Grey Wolf *Canis lupus*, Himalayan Musk Deer *Moschus chrysogaster* and Snow Leopard *Uncia uncia*. The park is especially important for the population of Snow Leopard and its prey species.

Source: ADB's TA Consultant, Birdlife International and https://www.keybiodiversityareas.org/sites-table

Figure 4.6 KBA, Endemic Bird Areas, and Biodiversity Hotspot of Karnali Province



Source: https://www.globalforestwatch.org/map/country/NPL/4/2

115. **Modified and Natural Habitat.** Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition. Land use within a 50m PAI of sample lines visited is a mix of natural habitat like native forests, valleys, etc and modified habitat like rural and remote settlements, agricultural land, uncultivated land, etc. For the sake of this assessment, areas of dense vegetation and water bodies were considered as Natural Habitats (NH). In all the 6 districts, based on visual assessment during site visits, the NH in the PAI is about 30-40%.

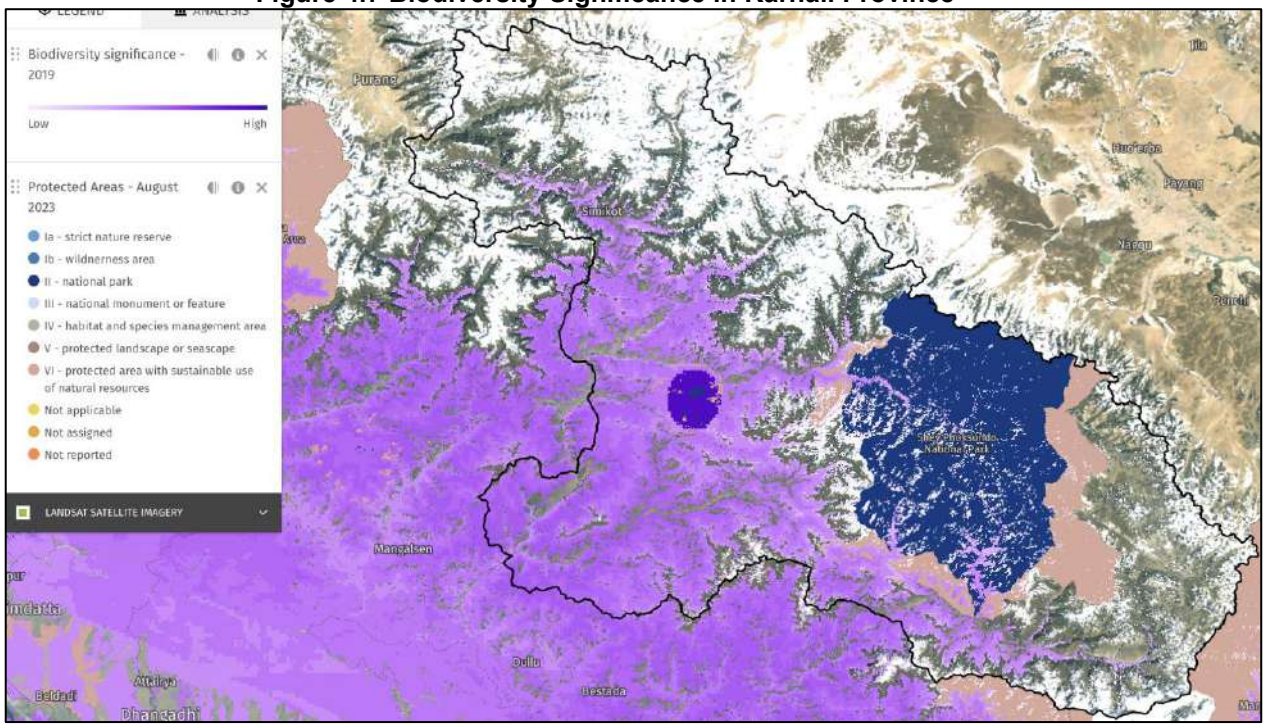
116. **Critical Habitat (CH).** A detailed Critical Habitat Assessment (CHA) screening has not been conducted given limited information on the distribution lines (it will need to be considered in updating the IEE once NEA has prepared the list of distribution lines) but the potential to trigger critical habitat has been considered. Based on secondary analysis, critical habitat

assessment undertaken for the transmission line component in Karnali province (but not covering all six districts), and discussion with NEA officers, Divisional Forest Officers and locals, some of the lines may pass through critical habitats, outside nationally protected areas and conservation forest which would automatically be Critical Habitat. As such, these areas do not automatically qualify as Critical Habitat, following IFC (2019) but may qualify for the flora and fauna species they support.

117. The Mugu district where lines are planned, houses part of the Rara National Park and the Chaynaath National Park, both KBAs/IBAs, and include the Ramsar wetlands, which all qualify as Critical Habitat. The Jumla district, which will also have lines, includes part of the Rara National Park Buffer Zone. Overall, it has been confirmed that by following selection criteria no lines will be in National Park, Buffers Zones, KBA/IBA, or Ramsar site that may trigger ADB's Category A for environment.

118. The biodiversity significance map is provided as Figure 4.7.

Figure 4.7 Biodiversity Significance in Karnali Province



Source: https://www.globalforestwatch.org/map/country/NPL/4/

119. **Flora and Fauna.** Critical Habitat-qualifying globally threatened biodiversity identified via IBAT[22] (IBAT: www.ibat-alliance.org) and other Government of Nepal reports/literature[23] as actually or potentially present within the six districts has been considered. Karnali province supports a high proportion of Nepal's mammals (42%), birds (46%), reptiles (11%), amphibians (43%), fishes (32%) and butterflies (22%). The province is exceptionally rich in medicinal herbs and supports many globally threatened flora and fauna. The province is also an ethnically, culturally, and linguistically rich region. A species of special conservation concern (SSCC) is a plant or animal species which is either (a) poorly known (e.g., data

[22] The World Database on Protected Areas (WDPA) is a joint project between UN Environment Programme and the International Union for Conservation of Nature (IUCN), managed by UN Environment World Conservation Monitoring Centre. Data for the WDPA is collected from international convention secretariats, governments, and collaborating NGOs. The WDPA uses the IUCN definition of a protected area as the main criteria for entries included in the database.

[23] Acharya, K. P., Paudel, P. K. (2020). Biodiversity in Karnali Province: Current Statusand Conservation. Ministry of Industry, Tourism, Forest and Environment, Karnali Province Government, Surkhet, Nepal

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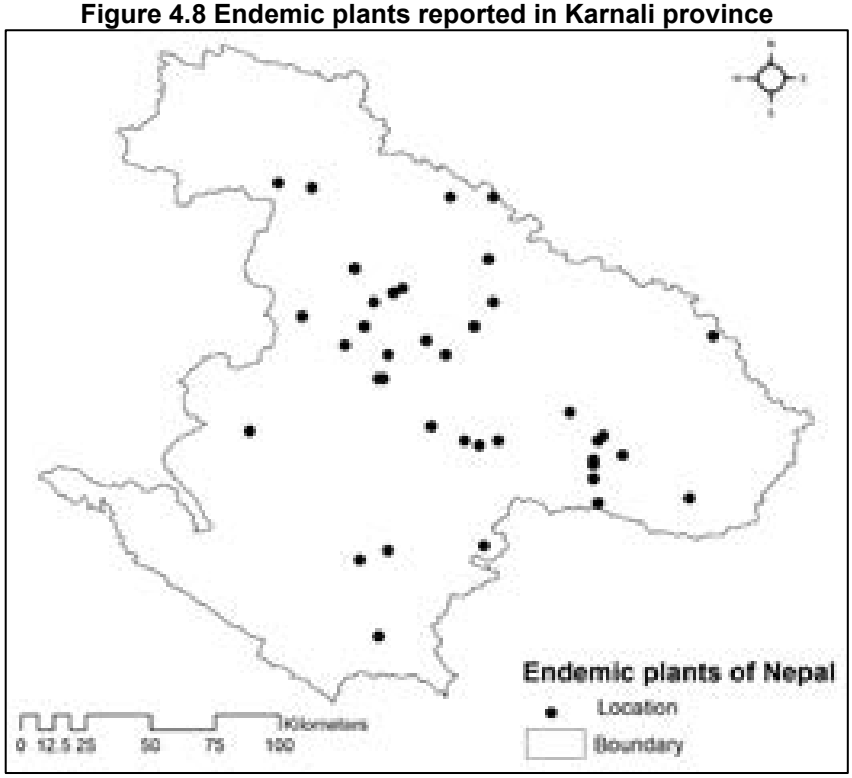
deficit), or assessed as being threatened (critically endangered, endangered and vulnerable) in both global and national assessments, or (c) restricted in small area of the Karnali province[24].

120. **Endemic floral species**: Tiwari et at. (2019) reported 47 endemic species from 8 districts of Karnali province where Dolpa and Jumla districts share more than half (55%) (Figure 4.6). These endemic species represented 21 families, and most of them came from Papaveraceae, Fabaceae, Asteraceae and Poaceae. The known endemic plant areas in Karnali are provided in Figure 4.8 and key floral species provided in Table 4.4. Their distribution will need to be mapped in updating the IEE once NEA has prepared the list of distribution lines.

Figure 4.8 Endemic plants reported in Karnali province



Source: Tiwari et at. (2019)

Table 4.4 Plant species of special conservation concern in Karnali Province

Scientific name	IUCN Category
Ulmus wallichiana	VU
Dalbergia latifolia	VU
Taxus wallichiana	EN
Takakia ceratophylla	VU
Taxus contorta	EN
Scaphophyllum speciosum	VU
Cypripedium cordigerum	VU
Nardostachys jatamansi	CR

Source: IBAT and Acharya, K. P., Paudel, P. K. (2020). Biodiversity in Karnali Province: Current Status and Conservation. Ministry of Industry, Tourism, Forest and Environment, Karnali Province.

121. **Vertebrates.** List of key species is provided in Table 4.5. Of these the three frogs and

[24] https://wcn.org.np/the-list-of-protected-species-of-nepal/34/

one toad which are endemic potentially qualify freshwater and associated habitat in the six districts of Karnali province as Critical Habitat because it is likely >10% of the global population of the species occurs across them. For the most part, the distribution lines will be in terrestrial habitat but there may be crossings of rivers, streams or other waterbodies required. The potential for critical habitat will need to be reviewed in updating the IEE once NEA has prepared the list of distribution lines.

Table 4.5 Globally threatened faunal species in Karnali province

Common Name	Scientific name	IUCN Status
Mammals		
Red panda	*Ailurus fulgens*	EN
Alpine musk deer	*Moschus chrysogaster*	EN
Himalayan black bear	*Ursus thibetanus*	VU
Common leopard	*Panthera pardus*	VU
Snow leopard	*Panthera uncial*	VU
Wild yak	*Bos mutus*	VU
Dhole	*Cuon alpinus*	EN
Clouded leopard	*Neofelis nebulosa*	VU
Chinese pangolin	*Manis pentadactyla*	CR
Birds		
Cheer pheasant	*Catreus wallichii*	VU
Common pochard	*Aythya ferina*	VU
Saker falcon	*Falco cherrug*	EN
Red-headed vulture	*Sarcogyps calvus*	CR
Steppe eagle	*Aquila nipalensis*	EN
Egyptian vulture	*Neophron percnopterus*	EN
Black-necked crane	*Grus nigricollis*	VU
Wood snipe	*Gallinago nemoricola*	VU
Woolly-necked stork	*Ciconia episcopus*	VU
Reptiles		
King cobra	*Ophiophagus hannah*	VU
Amphibian		
Torrent paa frog	*Nanorana ercepeae*	NT
Nepal paa frog	*Nanorana minica*	VU
Rastogi paa frog	*Nanorana rostandi*	VU
Nepal lazy toad	*Scutiger nepalensis*	VU
Fish		
Snow trout	*Schizothorax nepalensis*	CR
Snow trout	*S. raraensis*	CR
Golden Mahaseer	*Tor putitora*	EN
Gangetic loach	*B. dayi*	VU
Catfish, Sheet-fish, Freshwater shark	*Wallago attu*	VU
Common snowtrout	*S. richardsonii*	VU

IUCN Red List of Threatened Species category: CR- Critically Endangered, EN-Endangered, VU-Vulnerable

Source: IBAT and Acharya, K. P., Paudel, P. K. (2020). Biodiversity in Karnali Province: Current Status and Conservation. Ministry of Industry, Tourism, Forest and Environment, Karnali Province Government, Surkhet, Nepal; Baral et al., 2014; Nanhoe and Ouboter, 1987 ; Rawat et al., 2019; Swan et al., 1962.

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122. **Invertebrates.** 144 butterflies were found in Karnali province (Suwal, 2020). This accounts for nearly 22% of butterfly species reported in Nepal. Among them, 2 vulnerable and 5 susceptible species as per Nepal Red Data Book status. Among all species, Nepal Argus (*Paralasa nepalica*) and Nepal Comma (*Polygonia c-album agnicula*) may be endemic to Nepal (Smith, 1994). Suwal et al. (2019) reported *Polygonia c-album* in Rara National Park. The park is rich in butterflies including Nepal meadow blue (*Polyommatus nepalensis*), dusky hedge blue (*Oreolyce vardhana*), eastern blue sapphire (*Heliophorus oda*) and yellow wood brown. (*Zophoessa nicetas*). Research on butterflies in Karnali province is very limited and confined within protected areas. Suwal et al. (2020) observed *Paralasa nepalica*, the only species found in Nepal among 30 species of Paralasa recorded globally, in Talung Valley of Upper Humla. Of other invertebrates the endemic dragonfly *Somatochlora nepalensis* potentially qualifies freshwater and associated habitat in the 6 districts of Karnali province as Critical Habitat because it is likely >10% of the global population of the species occurs across them. For the most part, the distribution lines will be in terrestrial habitat but there may be crossings of rivers, streams or other waterbodies required. The potential for critical habitat will need to be reviewed in updating the IEE once NEA has prepared the list of distribution lines.

Key Biological Features

123. Key biological features in the PAI are summarized in Table 4.6.

Table 4.6 Summary of key biological features in the PAI by project component

Component	Subproject	Location	Key biological features in PAI
1684.86 km of 11kV, and low-tension distribution lines	• New 11kV covered conductor (CC) and conversion (and rehabilitation) of bare 11kV lines to covered CC:463.29 km • New LT ABC and conversion (and rehabilitation) of bare LT lines to ABC: 1221.57 km	Salyan, Kalikot, Jarkot, Mugu, Jumla and West Rukum district	• Habitat type along distribution line routes: mix of natural/forest habitat and modified habitat (roads passing settlements, agricultural fields, fallow) - to be reconfirmed through ecological survey for final routes. • UNESCO site: none. • Protected areas: sampled 11kV and LT lines were outside of protected areas, buffer zones. • The 11kV CC Mugu line is 3.2km, the LT ABC Khadachakra Line is 2km and the LT ABC Khar and Dousar Mugu Line is 800m from Rara NP. • Key Biodiversity Areas/IBA: Some in Mugu and Jumla (that proximity to Rara NP) of the 11kV and sampled LT lines are inside Rara NP Buffer and KBAs/IBAs and will be CC/ABC. Those in NP or Buffer Zones will be dropped • Conservation Forests: None. • Community Forests: 11 kV and LT lines are found mostly along roads, although some 11kv and LT lines in new RoW to be in natural habitats. • Surface water: some of the sampled lines cross and also pass along rivers/streams. • Vegetation supported: shrubs, herbs, and trees especially where the lines are passing through natural forest habitat. • Critical Habitat: the districts of Mugu and Jumla support areas which are likely to qualify as Critical Habitat. Some of the species for which the districts qualify as critical habitat may be present at sites where distribution lines are planned. This is the case, though to a lesser degree, even where no Natural Habitat remains. The potential for critical habitat will

Component	Subproject	Location	Key biological features in PAI
			need to be reviewed in updating the IEE once NEA has prepared the list of distribution lines since it will depend on their locations within the six districts. • No species of high biodiversity values were observed during site visits. No high biodiversity values, in either natural or modified habitat, were seen to be supported along the indicative distribution line routings. For all distribution line routings ecological survey will reconfirm no plant or animal species of high biodiversity value are supported. • Some bird species have been found electrocuted (secondary reports) in the province.

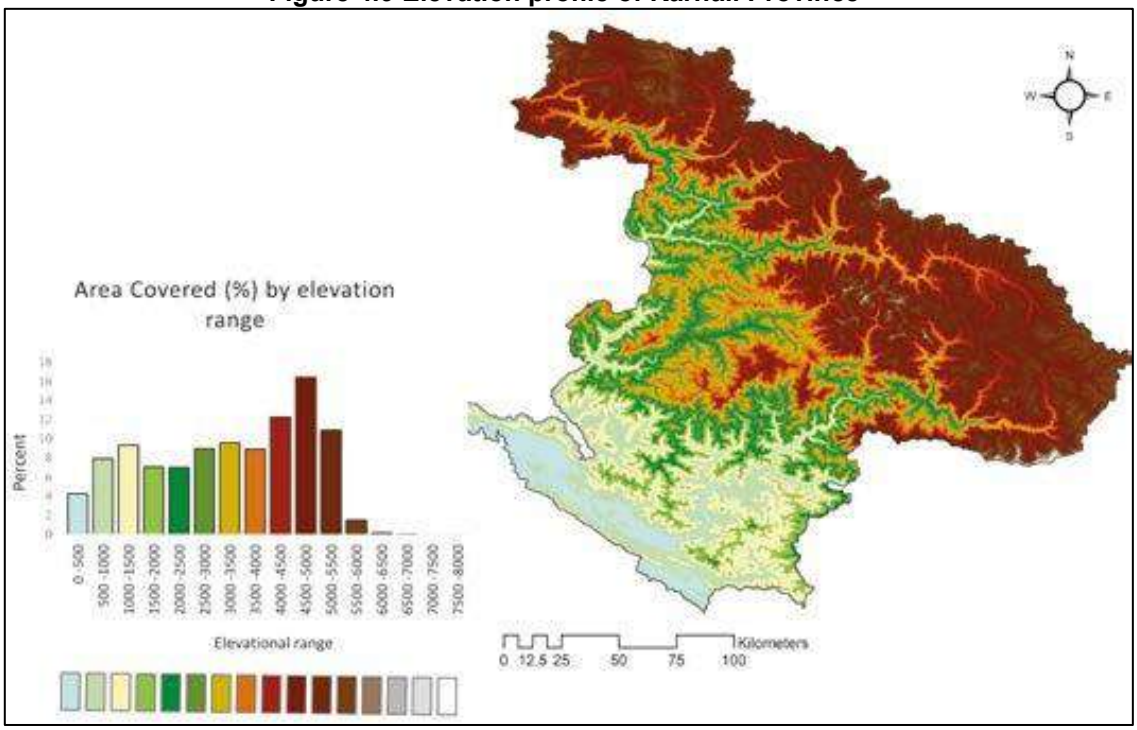
Source: ADB's TA Consultant

2. Physical Environment Setting

a. Elevation, Topography and Drainage

124. Karnali province is a mountainous province. It occupies nearly 20% of Nepal's area and shares 6% of the country's population, making it the largest but least populated province of Nepal. The province is located in north-western Nepal and covers 10 districts. The elevation range spans from 180 m to 7348 m. More than 40% of the province area is located at altitudes above 4000 m (Figure 4.7). The province has several peaks above 6000 m. Some of the most notable peaks include Hrikuti (6364 m), Changla (6563 m), Gurja Himal (7193 m), Nala Kankar (6062 m), Jagdula (6556 m), Kagmara (5960 m), Kande Hiunchuli (6627 m), Kanjeralawa (6612 m), Kanjiroba (Main Peak, 6838 m), Patarashi Himal (6450 m), Shey Shikhar (6139 m) and Tripura Hiunchuli (6563 m). Elevation profile is given as Figure 4.9.

Figure 4.9 Elevation profile of Karnali Province



Source: chrome- https://moitfe.karnali.gov.np/sites/moitfe/files/2020-12/Karnali%20Province%202020_13%20oct%202020_0.pdf

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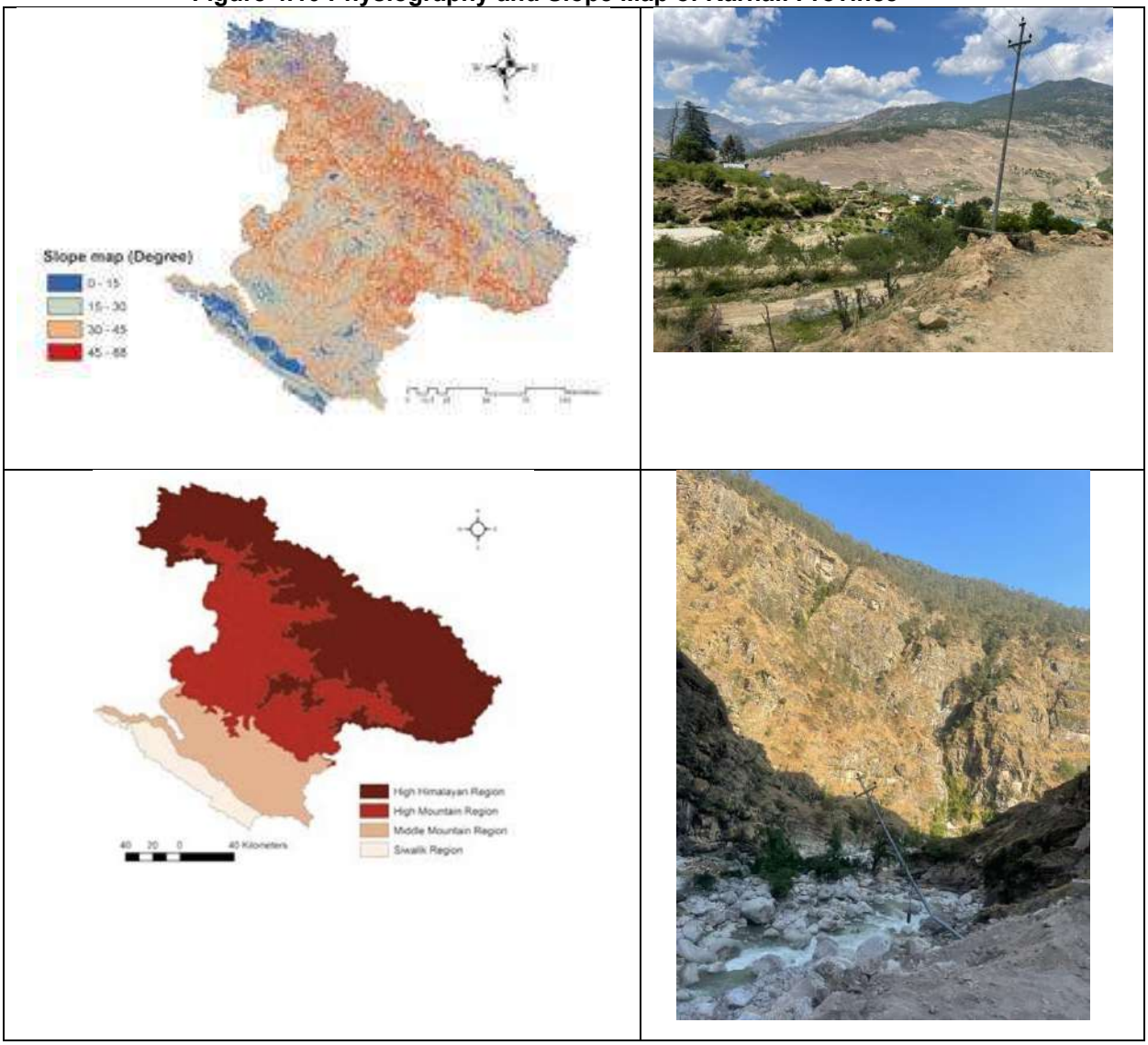
125. The southern part of the province is a low-lying region and consists of relatively flat areas, where Birendranagar, the province headquarters, is located. Here, the river valley along Bheri river is the most fertile region of the province. Such flat areas are also present in the central, far-western and far-eastern parts of the province (Figure 4.10). Guthi Chaur is the large alpine meadows of the southern Jumla, which are mostly rolling hills, whereas the Kuse-Junichade and Barekot pastureland are trans-Himalayan regions boarding with PCR. Karnali river basin drains most of the mid and far western development region of Nepal. Karnali river system also originates from Macha-khabab of PCR and flows through Nepal and meets Ghaghara river in India. Karnali river is the longest river (507 km) flowing through Nepal and along with other snow-fed rivers constitutes Karnali river system. More than 90% area of the basin lies in Nepal (Panthi et al. 2018). Humla Karnali originates in PCR and meets Mugu Karnali at Galwa forming the Karnali river. West Seti, Bheri, Kawari and Tila rivers are other tributaries of Karnali river system. Flat areas along the rivers are fertile and extensively used for agriculture and human settlements. River valleys are developed with abundant nutrients derived from the weathering of primary rock from mountainous regions upstream. Steep mountain terrains are common in Kalikot, northern Mugu, Rukum West and Dolpa districts. The mountain aspects of the land surface in Karnali province are highly varied.

Figure 4.10 Physiography and Slope Map of Karnali Province



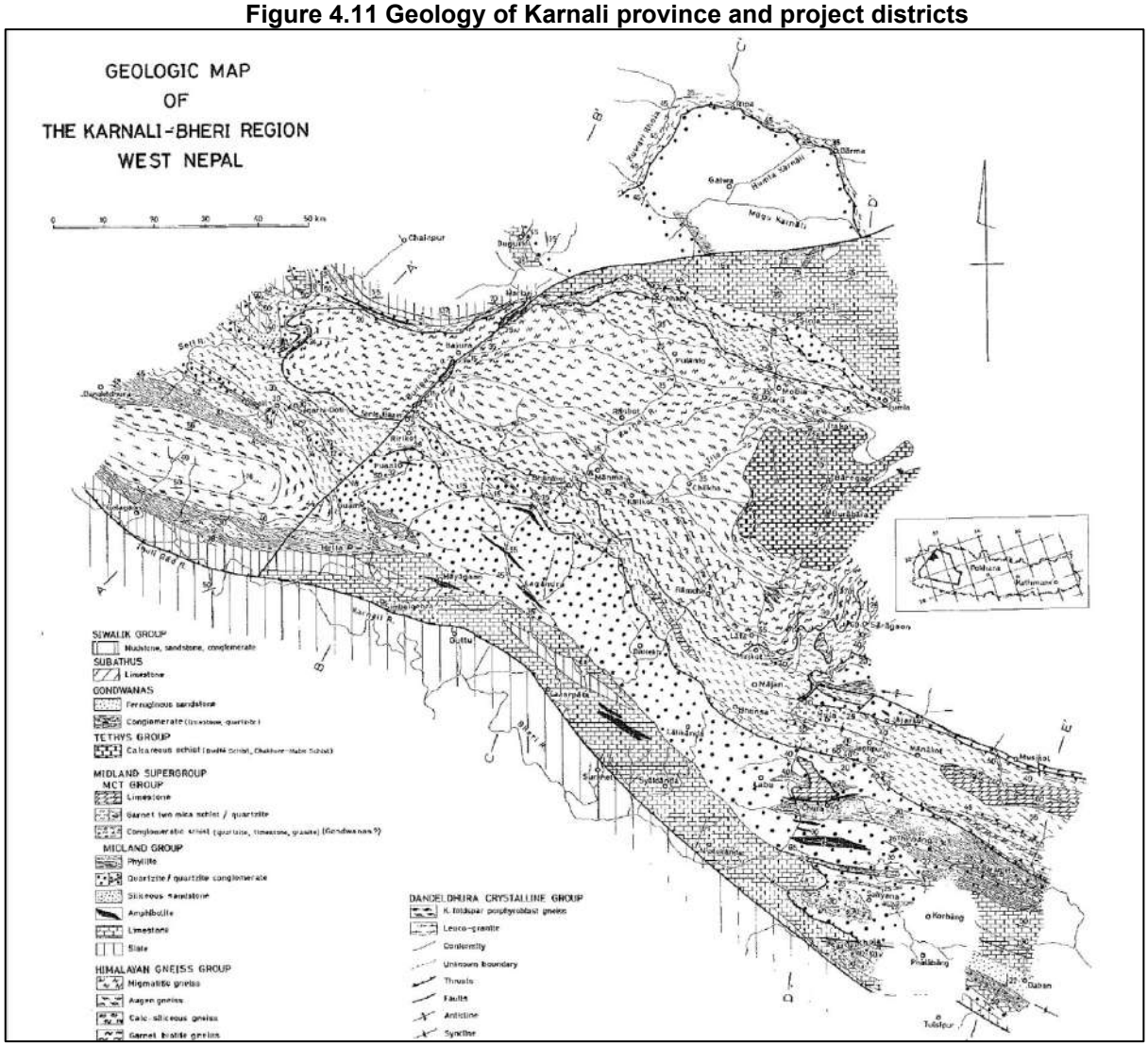
Source: ADB's TA Consultant and https://moitfe.karnali.gov.np/sites/moitfe/files/2020-12/Karnali%20Province%202020_13%20oct%202020_0.pdf

b. Geology, Soils and Geological Hazards

Geology

126. The Siwalik Group, known as the molassic sediments exposed in association with Himalayan uplift, was deposited during the middle Miocene to the early Pleistocene as a 4 – 6 km thick succession of fluvial sediments at the southern front of the entire Himalayan belt. The Siwalik Group has been traditionally subdivided into three units which are the Lower, Middle and Upper Siwaliks (Auden, 1935; Hagen, 1969; Yoshida and Arita, 1982; Quade et al., 1995; DeCelles et al., 1998; Gautam and Fujiwara, 2000; Ojha et al., 2000; Robinson et al., 2006; Sharma et al., 2007) and locally modified subdivisions into up to five subunits have been applied (Glennie and Ziegler, 1964; Sharma, 1973; Tokuoka et al., 1986, 1988; Sah et al., 1994; Corvinus and Nanda, 1994; Dhital et al., 1995; Ulak and Nakayama, 1998; Sigdel et al., 2011). The common three-fold classification starts in general with the mudstone-dominated Lower Siwalik, grading upward into the sandstone-dominated Middle Siwalik and the Upper Siwalik with conglomerate-dominated sediments. Figure 4.11 shows the geological profile.

Figure 4.11 Geology of Karnali province and project districts



Source: https://www.researchgate.net/publication/282445446_Observations_on_the_geology_of_the_Karnali_region_west_Nepal

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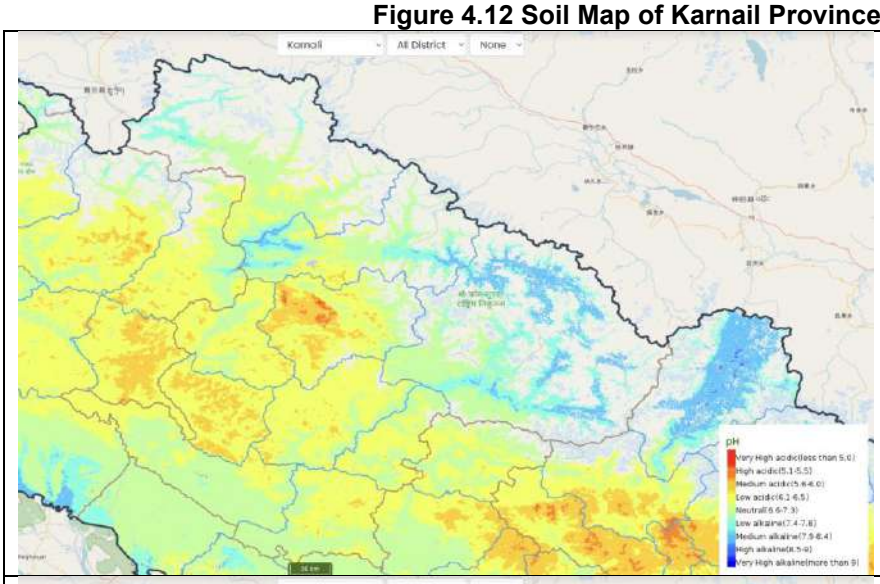
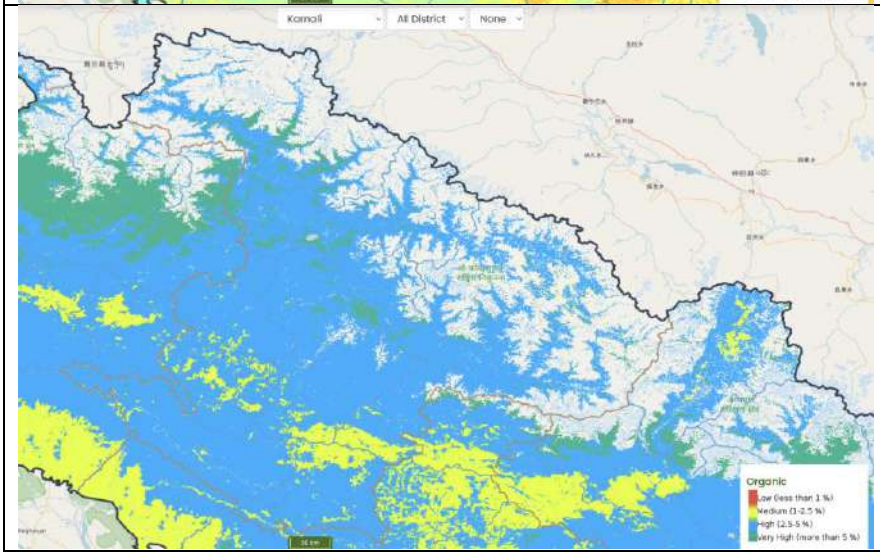
Soil

127. Traditionally, Nepali people classify (Munsell) soil based on soil colour and texture (Shah, 1995). Kalo (black) soil is 10 YR 3/1–4/1[25] (YR-Yellow Red)–dark greyish brown-very dark greyish brown in Munsell soil colour chart. Rato (red) means 2.5 YR 4/6–5/6 – red. Haluko rato (light red) denotes 5 YR 5/6–6/6-yellowish reddish yellow. Similarly, Khair (brown), Phusro (grey), Kharani (light grey) and Jogi (yellow) soils are 7.5 YR 4/2–5/2- brown-dark brown, 10 YR 5/1–5/2- grey –greyish brown, 7.5 YR 7/10 YR 7/7- light grey and 10 YR 6/6-7/6–8/8 – brownish yellow-yellow in Munsell soil colour chart respectively. Soil maps showing Soil pH and Organic Matter are shown in Figure 4.12.

Figure 4.12 Soil Map of Karnail Province



Soil PH



Organic matter

Source: https://soil.narc.gov.np/soil/soilmap/

Geological hazards

128. Nepal is the one of the 20 most disasterprone countries in the world.[26] The country is

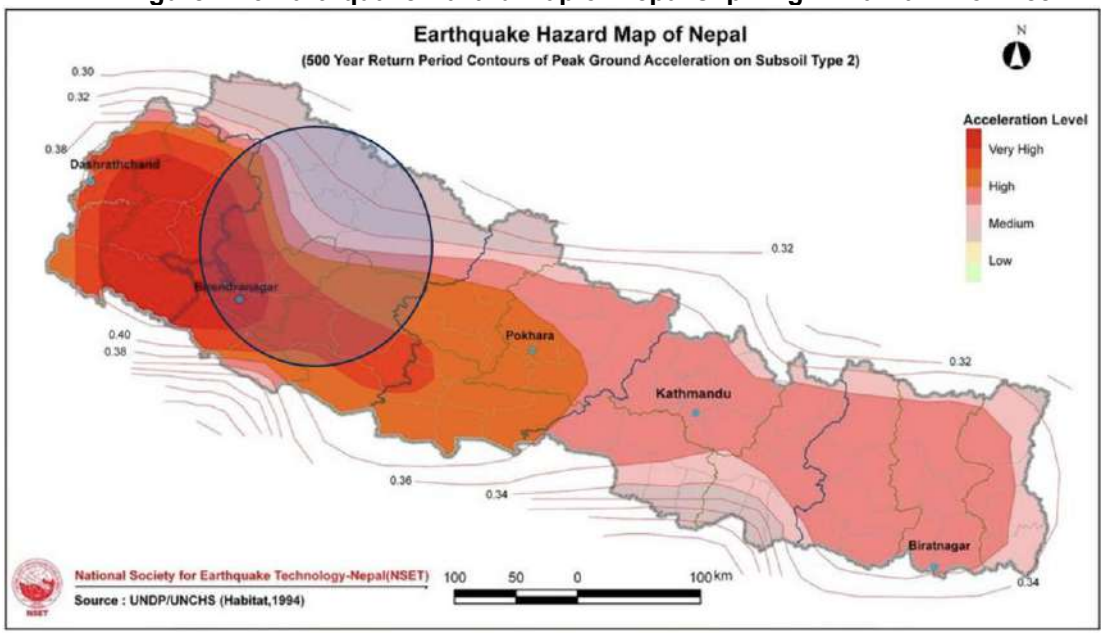
[25] Munsell is a three dimensional color space and notation system used to describe colors. The 10yr 3/4 indicates the colors location in this three-dimensional space.

[26] https://www.preventionweb.net/files/50366_50366nepdip003riskhazardandvulnerab.pdf

exposed to multiple hazards, most prominently earthquakes, floods, landslides, windstorms, hailstorm, fire, glacial lake outburst floods (GLOFs) and avalanches. Kalikot district is one of the landslide hazardous districts of Mid-Western Region. Its altitude ranges from 738 to 4,790 meters above sea level. Frequent landslide disasters and land subsidence are common in the district. Out of 30 VDCs in Kalikot district, 14 VDCs are most vulnerable with devastating landslide events in 1996, 2008 and 2010. During 1985 to 2011 (25 years of time), 50 people died, 36 injured, 139 houses destroyed and 155 damaged, with 1510 people relocated in the Kalikot district.

129. **Earthquake.** Karnali province is seismically very active associated with collisional tectonics where Indian plate subducts beneath the Eurasian Plate and is located in a high risk seismic zone. A 6.4 magnitude earthquake struck Jajarkot District on 3 November 2023 at 11:47 local time. The epicentre was located in Ramidanda in Jajarkot district claiming lives of 154 people of Jajarkot (101) and Rukum West (53) district and injuring 366 people. According to the National Earthquake Monitoring and Research Centre, at least 483 aftershocks have been recorded since then with the most powerful one measuring 5.8 magnitude on 6 November 2023. National and Karnali Province earthquake zone maps is provided as Figure 4.14.

Figure 4.13 Earthquake Hazard Map of Nepal shpwing in Karnail Province



Source: https://www.researchgate.net/figure/Probabilistic-Seismic-Hazard-Map-of-Nepal-showing-PGA-values-with-10-probability-of_fig1_322539935

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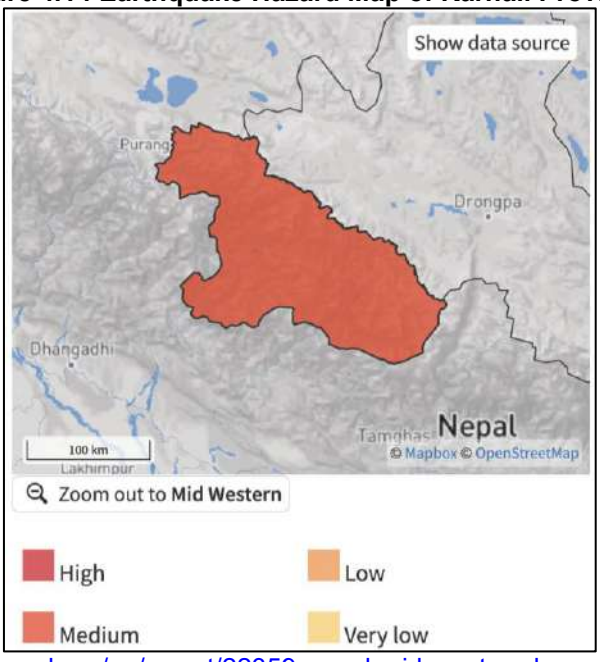
Figure 4.14 Earthquake Hazard Map of Karnail Province



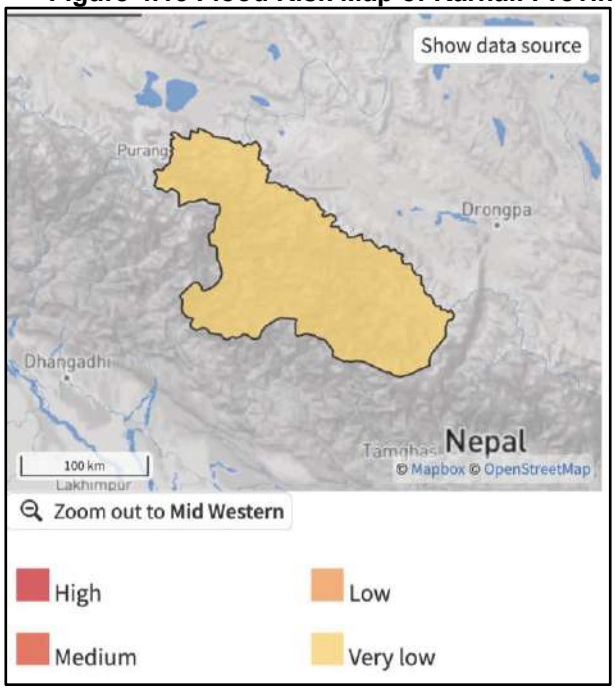
Source: https://thinkhazard.org/en/report/22359-nepal-mid-western-karnali/EQ

130. **Flooding.** Riverine and urban floods levels are generally high in Karnali province because of the hydrodynamics of the complex watershed, the topography, and rainfall patterns. This includes high velocity water runoff from the large perennial rivers accelerated by the steep slopes flowing mostly from North to South; and urban flooding. In the province the flood hazard levels are compounded by the observed deforestation and land-use change upstream, by the change in the permeability of the soils influenced by urbanization downstream, the erratic rainfall patterns, and the progressive melting of glaciers. Flood, a common water induced disaster of monsoon season, is the recurring phenomenon in Nepal. The Karnali River Basin (KRB) comprises the longest river in Nepal, located south of the Himalayas.

131. Despite its high susceptibility to floods, the Karnali river basin lacks detailed studies. The area of very high flood susceptibility ranges from 0.8 to 2.5% of the basin area, most of the areas located in the south with low slopes and elevations.[27] The Karnali river flooded repeatedly beyond known thresholds in 2014, 2015 and 2017. Floods were reported at their largest in 2015 in what was a one-in-450 year flood. According to the Ministry of Home Affairs (MoHA) about 40,000 families were affected. No previous studies have monitored underlying land-cover dynamics and flood hazards for the area, resulting from rapid expansion of urban cover and the gradual decline of cultivated lands. The urban area expanded by nearly 700%, from 85 ha in 1989 to 656 ha in 2016, with an average annual growth rate of 23.99%. Cultivated land declined simultaneously by 12%, from 7005 ha to 6205 ha. Although the risk screening is low to medium as shown in Figure 4.15, the project area is identified as High to Moderate Risk Zone for flooding as the areas/population exposure to flooding map shows in Figure 4.16.

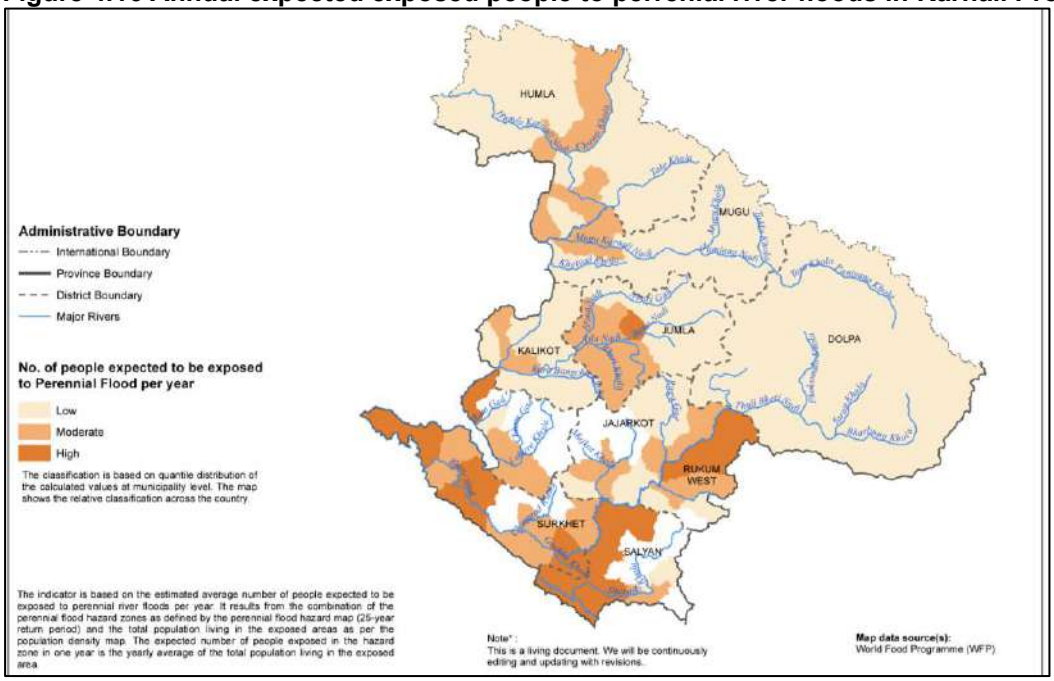
[27] https://www.semanticscholar.org/paper/Flood-susceptibility-modeling-of-the-Karnali-river-Duwal-Liu/d2c11abfcce502362cd95a13f71ef66dfd9600bc

Figure 4.15 Flood Risk Map of Karnail Province



Source: https://thinkhazard.org/en/report/175-nepal/FL

Figure 4.16 Annual expected exposed people to perrenial river floods in Karnali Province



Source: World Food programme , 2021

132. **Glacier Lake Outburst Flood (GLOF).** GLOF affects the high Himalayan region as well as downstream causing extreme damages of lives and properties. While the northern districts of Karnali are not considered at high risk for GLOF, climate change may alter this profile and should be considered. GLOFs are induced by glaciers in retreating state with the formation of glacial lakes in the Higher Himalayas, which forms natural water reservoirs dammed by ice or moraines. Northern areas of the province are potentially prone to GLOFs and in the past high levels of casualty and loss of agricultural assets have resulted in the area. Bishayaris occur when a landslide that blocked a river is breached by the reservoir of water which formed

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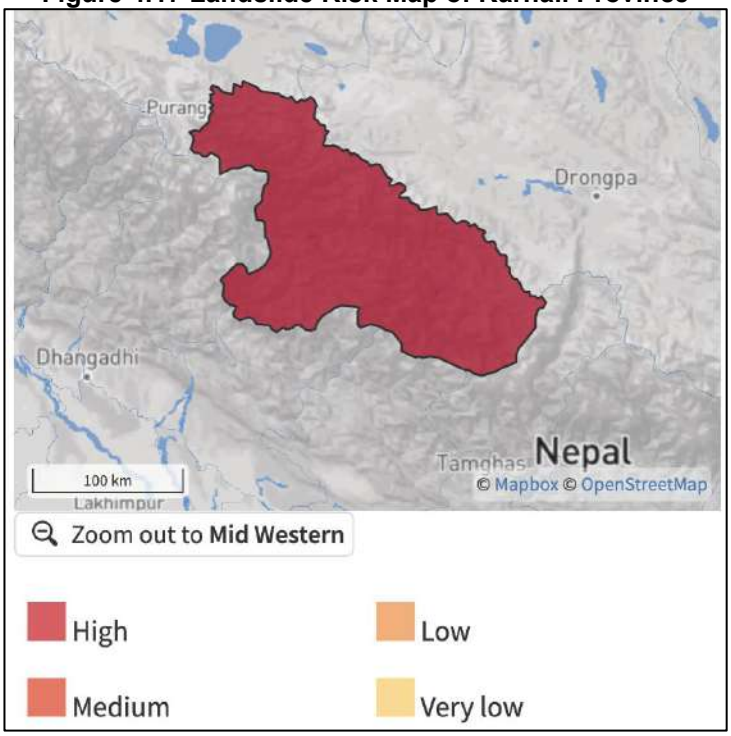
upstream of the blockage.

133. **Landslide.** Nepal is one of the most landslide-prone countries in the world, with year-on-year impacts resulting in loss of life and imposing a chronic impediment to sustainable livelihoods.[28] Every monsoon, the meandering Karnali River swells, erodes rivers banks, and carries away arable soil as it hurtles downstream. In 2014, floods and landslides on the river caused the loss of 222 lives and affected 120,000 others, leaving damaged infrastructure and property in its wake. In 2023, monsoon floods and landslides claimed 14 lives, and 16 went missing in the two provinces that share the Karnali River. Landslides, debris and rock-fall susceptibility is very high in the Karnali province, particularly at the centre Churea range and north. The rugged topography of the province, steep slopes, unstable geological structures, complex geology, seismic active and high precipitation intensity compounded by environmental stressors (such as observed deforestation for land-use clearance, terracing or logging) require that landslides are considered in planning decisions for projects in these areas.[29] Landslide risk map and hazard level is provided in Figures 4.17 and 4.18 respectably.

Figure 4.17 Landslide Risk Map of Karnali Province

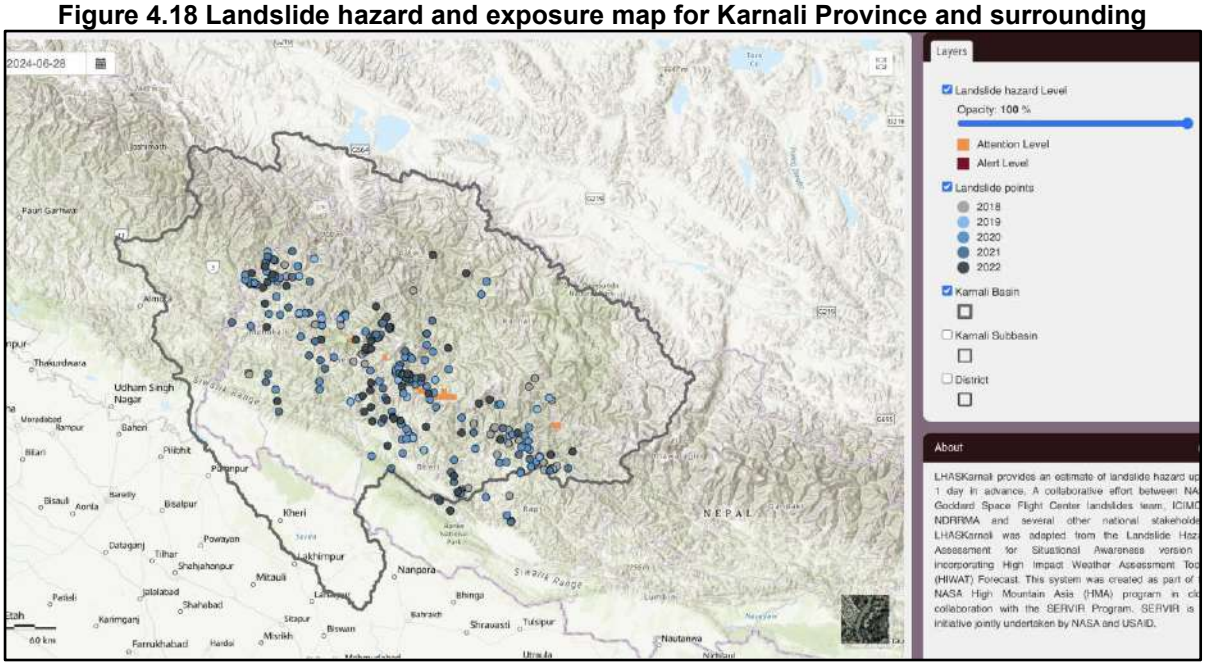


Source: https://thinkhazard.org/en/report/175-nepal/LS

28 https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2023EF004102#:~:text=Nepal%20is%20a%20global%20hotspot,Froude%20%26%20Petley%2C%202018).

29 https://kppc.karnali.gov.np/noticefile/PPC_Nepal_Regional_Report_Karnali_Province-_Final_copy_1616311073.pdf

Figure 4.18 Landslide hazard and exposure map for Karnali Province and surrounding



Source: http://nepal.spatialapps.net/LHASKarnali

c. Water Resources and Quality

134. **Surface water**. In the Karnali province the mountain peaks and forests feed natural lakes and rivers, including Karnali and Bheri River, two major river corridors of the region. There are numerous lakes in Karnali Province but lakes such as Rara (the biggest lake of Nepal) and Phoksundo (the deepest Lake of Nepal) have the outstanding significance from the standpoint of ecotourism with their rich biodiversity, aesthetic and aquatic ecosystem value. Other lakes are Chhangbo Lake (Halzi Glacier Lake, Humla), Syarpu Tal and Gupti Daha (in Rukum), Vadale Lake (Nalgad, Jajarkot), Nadai Daha (Kuse, Jajarkot), Dude Daha (Sarkegad, Humla), Kubhinde Daha and Kachhuwa Paha Daha in Salyan; Bulbul Tal and Baraha Tal in Surkhet; Bista Jyu Daha and Giri Daha, Shankha Daha (Tatopani, Jumla), Kaya Mokchhya Tal (Patarasi, Jumla), Triveni Daha (Chandannath, Jumla) etc. Similarly, Karnali Province possesses numbers of waterfalls (Jharana) such as Pachal Jharna of Kalikot, arguably the highest waterfall (481m) of Nepal. Phoksundo Waterfall is considered to be the largest waterfall (by volume of water). Other important waterfalls in Karnali Province include Chachahara Waterfall (Namkha, Humla), Lepche/Nigle Talchhari Waterfall in Sarkegad, Thulichadi Waterfall (Thandikadh (Dailekh), Duwari and Batase Waterfall (Naumule, Dailekh). The drainage map of Karnali province is provided as Figure 4.19.

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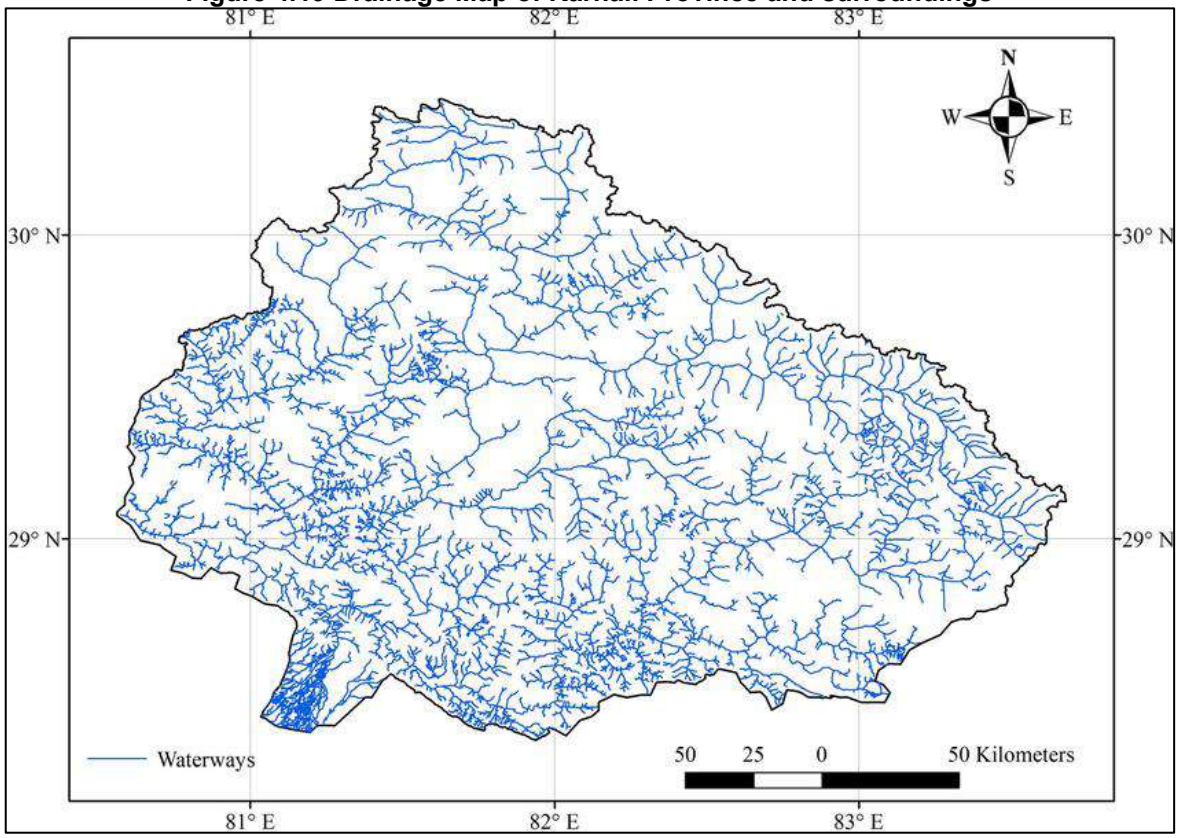
Figure 4.19 Drainage Map of Karnali Province and surroundings



Source: https://www.researchgate.net/figure/Drainage-map-of-Karnali-River-Basin_fig2_371131722

135. **Water Scarcity.** The Karnali province is identified as a high water scarcity hazard zone (refer Figure 4.18).[30] In Karnali province potential droughts are expected to occur on average every 5 years. Water scarcity was also confirmed in some districts/areas during public consultation. Based on this information, the impact of drought must be considered in all phases of the project, in particular its effect on workers and communities, and during the design of the distribution infrastructure. Project planning decisions, design, and construction methods must take into account the level of water scarcity. Meteorological and agricultural drought hazard levels are high across the Karnali province, despite the apparent water availability from the perennial rivers and lakes. Water scarcity conditions resulting from droughts may occur frequently because of dry-spells, especially in the winter, and the erratic monsoon rainfall.

136. **Groundwater:** There are primarily two types of aquifer systems in the area: shallow aquifers (0–46 m depth) and deep aquifers (> 46 m depth) (GDC, 1994). The maximum aquifer yield from those aquifers varies from 167 to 2592 m^3/day. Recharge from the Terai's northern boundary, the Bhabar Zone, along the Siwalik foothills, results in the province's renewable groundwater supplies (Shrestha et al., 2018), with rainfall and lateral inflows from the Bhabar zone directly infiltrating the Terai's aquifers, recharging them. Subsurface inflow and seepage losses through streams and rivers also provide significant inputs to the groundwater recharge.

d. Ambient Air Quality

137. Since 2016, the Department of Environment has established 27 Air Quality Monitoring Stations in 19 districts of Nepal with support from various governmental and intergovernmental organizations. The analysis of data showed that air quality was found varied both temporally

[30] https://thinkhazard.org/en/report/175-nepal/DG

and spatially. The air quality status of Kathmandu Valley and Terai region was found poor especially in winter and pre-monsoon season. The compliance status of National Ambient Air Quality Standard 2012 was found very low in winter and pre-monsoon season. Incident of forest fire was the highest during March and April; precipitation was high during the monsoon season, both of which can be related to varied level of air pollution. Nepal Government has set and enforced national ambient air quality standards (NAAQS) and has a legal obligation to maintain this standard. All the monitoring stations measure PM1, PM2.5, PM10 and Total Suspended Particulate Matter. The Department of Environment, GoN monitors the air quality index (AQI) (refer Table 4.7 for scale) in Nepal, whose latest results are discussed in this section. The location nearest to the Output 2(iii) distribution components is Mugu district.

138. Spot measurements using smartphone based weather application done on sites visited are provided in Table 4.8.

Table 4.7 Air Quality Index Nepal - Scale

AQI	Remark	Possible Health Impacts
0-50	Good	Minimal impact
51-100	Moderate	Minor breathing discomfort to sensitive people
101-150	Unhealthy for Sensitive Groups	Moderate to high breathing discomfort to sensitive people
151-200	Unhealthy	Breathing discomfort to the people with lungs, asthma and heart diseases
201-300	Very Unhealthy	Breathing discomfort to most people on prolonged exposure
301-400	hazardous	Respiratory illness on prolonged exposure
401-500	Very hazardous	Affects healthy people and seriously impacts those with existing diseases

Source: https://pollution.gov.np/portal/files/Air%20Quality%20Index%20(%20AQI%20)%20Basics.pdf

139. **Karnali province**: Inside the premises of Rara National Park, the Rara Air Quality Monitoring Station was established in the year 2020. It lies in Mugu district of Karnali Province. This station represents air quality of high mountain (also stated as background AQMS). Hence the major source of air pollution in this area is either forest fire or pollutants transported because of various meteorological processes. Summary results are shown in Figure 4.20 and discussed below:

- **PM2.5.**
  - PM2.5 peaks at 12 AM to 1 AM in the morning whereas in the evening it peaks at 10 PM to 11 PM. The diurnal variation is found high during 1 to 2 AM as well as 10 to 11 PM.
  - Higher concentration can be seen during April whereas lower concentration was observed during monsoon and post-monsoon season. High variation was seen during April and less during August and September. The mean value was found more than median during January, February, March, April and June. The monthly average of April was found to be highest (55.95 µg m3) and that of September was found to be lowest (3.5 µg m3) while comparing with other months.
  - The average concentration of PM2.5 was found to be the highest during the pre-monsoon season (35.67 µg m3) and the lowest during the monsoon season (6.05 µg m3).
  - Out of 340 days of measurement, only 32 days exceeded the National Ambient Air Quality Standard for PM2.5. From May to December none of the days exceed the NAAQS of 40 µg m3.

- **PM10.**
  - PM10 in Rara Station was observed to range from 0.3 to 1000.3 µg/m^3. The mean

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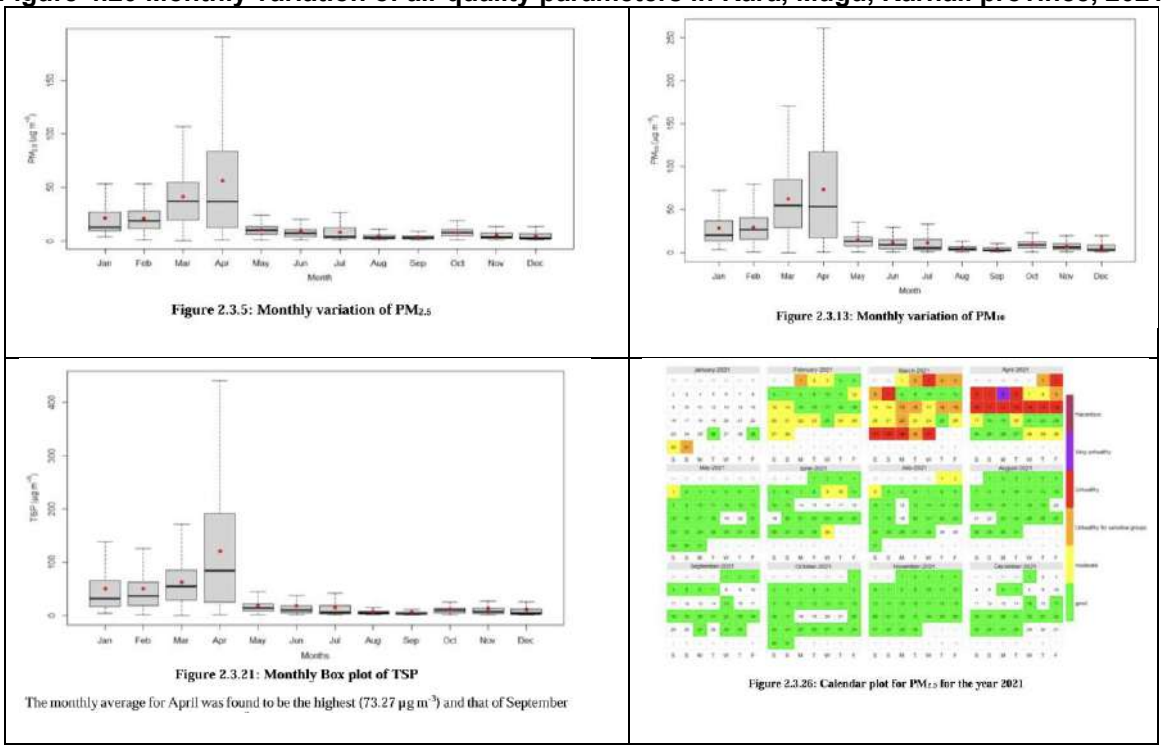
of the PM10 point data was observed to be 21.80 µg/m^3. PM10 peaks at 12 AM to 1 AM in the morning whereas in the evening it peaks at 9 to11 PM.

- The highest value is found during the evening. The mean value is found to be more than median throughout the day. Higher concentration can be seen during April whereas lower concentration was observed during monsoon and post-monsoon season. High variation was seen during April and less during September. The mean value was found more than the median during January, February, March, April, June and July.
- The monthly average for April was found the highest (73.27 µg/m^3) and that of September was found lowest (4.18 µg m3) while comparing with other months.
- The average concentration of PM10 was found to be the highest during pre-monsoon season (35.67 µg/m3) and the lowest during monsoon season (6.05 µg/m^3).
- Out of 340 days of measurement, only 9 days exceeded the National Ambient Air Quality Standard of 120 µg/m^3 for PM10. During January, February, May to December none of the days exceed the NAAQS.

- **TSP (Total Suspended Particulate) Matter**
  - In Rara Station TSP was observed to range from 0.3 to 3219 µg/m^3 (Figure 2.3.17). The mean of the TSP point data was observed to be 30.86 µg/m^3. TSP peaks at 12 AM in the morning whereas in the evening it peaks at 5 PM.
  - The diurnal variation is found high during 5 PM. The mean value is found to be more than median throughout the day. Higher concentration can be seen during April whereas lower concentration was observed during monsoon and post-monsoon season.
  - High variation was seen during April whereas less during August and September. The mean value was found more than median during January to July and November and December.
  - The monthly average for April was found to be the highest (73.27 µg/m^3) and that of September was found to be the lowest (4.18 µg/m^3) while comparing with other months.
  - The average concentration of TSP was found to be the highest during the pre-monsoon season (66.58 µg/m^3) and the lowest during the monsoon season (11.32 µg/m^3).
  - Out of 340 days of measurement, only five days exceeded the National Ambient Air Quality Standard for TSP of 230 µg/m^3. All the days exceeding the NAAQS lie in April.

Figure 4.20 Monthly variation of air quality parameters in Rara, Mugu, Karnali province, 2021



Source:https://doenv.gov.np/progressfiles/Status-of-Air-Quality-in-Nepal-Annual-Report_2021-1676438644.pdf

140. As per recent study,[31] air quality has been a major environmental and public health concern in Nepal. Available daily air pollution data (PM2.5) for 21 stations spread across 6 provinces (except Sudorpaschim) and 14 districts for around two and half years from 2019 till May 2021 showed the overall annual average of Nepal assessed by PM2.5 has decreased from 37.8 µg/m^3 in 2019 to 35.8 µg/m^3 in 2020 but has again unexpectedly and substantially risen to 56.5 µg/m^3 in 2021 (till May) primarily due to large scale forest fires that occurred at many places of Nepal which peaked at the end of March, 2021. Provincial averages for the study period showed Karnali province as the least air polluted province (30.5 µg/m^3) which implied that the averages are 3.5 to 5.9 times higher than the WHO annual guideline of 10 µg/m^3 for PM2.5. Highest attributable factor associated with PM2.5 is obtained for pneumonia (0.108), followed by COPD (0.053) and respiratory disease (0.033). The corresponding annual attributable burden is found to be highest for respiratory (1.66 Lakhs) disease followed by pneumonia (0.35 Lakh) and COPD (0.2 Lakh) morbidities. In conclusion, air quality situation in Nepal is still a major environmental and public health hazard which requires further steps and efforts to reduce it in the coming years.

141. The sample distribution lines visited are characterized mainly by rural settlement/built-up, natural habitats/high altitude vegetation and open/agriculture or uncultivated fallow land. There are no industrial activities in the areas visited and the major contribution to air pollution is mainly due to unpaved shoulders and unpaved/damaged roads. The spot data on AQI (based on smartphone-based application) for sites visited are provided in Table 4.8.

[31] Shrestha, S. L. (2021). Analysis Of Ambient Particulate Air Pollution And Health In Nepal. *Journal Of Global Ecology And Environment*, *12*(4), 14–29. Retrieved From Https://Ikprress.Org/Index.Php/Jogee/Article/View/6950

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Table 4.8 Air Quality Index data of sample sites visited (15th June -22nd June 2024)

#	Site	Component	AQI	Remark
1	Kalikot	New substation	109	Unhealthy for Sensitive Groups
2	Jumla	New substation	44	Good
3	Aathbis	Distribution lines	103	Unhealthy for Sensitive Groups
4	Jumla	Distribution lines	110	Unhealthy for Sensitive Groups
5	Mugu	Distribution lines	53	Moderate
6	Chandannath	Distribution lines	103	Unhealthy for Sensitive Groups
7	Bagbajar	Distribution lines	110	Unhealthy for Sensitive Groups
8	Fungra	Distribution lines	77	Moderate
9	Mofla	Distribution lines	68	Moderate
10	Gora	Distribution lines	61	Moderate
11	Sinja	Distribution lines	44	Moderate
12	Rema	Distribution lines	70	Moderate
13	Sanigaon	Distribution lines	80	Moderate
14	Rugagaon	Distribution lines	103	Unhealthy for Sensitive Groups
15	Chandannath,	Distribution lines	100	Unhealthy for Sensitive Groups
16	Chinna	Distribution lines	100	Unhealthy for Sensitive Groups
17	Chhayanath	Distribution lines	112	Unhealthy for Sensitive Groups
18	Rara	Distribution lines	31	Good

AQI recoded from smartphone-based weather app -spot data
Source: ADB's TA Consultant

e. Ambient Noise

142. In Nepal, there were very few researches on noise pollution being carried out. Even such surveys conducted in the past have revealed that noise levels in urban areas are generally much higher than recommended international standards. Road traffic noise is a major source of noise in urban areas. It produces disturbance and gives an impact to more people than any other forms of noise source[32].

143. There are no noise generating industries in the Karnali province or along the distribution lines visited. Traffic noise is the principal source of noise in the sample lines visited within rural settlement areas like Jumla, Nagma, Kalikot, Salyan, etc. The distribution line PAI mostly includes rural/remote open areas with intermittent and sparce settlement. Therefore, noise levels are relatively low. Spot measurements done for sites visited using a phone app are provided in Table 4.9.

Table 4.9 Noise level at sites visited – Day Time (15th June -22nd June 2024)

Sl.No.	Site	Component	Leq (A)	Applicable Standard (Day) Nepal, 2012 (NSQS)
1	Kalikot	New substation	49	55
2	Jumla	New substation	53	55
3	Aathbis	Distribution lines	44	55
4	Jumla	Distribution lines	50	55
5	Mugu	Distribution lines	43	55
6	Chandannath	Distribution lines	49	55
7	Bagbajar	Distribution lines	47	55
8	Fungra	Distribution lines	44	55
9	Mofla	Distribution lines	52	55
10	Gora	Distribution lines	48	55
11	Sinja	Distribution lines	42	55
12	Rema	Distribution lines	52	55
13	Sanigaon	Distribution lines	42	55

[32] https://kumj.com.np/issue/3/177-183.pdf

Sl.No.	Site	Component	Leq (A)	Applicable Standard (Day) Nepal, 2012 (NSQS)
14	Rugagaon	Distribution lines	43	55
15	Chandannath,	Distribution lines	46	55
16	Chinna	Distribution lines	51	55
17	Chhayanath	Distribution lines	46	55
18	Rara	Distribution lines	45	55

Sound recoded from smartphone-sound level measurement app -spot data
Source: ADB's TA Consultant

f. Waste management

144. Rapid and uncontrolled urbanization, lack of public awareness, and poor management by municipalities have intensified environmental problems in towns in Nepal, including unsanitary waste management and disposal. While solid waste management (SWM) has become a major concern for municipalities and the country as a whole, the status of SWM is not fully understood due to the lack of SWM baseline data. It is estimated that waste from households in general contributes about 50%–75% of the total MSW generated. The average MSW generation was found to be 317 g/capita/day. The analysis of household waste composition indicated that the highest waste category was organic waste with 66%, followed by plastics with 12%, and paper and paper products with 9%. The composition analysis of institutional wastes revealed 45% paper and paper products, 22% organic wastes, and 21% plastics. The study found that commercial wastes comprised 43% organic wastes, 23% paper and paper products, and 22% plastics. In aggregate, MSW is composed of 56% organic waste, 16% plastics, and 16% paper and paper products.

145. About 30% of households in one study practiced segregation of waste at source; which means that waste generated from about 70% of households in municipalities goes for collection and disposal municipalities in the form of mixed waste. The vehicles and equipment available for waste collection and transport in each municipality varies widely. Facilities and equipment available in municipalities affect the efficiency of waste transfer from primary collection to processing centers or final disposal sites. Transfer sites are not available in major municipalities except Kathmandu (400km from project province) and Lalitpur (700km). Sites for treatment facilities and sanitary landfill are yet to be identified by many municipalities and waste is currently being disposed of without treatment in crude dumping sites, creating public health risks and environmental problems.

146. Open dumping, including riverside and roadside dumping, is practiced by as many as 45 of the 58 municipalities. Only six municipalities Kathmandu, Lalitpur, Pokhara, Ghorahi, Dhankuta, and Tansen have constructed sanitary landfill sites. None are in Karnail province or nearby. For Kathmandu and Lalitpur, a sanitary landfill site at Sisdol, Okharpauwa was constructed with grant funding from the Government of Japan and operated as a sanitary landfill site in the early stage of operation, although currently it is not operated as a sanitary landfill site. The sanitary landfill in Pokhara was financed by ADB. Landfills in Dhankuta, Ghorahi, and Tansen were financed by the municipalities, with technical support from the Nepal government. Tribhuwan Nagar is another municipality in Nepal that has a sanitary landfill for waste management.[33]

[33] solid-waste-management-in-nepal-2008.pdf

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g. Climate Change and Climatic hazards

147. Karnali province has a diverse climatic region, ranging from tropical to the nival. The province experiences a Western Himalayan type climate, characterized by cool, wet winters and warm and dry summers. The monsoon, which enters through eastern Nepal and contributes more than 80% of the annual total precipitation in Nepal, also contributes significant precipitation in the Karnali province. There are 25 meteorological stations in the province, most of them are situated at the lower elevations. The rainfall recorded in different parts of the province shows a remarkable variation within a small area. Jajarkot and Surkhet receive a high monthly rainfall, on average, as compared to other stations. However, the highest average rainfall is recorded in July in all stations, except Jumla which receives the highest average rainfall in August. Rainfall gradients are exceptionally steep and are influenced by not only altitude but also aspect and other topographic features that serve to trap rain-bearing winds. The northwestern part receives less rainfall due to rain-shadow influence by the north-facing sides of the Himalayas and the inner or trans-Himalayan regions (DHM, 2015; Kansakar et al., 2004).

148. Projections for climate change in Nepal,[34] under emissions' scenarios for two Representative Concentration Pathways 4.5 (median) and 8.5 (extreme) over the medium-term (2016–2045) and long-term period (2036-2065) compared to the baseline period 1981–2010, include:

- Average annual precipitation likely to increase in the medium-term and long-term by 2–6% in the medium-term period and by 8–12% in the long term period; decrease will be likely experienced in the pre-monsoon,
- Average annual mean temperature is likely to rise by 0.9–1.1 degrees Celsius (°C) in the medium-term and 1.3–1.8°C in the long-term period; increase will be higher in the post-monsoon and in winter.

149. Changes in climate as projected will likely result in two main sets of consequences for the Karnali province[35] including:

- A more frequent recurrence of intense events provoking rapid on-set (floods, rain-triggered landslides, GLOF) and slow on-set (droughts) disasters with severe disruption of services;
- Increase in morbidity; destruction of economic and infrastructure assets;
- Progressive alteration of natural processes and impact on critical ecosystem services that may result in the decrease in agricultural productivity and insurgence of new pests and diseases, and water scarcity.
- The potential for changes to the water flow resulting from the retreat of the glaciers will affect the discharge of perennial rivers likely lead to excess water at certain times of the year, prolonged dry periods and extreme drought in others.

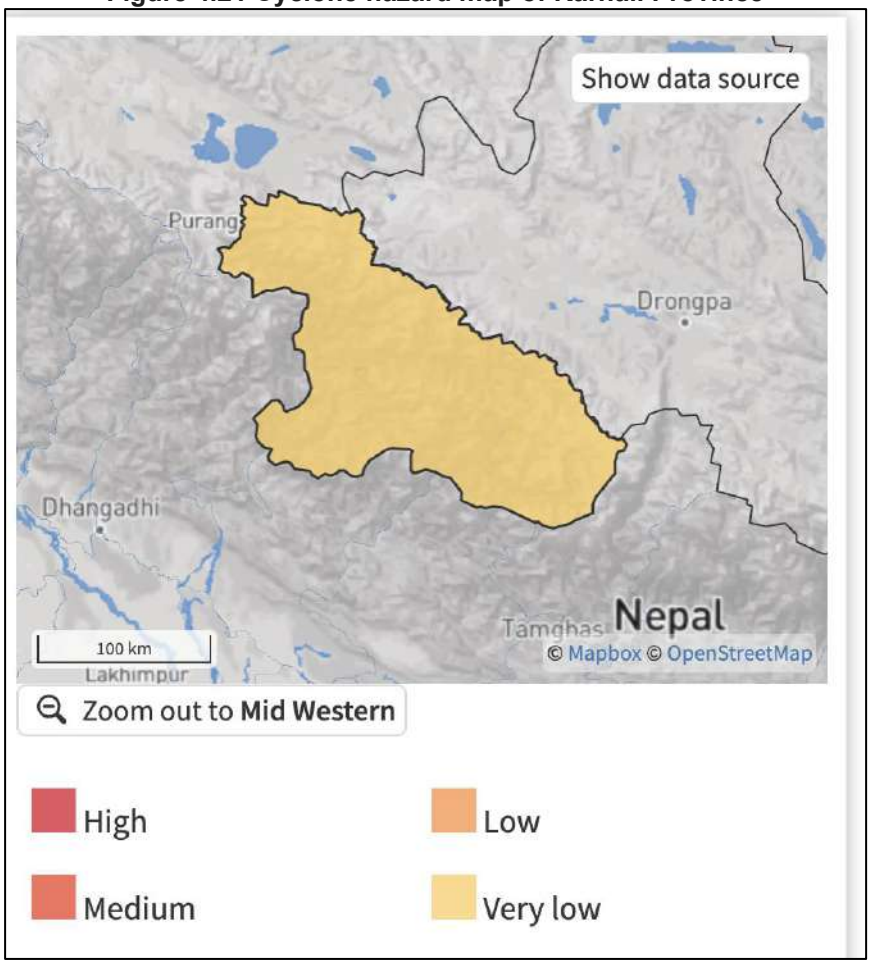
150. The geographic, geo-climatic conditions and natural resources of Karnali Province endow the province with an attractive natural landscape and a variety of eco-system services, although these features may also represent a challenge. The province is exposed to natural hazards that may result in risks of disasters. The combined effects of observed and projected climate change, and human-induced environmental degradation, will likely compound risks, if vulnerabilities are not addressed.[36]

151. **Cyclone hazard.** In the Karnali province cyclone hazard is classified as low. This means that there is a 1% chance of potentially damaging wind speeds in the next 10 years.

[34] https://www.sciencedirect.com/science/article/pii/S2405844021002516
[35] https://pdf.sciencedirectassets.com/craft/capi/cfts/
[36] https://kppc.karnali.gov.np/noticefile/PPC_Nepal_Regional_Report_Karnali_Province-_Final_copy_1616311073.pdf

Based on this information, the impact of cyclones should be considered during design and construction. Project planning decisions, design, and construction methods should take into account the level of cyclone hazard. Note that damages can not only occur due to wind but also cyclone induced heavy rainfall and subsequent flooding. The cyclone hazard map is provided as Figure 4.21.

Figure 4.21 Cyclone hazard map of Karnali Province



Source: https://thinkhazard.org/en/report/175-nepal/CY

152. **Extreme Heat Hazard.** In the Karnali province extreme heat hazard is classified as high based on modelled heat information.[37] This means that prolonged exposure to extreme heat, resulting in heat stress, is expected to occur at least once in the next five years. Project planning decisions, design, and construction methods must take into account the level of extreme hazard.

153. **Wildfire.** In the Karnali province the wildfire hazard is classified as high. This means that there is greater than a 50% chance of encountering weather that could support a significant wildfire that is likely to result in both life and property loss in any given year. Based on this information, the impact of wildfire must be considered during design and construction. Project planning decisions, design, construction and emergency response planning methods should take into account the high level of wildfire hazard. Damage cannot only occur due to direct flame and radiation exposure but may also include ember storm and low level surface fire. In extreme fire weather events, strong winds and wind born debris may weaken the integrity of infrastructure. It would be prudent to consider this effect in design and

[37] https://thinkhazard.org/en/report/175-nepal/EH

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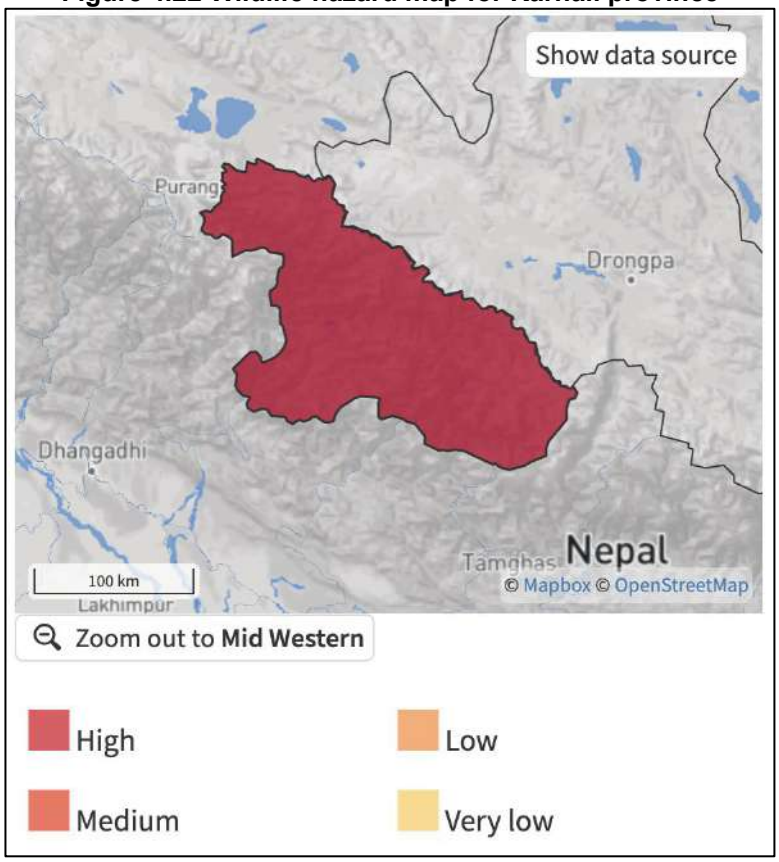
construction. Further detailed information specific to a location should be obtained to adequately understand the level of hazard. Modelled projections[38] of future climate identify a likely increase in the frequency of fire weather occurrence in this region, including an increase in temperature and greater variance in rainfall. In areas already affected by wildfire hazard, the fire season is likely to increase in duration, and include a greater number of days with weather that could support fire spread because of longer periods without rain during fire seasons. Climate projections indicate that there could also be an increase in the severity of fire. It would be prudent to design projects to be robust to increases in the severity and frequency of wildfire hazard. The wildlife hazard map is shown in Figure 4.22.

Figure 4.22 Wildlife hazard map for Karnali province



Source: https://thinkhazard.org/en/report/175-nepal/WF

[38] https://pdf.sciencedirectassets.com/craft/capi/cfts/

Key Physical Features

154. Key physical features in the PAI are summarized in Table 4.10.

Table 4.10 Summary of key physical features in the PAI by project component

Component	Subproject	Location	Key PCR features in PAI
1684.86 km of 11kV, and low-tension distribution lines	• New 11kV covered conductor (CC) and conversion (and rehabilitation) of bare 11kV lines to covered CC:463.29 km • New LT ABC and conversion (and rehabilitation) of bare LT lines to ABC: 1221.57 km	Salyan, Kalikot, Jarkot, Mugu, Jumla and West Rukum district	• Karnali province has elevation range of 180m to 7348m and more than 40% province area is located at altitudes above 4000m. • Topography is mostly complex to very complex terrain (some non-motorable) in all PAI of the sample distribution line site visited. • Surface water bodies: river/stream were crossed/passed along few of the sample alignments in Salyan, Jumla and Kalikot areas. • No ponds are found within any visited ROWs although few ponds are found within the PAI. • Ground water features like springs are found within a few ROWs and PAI • On most route alignments, especially the rural areas, intermittent (soil suspension) conditions were observed due to bad road conditions, unsurfaced roads.

Source: ADB's TA Consultant

3. Socio-economic Setting

155. The socio-economic study adopted a desk-based methodology with review and analysis of published secondary data[39] sources. Secondary data was also collected from Nepal Census statistics of 2021.

a. Administrative

156. Karnali province is the largest province in Nepal. Birendranagar, the province headquarters, is situated in the south of the province. The province is located in north-western Nepal and covers 10 districts. Among these Output 2(iii) distribution works will take place in Dailekh, Mugu, Kalikot, Jarkot, West Rukum and Jumla. The province shares its borders with province 5 to the south and east, Sudurpashchim to the west, Gandaki to the east and PCR to the north. A district is administered by the head of the District Coordination Committee and the District Administration Officer. The districts are further dived to municipalities or rural municipalities which are further divided into wards. There are 25 municipalities and 54 rural municipalities in the province. Figure 4.23 shows details of Karnali province administrative divisions.

[39] Acharya, K. P., Paudel, P. K. (2020). Biodiversity in Karnali Province: Current Statusand Conservation. Ministry of Industry, Tourism, Forest and Environment, Karnali Province Government, Surkhet, Nepal

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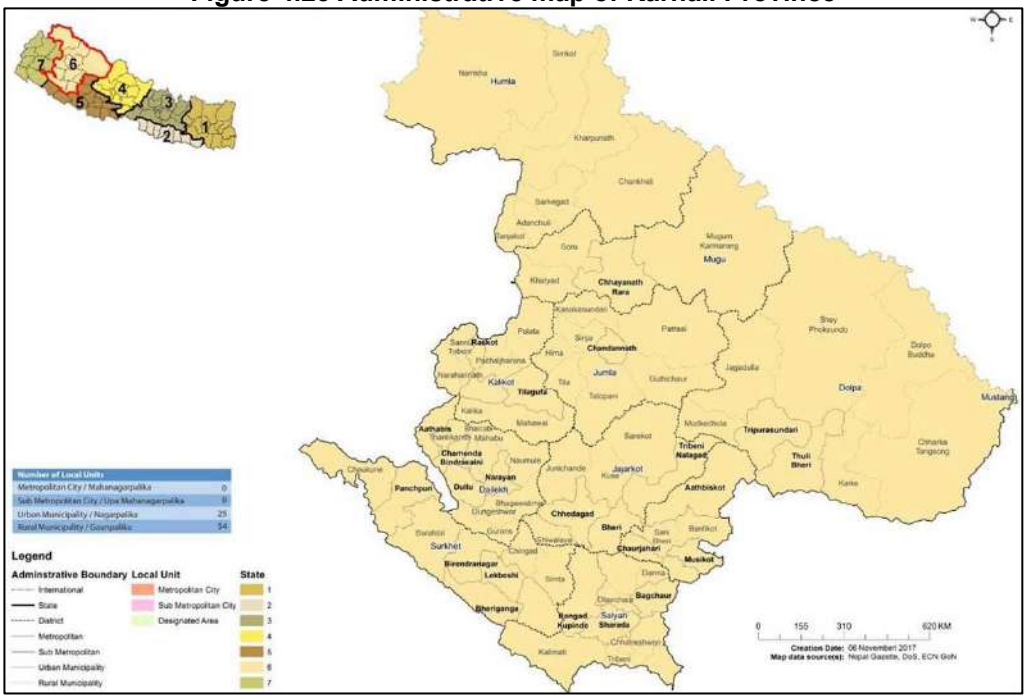
Figure 4.23 Administrative map of Karnali Province

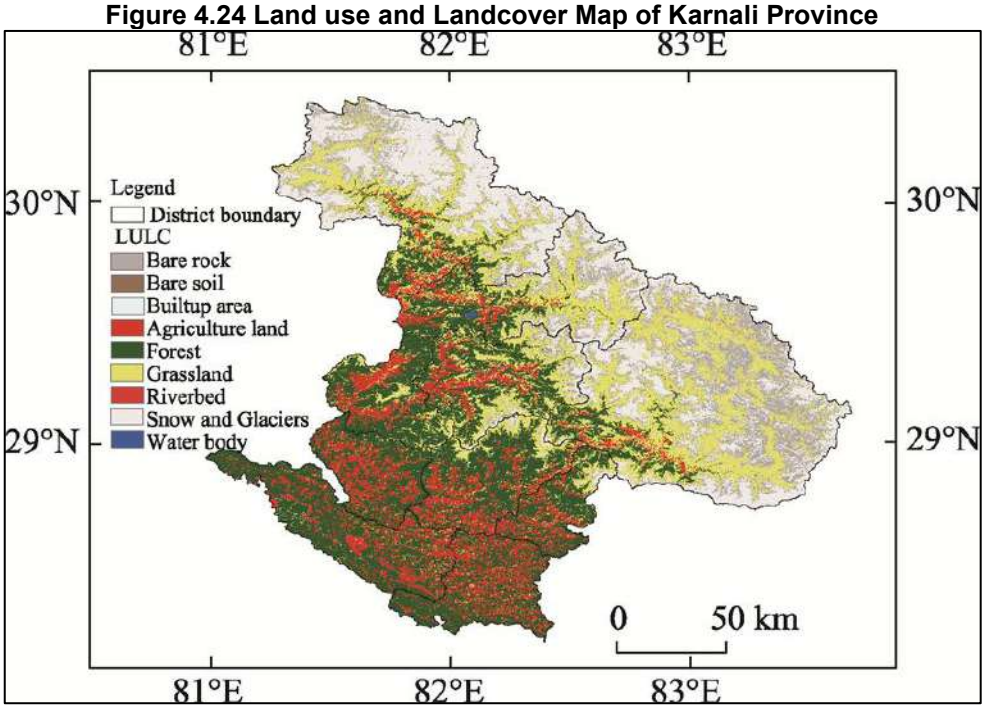


Source: https://un.org.np/map/nepal-administrative-unit-karnali-province-map

b. Land use

157. Karnali province lies between 80^{0}58'58" and 83^{0}40'57" E and 28^{0}10'7" and 30^{0}26'50" N. It has an area of 30,211 sq.km i.e., 21.6% of the total area of Nepal. Out of which 38% land is covered by forest, 12.8% grazing land and 3.2% shrub/grass land/bush area. Landcover and landcover map is provided as Figure 4.24.

Figure 4.24 Land use and Landcover Map of Karnali Province



Source: https://www.researchgate.net/figure/Land-cover-map-of-Karnali-Province-Note-Source-ICIMOD-Uddin-et-al-2015_fig1_372861537

c. Population characteristics

158. Karnali exhibits the lowest population density (~60 people per square kilometre) of any province in Nepal which creates significant challenges for cost effective provision of infrastructure and services – particularly in extremely remote areas of Humla, Mugu and Dolpa. High levels of out migration align with the national trend of migration to the Terai and abroad which is likely to continue with the exception of Surkhet which exhibits considerable urbanisation growth. According to the 2021 Census of Nepal, Karnali Province has a population of 1,688,412 comprising 864,651 females and 823,761 males. The province has the lowest population in the country, having 5.93% of the population on 19.74% of the land. The population density of the province is 56 people per square kilometer. Municipality wise population in Output 2(iii) districts are provided in Table 4.11.

Table 4.11 Project municipality wise population in Karnali Province (Census 2021)

Municipalities	Districts	Area (sq km)	Population
Bagchaur Municipality	Salyan	163.14	34021
Bangad Kupinde Municipality		338.21	32940
Chhatreshwori Rural Municipality		150.69	21242
Darma Rural Municipality		81.46	20139
Kapurkot Rural Municipality		119.21	17526
Kumakhmalika Rural Municipality		177.28	24859
Sharada Municipality		198.34	34663
Bheri Malika Municipality	Jajarkot	219.77	33515
Chhedagad Municipality		284.2	35295
Tribeni Nalagad Municipality		387.44	25590
Chandannath Municipality	Jumla	102.03	19047
Khandachakra Municipality	Kalikot	133.29	20288
Raskot Municipality		59.73	16272
Tilagufa Municipality		262.56	15766
Chhayanath Rara Municipality	Mugu	480.67	20082
Aathbiskot Municipality	Rukum West	560.34	33601
Chaurjahari Municipality		107.38	27438
Musikot Municipality		136.06	32939

Source: https://nepaloutlook.com/karnali-province/#:~:text=It%20has%20an%20area%20of,of%20Karnali%20Province%20is%2041%25. and CBS 2021 Census.

159. Population (Census 2021) summary for Karnali province[40]:

- Population: The total population of Karnali Province, as of the census day (25 November 2021) is 1,688,412 of which the number of males is 823,761 (48.79%) and the number of females is 864,651 (51.21%). Accordingly, the sex ratio is 95.27 males per 100 females. The total population was 1,570,418 with sex ratio of 95.69 males per 100 females in 2011.
- Population of other gender: the 2021 census includes information about the total number of males, female and 'other gender' (sexual and gender minorities) - there are a total of 2,928 individuals (0.01% of the total population) reported as 'other gender' nationally. The population of this community in Karnali province is 2.8% of the total 'other gender' population.
- Annual average population growth rate: Annual average population growth rate in Karnali province is 0.70% in 2021. Whereas this rate is 0.92% at national level. By district, the annual average population growth rate is the highest in Surkhet (1.62%) and the lowest in Dailekh (-0.35%) within Karnali province.

[40] https://censusnepal.cbs.gov.np/results/files/result-folder/province/Karnali_Province_census_report.pdf

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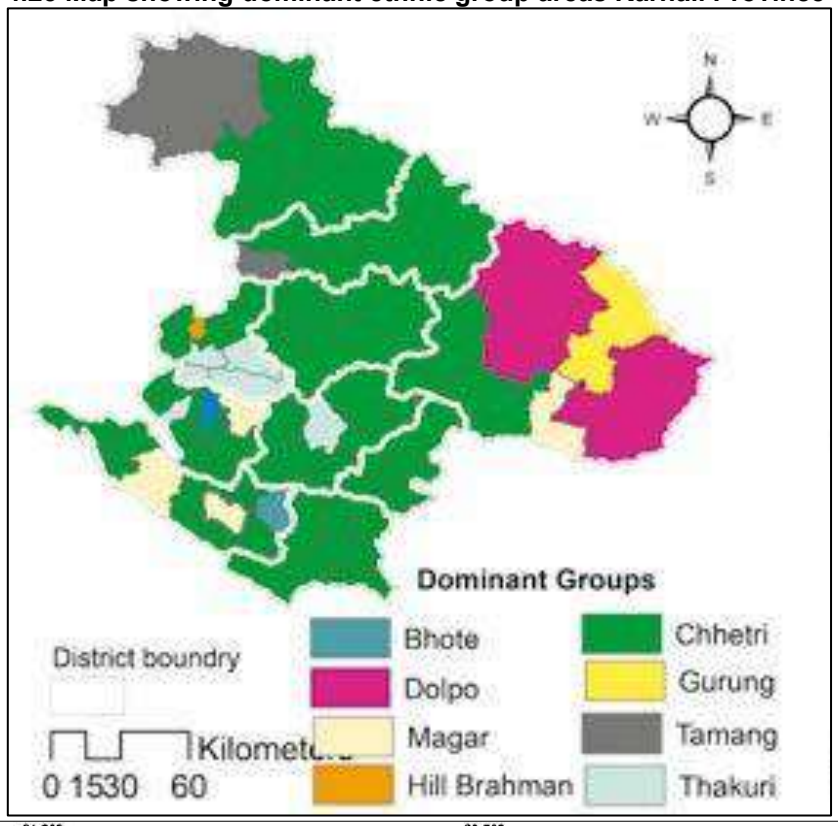
- Population density: The population density in Karnali province is 60 per sq km in 2021, which was 56 per sq km in 2011. Among the districts in Karnali province, the highest population density is in Surkhet district (169 per sq km) and the lowest in Dolpa district (5 per sq km).
- Population by broad age group: The census 2021 shows that 58.9% of total population in Karnali province is between the ages of 15–59 years. Similarly, the population aged 14 years or below and 60 years or above is 33.1% and 8.0% respectively.
- Number of households: The number of households in Karnali province has increased from 298,359 in 2011 to 366,255 in 2021, an increase by 22.8% over the decade, of which 366,037 are non-institutional and 218 are institutional households.
- Average household size: The census 2021 shows that average household size in Karnali province is 4.61 persons per household whereas it was 5.26 in 2011. Among the districts in Karnali province, the average household size is the highest (5.43) in Kalikot district and the lowest (4.24) in Surkhet district.
- Urban/Rural municipality population: In Karnali province, the population in urban municipalities has reached 52.1%, while the population in rural municipalities has reached 47.9% in 2021.

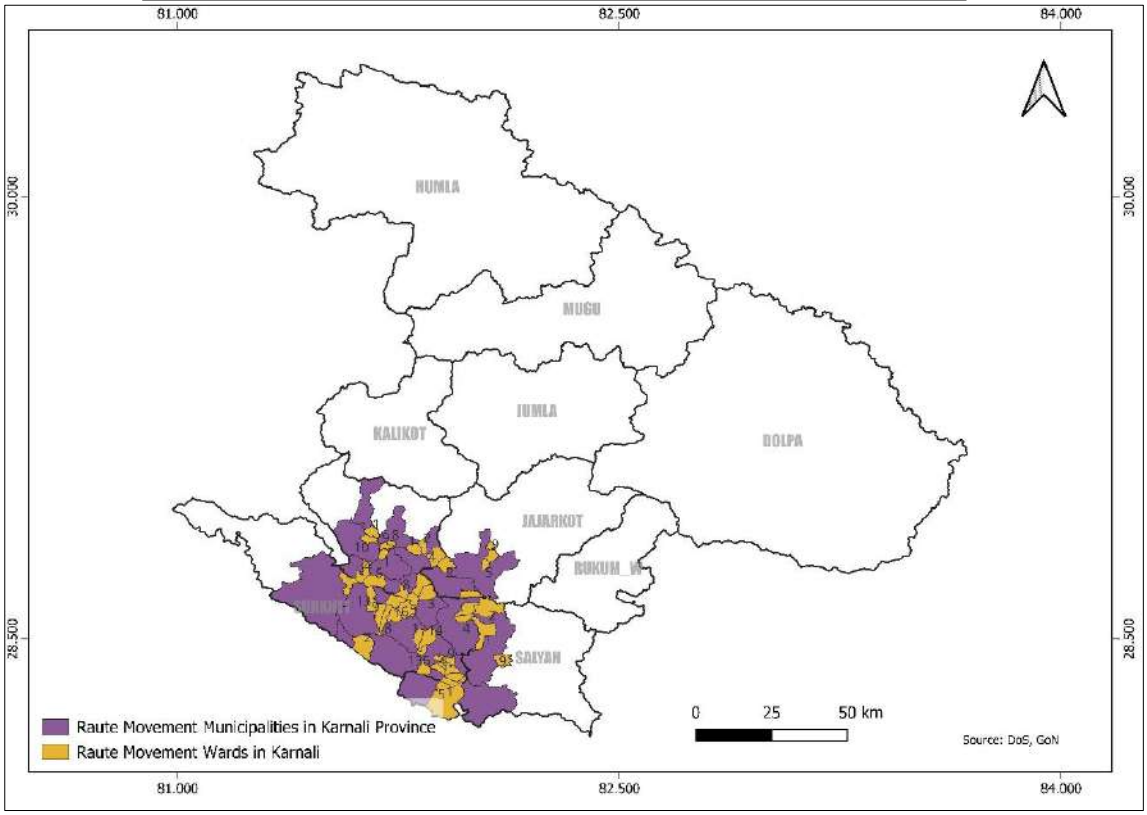
d. Vulnerable groups

Ethnic Groups

160. Karnali province is home to many ethnic and indigenous communities including, Nyimba (Raling area), Hultshodun (Hilsa), Thuktshulung (Kermi), Lime (Limi), Byasi (Lower Humla), Thakuri, Mugali, Dolfu, Mugum-Karmarong, Kaike (Tarali), Kham Magar, Raute (Nomad), Musto worshippers, Badi, Tharu, Raji, Bishwokarma, and others. There are at least 56 castes/ethnic groups in the Karnali province (Census, 2012). Chhetri, a hill origin caste group, is the most dominant caste group (41.84%) and Thakuri is the fourth largest group (10.30%). Hill Dalits (e.g., Kami, Damain, Sarki, Badi and Gaine) are the second largest social group with 22.9% of the total population, which also makes Karnali province the highest in terms of the population share of Dalits (Nepali et al., 2018). Caste/ethnic groups, namely, Chhetri, Thakuri, Kami, Badi, Hill-Brahmin, Damai, Gurung, Magar, Newar, Sarki, Tamang, Tharu and Sanyasi/Dashnami are distributed throughout the province. The province is also the homeland of Raute and Raji, two endangered ethnic groups of Nepal (CBS, 2012). Southern (e.g., Surkhert) and northern districts (e.g., Humla and Dolpa) are ethnically diverse in comparison with other districts (Figure 4.25). These groups are probably migrants from other parts of Nepal who have settled here for various purposes. 16 mother tongues (e.g., Achhami, Bhote, Belhare, Baitadeli, Bantawa, Bajhangi, Chhantyal, Dolpali, Jumli, Khash, Khamchi (Raute), Kaike, Limbu, Raji, and Rai) have very localized distributions with a varying degree of intensity and coverage. Rautes are the last nomadic people of Nepal and migrate in different districts of Karnali Province. Among the distribution line proposed for the project Bangad Kupinde Municipality's Ward Number 1 and 9 are two wards where they have been known to travel.

Figure 4.25 Map showing dominant ethnic group areas Karnali Province





Source:
https://kppc.karnali.gov.np/noticefile/PPC_Nepal_Regional_Report_Karnali_Province-_Final_copy_1616311073.pdf and NHRC, Nepal

Poverty

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161. Karnali has the highest Multidimensional Poverty Index (MPI) and lowest Human Development Index (HDI) value of all provinces, and all the districts have consistent HDI values lower than the national average of 0.579 (Table 4.12). The United Nations Country Team in Nepal (UNCTN) has listed eight of the ten districts in Karnali as among the least developed in the country based on a range of indicators including: rate of poverty; lack of alternative income and livelihood opportunities; landlessness, marginal landholding, and insecure property ownership; prevalence of caste and ethnic discrimination; socioeconomic status; and rate of education and literacy.

Table 4.12 Popoluation matrics and proverty indicators of Karnali Province

Characteristics	Nepal	Karnali province
Total population	26,494,504	15,70,418 (6% of Nepal's population)
Area	147,516 km²	30,211 km² (20% of Nepal's area)
Caste/ethnic group	126	56 (44% of Nepal's ethnic groups)
Lingual group	123	33 (27% of Nepal's lingual groups)
Multi-dimensional Poverty Index	0.127	0.23
Multi-dimensional Poverty rate	28.6%	51.2%
Population below Poverty line	18.7%	28.9%
Human Development Index	0.579	0.427

Source: Nepal Census, 2021

Children

162. Per Census 2021, of the total 204,638 children of age five years and below, 87.3% are found to have registered their birth and 12.7% are unregistered. Among the registered children, female children are 0.7% more than male.

163. The 2021 census shows that 11.4% of the total ever married women aged 15-49 (352,983) do not have any children ever born to them. The percentage of the ever-married women aged 15-49 with 2 children ever born to them is the highest at 28.0 percent. Similarly, 19.6 percent of the total ever married women aged 15-49 have 3 child ever born to them, while 2.1 percent of the women have 7 or more children ever born to them. Overall, a total of 352,983 ever married women aged 15-49 have given birth to 852,322 children as of the census date. Out of the total children ever born, 52.2% are males while 47.8% are females.

164. A total of 31,323 children were born in the last 12 months preceding the census, of which 16,311 (52.1%) were males while 15,012 (47.9%) were females. Among the total children born in the last 12 months preceding the census, 42.9% of the children were born to women aged 20-24 years. Among the total 677,048 children (population aged below 18 years), 81.6% of them live with both parents (father and mother), 13.2% live with their mother only, 0.9% live with their father only, and 3.3% live with other relatives.

165. **Childhood Illnesses**: in the two weeks before the survey (2021), 1% of Nepali children under age five and 4% of children in Karnali Province were ill with cough and rapid breathing, symptoms of acute respiratory infection (ARI). 23% of Nepali children and 28% of those in Karnali Province had recent fever. One in ten children in Nepal and Karnali Province had diarrhoea. There is little variation by population group.

166. **Childhood Mortality Rates:** infant and under-5 mortality rates for the five-year period before the survey are 28 and 33 deaths per 1,000 live births, respectively. In Karnali Province, the infant and under-5 mortality rates for the ten-year period before the survey are 36 and 46 deaths per 1,000 live births, respectively. 2021 census data shows that 6.4% of the children

ever born alive have died. Among the children who died, 57.2% are males and 42.8% are females.

Women

167. Overall, 32.1% of the total households (366,255) in Karnali province are headed by a female, which is an increase of 10.8% since 2011. The percentage of households headed by a female in 2021 is 31.6% in Nepal.

168. The 2021 census shows that 34.0% of the total population aged 10 years or above in Karnali province are never married. By sex, 37.9% of the total males and 30.4% of the total females aged 10 years or above are unmarried. Similarly, 61.5% of the total population aged 10 years and above are married and 4.0 percent are widow/widower. By sex, 59.8% of the total males and 63.2% of the total females aged 10 years or above are married.

169. A factsheet of women in Karnali province is provided as Figure 4.26. The practice of chhaupadi (a menstrual taboo which prohibits women and girls from participating in normal family activities while menstruating) is prevalent in the midwestern and far western regions including Karnali which reportedly affects 58% of women and contributes to female vulnerability.

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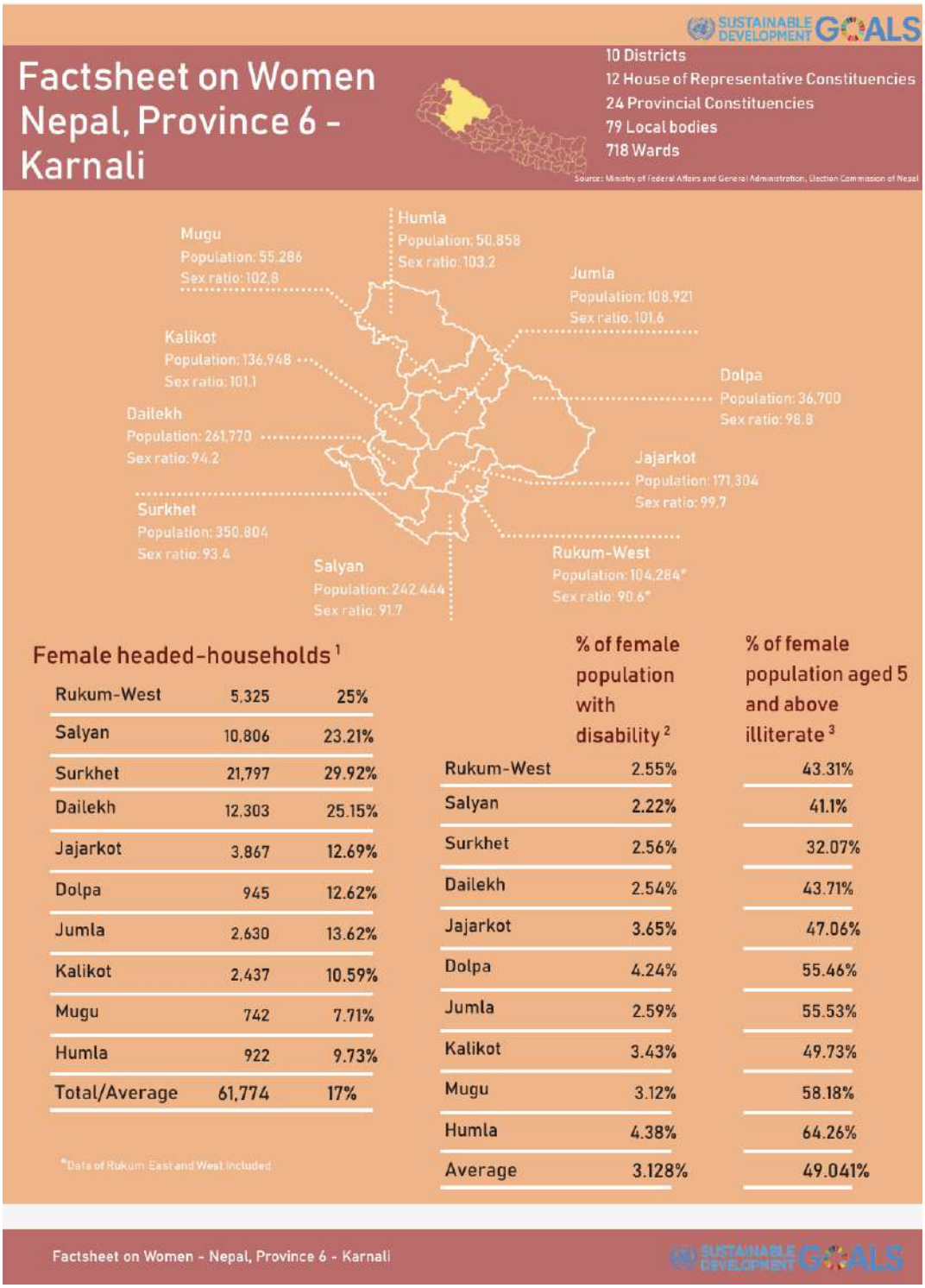
Disabled Persons

170. The 2021 census shows that 3.1% of the total population in Karnali province have one or other type of disability. Among the total persons with disability in this province, 55.6% are male and 44.4% are female.

Figure 4.26 Women factsheet in Karnali Province



Source: https://un.org.np/sites/default/files/doc_publication/2021-03/RevisedWomenFactsheet-2021-Province6-final%20revised_0.pdf

Religion

171. Karnali province is religiously diverse although Hindu is the dominant religion (95%). Buddhist is the second largest religion and is significantly presented in three districts: Dolpa, Humla and Mugu. Christian and Muslim comprised of 1.35% and 0.19% of the population respectively. The followers of Kirant, Prakiti, Bon and Bahai are less than one hundred (CBS, 2012). Masto followers are found in Humla, Kalikot, Jumla, Salyan, Mugu and Jajarkot districts.

e. Living conditions, health and sanitation

Living Condition and Health Status

172. Karnali province lags behind in economic indices despite being rich in natural resources. The multi-dimensional poverty rate is the highest in the Karnali province (Ministry of Finance, 2018). According to the Human Development Report, the human development index (HDI) of Karnali province is low at 0.469, far below the national average (0.490) (UNDP, 2019). The poor HDI value is attributed to the low life expectancy of Dolpa (61.20), Jumla (63.14), Kalikot (63.64) and Humla districts (64.15). The most deprived districts in terms of health care are Dolpa and Kalikot. Humla and Mugu have poor educational accessibility. Except for Surkhet, literacy rate is low in all districts as compared to Nepal's national average. Jajarkot is the most deprived districts in terms of access to safe drinking water. The highest prevalence of child malnutrition is in Humla, where more than 60 percent of children are malnourished (GoN, 2014).

173. The population of Karnali has the worst access to basic services (including health and education) of any province which can mostly be attributed to its remoteness as half the population lives more than an hour away from the closest facility or service. This has clear impacts on health outcomes and health indicators for Karnali are generally low by comparison to other provinces. Life expectancy (66) is the lowest in the country among the provinces. The infant mortality rate (47 deaths per 1,000 live births) is the second highest in the country.

174. In Karnali Province, 82% of health facilities offer all basic client services. While nearly all facilities in Karnali Province offer child curative care, child growth monitoring, modern methods of family planning, only 93% of facilities offer child vaccination services and 88% offer services for STIs. 88% of facilities have regular electricity and 66% have emergency transport. Just 1 in 10 facilities have communication equipment such as a functioning land-line telephone, cellular phone, or radio. Only 7% of facilities have all 6 basic amenities. Nearly half of facilities have a computer with internet. 46% of health facilities have all equipment items considered basic to providing quality client services (adult scale, child scale, infant scale, thermometer, stethoscope, blood pressure apparatus and light source). Child and infant weighing scales are the least commonly available basic equipment in health facilities in Karnali Province.[41]

175. In Nepal, 80% of women and 96% of men have heard of HIV or AIDS. Men in Nepal have greater knowledge of medicines to treat and prevent HIV than women. Overall, 37% of men aged 15–49 have heard that antiretroviral medicines (ARVs) treat HIV, compared to 26% of women. In Nepal, 37% of women and 33% of men aged 15–49 know that the risk of mother to child transmission (MTCT) can be reduced by the mother taking special drugs during pregnancy. In Karnali Province, 85% of women and 97% of men have heard of HIV or AIDS. Men in Karnali Province also have greater knowledge of ARVs (37%) compared to 26% of women. Finally, 43% of women and 32% of men know that the risk of MTCT can be reduced

[41] https://www.dhsprogram.com/pubs/pdf/SR284/SR284.pdf

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by the mother taking special drugs during pregnancy in Karnali Province.

Sanitation

176. According to the Census of 2021, only 35.64% inhabitants of Karnali have access to reliable sources of drinking water. Also, about 96.5% of households have not been tested for water hygiene. Out of 366,370 households, 235,000 households rely on alternative water sources, while 4,276 households rely on water from the river throughout the year. The 2021 census shows that tap/piped water (inside and outside household premises combined) is the main source of drinking water for 35.0% of the total households (366,037) in Karnali province. Other main sources of drinking water for households are tube well/hand pump 0.4%, jar/ boiled water 0.1%, spout 13.3%, covered well 2.1%, uncovered well 2.5% and river/stream 1.2% of the total households. The 2011 census had shown that tap/piped water was the main source of drinking water for 61.4% of the total households (298,174) while spout water was the main source of drinking for 24.1 % of the total households.

177. Out of the total 366,037 conventional households (excluding institutional households) in Karnali province in the 2021 census, 97.4% of the households use one or the other type of toilet facility, while 2.6% of them do not have access to any toilet facility. The 2011 census had shown that 48.2 percent of the total households did not have access to any toilet facility.

Education, literacy and languages

178. The literacy rate of the total population in Karnali province aged 5 years and above was 76.1% in the 2021 census. The literacy rate across Karnali is the second lowest in the country but with notable variation at the district level from 47% in Humla to 73% in Surkhet, and notable gender disparity between men (72%) and women (53%). Similarly mean years of schooling (2.83) across Karnali is considerably lower than the national average (3.9) and gender disparity in the level of education attained is significant. The male literacy rate is 83.3% while female literacy rate is 69.4% for this province. The largest proportion (30.9%) of the total literate population in Karnali province have completed primary level (class 1 to 5) of education. Similarly, 21.5% of the total literate population have completed lower secondary level (class 6 to 8), 8.0% have completed school leaving certificate (SLC) (or equivalent) and 15.8% have completed higher levels (above SLC or equivalent) of education. There are 3,167 schools in the province with 537,457 students including 277,186 girls and 260,271 boys. All together there are 11,840 teachers working in various levels of schools.

179. Karnali province comes to national prominence for being an origin of the Khas civilization and language and a home to the Bon religion. The Khas Nepali language, a dialect of the official Khas Nepali language, is originated in the Sinja Valley, Jumla district (Sharma, 1982). The Nepali language is the dominant language spoken by 96% population as a mother tongue although another 32 different mother tongues are spoken here. Four lingual groups, namely, Raji, Khamchi (Raute), Kaike and Dolpali are only spoken in the province. Magar is the second largest language (2% of the total population of the province).

f. Employment and livelihoods

180. Agriculture and forests are the mainstay of the province economy, providing a livelihood for three-fourths of the population and accounting for 32.9% of GDP. Industrial activity in the province is very low and it shares only 13.8% of GDP, while the service sector has a share of 53.3% in provincial GDP. Productivity of paddy in the province is 3.46 MT per ha, which is below the national average productivity of 3.8 MT per ha. Out of the total paddy production in the country Karnali Province comprises 2.4%. Similarly, 8.1% of wheat, 8.2% maize, 6.3% buckwheat and 43.7% barley is produced in the province. According to Ministry

of Agriculture and Livestock development, in the year 2020 Karnali Province has paddy plantation in 98.53% of the paddy fields in the province. In Karnali, GVA is comparatively low with the highest performing district (Salyan) ranked 39th nationally in absolute terms. There are 17,063 small and cottage and mini industries in the province registered under the Department of Industry. Similarly, there are 2,670 companies registered under the Company Act in the province. The census results show that out of total households in Karnali province, there are 32,463 (8.9%) households operating small scale enterprises other than agriculture with no paid employee. Among such households, 6,916 (21.3%) operate cottage industry, 16,168 (49.8%) operate trade/business, 1,252 (3.9%) operate transportation, 3,896 (12.0%) operate service related and 4,231 (13.0%) operate other types of such small scale enterprise in the province, of which 53.5 percent are mainly operated by males and 46.5 percent by females.

181. Out of 1,337,893 aged 10 years or above usually residing population in Karnali province, 926,340 were engaged in some kind of economic activities in the last 12 months preceding the census. The census results show that 42.5% of the population aged 10 years or above worked for 6 months or above, 26.7% worked for less than 6 months and 30.8% did not do any kind of economic work during the reference period.

182. As per the Census 2021, of the total 1,337,893 population aged 10 years or above, 958,643 persons (71.7%) are classified as economically active and 373,017 persons (27.9%) not economically active, while 6,233 persons did not report their status. Out of the total 958,643 economically active population, 668,715 persons (69.8%) are usually economically active and 289,928 persons (30.2%) are not usually economically active. The census 2021 shows that among the total 668,715 usually economically active population, 618,487 persons (92.5%) are usually employed and 50,228 (7.5%) are usually unemployed. Among 926,340 persons engaged in any economic activity during the reference period, the highest share of people (69.8%) are agriculture, forestry and fishery skilled workers, second largest share is elementary workers (manual labours) (14.1%) followed by service and sales workers (3.4%), managers (3.2%), crafts and trade workers (3.0%), professionals (2.9%), technicians and associate professionals (1.1%), plant and machine operators (1.0%), armed forces (0.8%) and office assistants (0.7%).

183. Agriculture and livestock farming is the mainstay occupation in Karnali province. Subsistence agriculture is common in Surkhet, Dailekh and Jajarkot (Census 2021). Livelihood strategies evolve with the availabilities of resources. Despite the largest land area of any province, Karnali has only 287,962 hectares of agricultural land and with only 27,603 hectares (~10%) currently under irrigation. Thus, overall output and GVA remains low. However, the range of ecological zones present significant opportunities and demonstrate comparative advantage in a wide range of agricultural areas. Forests play an important role in sustaining livelihoods of the majority of population in Karnali province. The province is rich in aromatic and medicinal plants, in which Dolpa alone shares 57% of Nepal's medicinal and aromatic plants. People living in the northern frontiers along international borders rely on Himalayan medicine called 'amchi' for curing various diseases. Amchi has a vast knowledge of medicinal plants and plays many roles as a physician, veterinarian and spiritual healer. Non-timber forest products (NTFP), mainly medicinal plants, play a crucial role in supporting local livelihoods. NTFP collection is the only means of cash income and may contribute up to 50% of the annual average household income (Edwards, 1996; Olsen and Larsen, 2003). NTFPs contribute a large proportion of households' income for the collecting households in study area of Humla (25%) (Subedi, 1999), Jumla (58%) (Timmermann and Smith Hall 2019) and Dolpa districts (53%) (Shrestha and Bawa 2014). Many people of Dolpa, Humla and Jumla largely practice livestock husbandry where proportions of grasslands are comparatively higher than the rest of five districts. The transhumance system of animal husbandry is popular in the Himalayan region of Humla, Dolpa and Mugu where agriculture yields are hardly enough to

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meet subsistence needs.

According to the Nepal Labor Migration Report (2020), Karnali province makes up only 3% of labor migrants of Nepal. Seasonal labor migration, mostly to Indian cities, is quite common for centuries (KPPC, 2020).

g. Land ownership, assets, and economic development

184. As per Economic Survey (2019/20), Karnali Province contributes 4% to national GDP and it is estimated to have a growth rate of 3.6% in the fiscal year 2019/20. Income per capita ($783) is the second lowest in the country at the provincial level. However, it ranges from $578 in Kalikot to $1,040 in Dolpa revealing significant variation within the province and the realisation of productive economic activity in fairly remote areas like Dolpa. The significant positive impact is due to the production of goods of comparative advantage such as yarcha gumba and others herbs and apples exported to the market despite the connectivity bottleneck.

185. There are 439,717 building structures in the Karnali province, out of which, 72.7% have been mainly used for residence, 9.6% for shed or storage, 8.5% vacant, 2.5% for business/trade, 2% for educational purpose, 0.2% for institutional use, 0.3% for hotel and lodge, 0.2% for industry/factory, 0.5% for government, 0.3% for health-related purpose, 0.1% for bank and financial institutions and 3.1% for other purpose. Out of the total 366037 conventional households, 94% reside in their own housing units while 5.3% reside in rented housing units in 2021. In the 2011 census, the proportions of the households residing in their own housing units and rented housing units were 94.4% and 4.6% respectively. According to the 2021 census, 0.4% of households live in institutional housing units and 0.3% of households live in other type of housing units. Overall, 12.5% of the total households have ownership of land or a housing unit or both (land & housing unit) in the name of female household member. The percentage of the households with female ownership of both land and housing unit is 6.2%, which is an increase of 1.7% compared to that in 2011.

186. **Access to electricity**: In Nepal, 97% of the household population has electricity (Figure 4.27) compared to 83% of the population in Karnali Province. Karnali Province has immense potential of hydropower. But it has not seen a considerable growth in electrification till date. According to a Nepal Electricity Authority report only 34.75% households in the province are electrified.

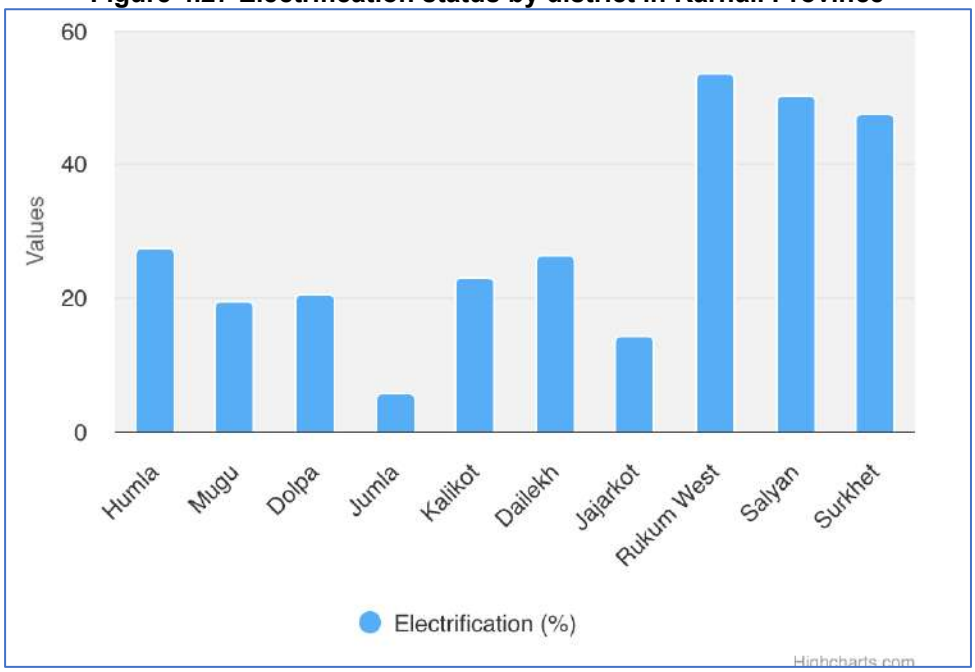
187. **Main source of fuel for cooking and heating:** In Nepal overall, 42% of the household population uses clean fuels and technologies for cooking compared to 18% in Karnali Province. The 2021 census shows that 82.2% of the total households in Karnali province usually use wood/firewood as the main source of fuel for cooking. Other main sources of fuel for cooking are liquefied petroleum gas (LPG) 16.9%, biogas 0.4%, electricity 0.1% of the total households. The 2011 census had shown that 94% used wood/firewood and 3.9% of the total households usually used LPG as the main source for cooking. Only 9% of the population in Nepal and 4% of those in Karnali Province have heating. Nearly three quarters of those in households with heating use clean fuels and technologies for heating, amounting to just 6% of the overall population and 2% in Karnali Province.

188. **Main source of lighting:** The census 2021 shows the percentage of the households that use electricity (Figure 4.25) as the main source of lighting has increased to 49.6% in 2021 from 21.7 percent in 2011. Other main sources usually used for lighting are solar energy 47.9%, kerosene 0.5% and other sources 1.9% of the households in 2021. The percentages of households that use solar and other energy sources for lighting were 33.4 and 38.6% respectively in 2011. Nearly all the household population uses clean fuels and technologies

for lighting.

189. **Household assets/amenities:** The 2021 census results show that 7.2% of the total households do not have any household assets/amenities, while 92.8% of the households have at least one household asset/amenity. By type of household assets/amenities, 82.2% of households have ordinary mobile phones followed by 58.4% of households with smart mobile phones. Similarly, other assets/amenities available in the households are radio 45.9%, internet facility 20.3%, television 17.6%, electric fan 12.4%, motorcycle/scooter 6.7%, computer/laptop 5.6%, refrigerator 4.7%, bicycle 1.8%, landline telephone 1.9% and car/jeep/van 0.8%, washing machine 0.3%, air conditioner 0.1% of households.

Figure 4.27 Electrification status by district in Karnali Province



Source: https://nepaloutlook.com/karnali-province/#:~:text=It%20has%20an%20area%20of,of%20Karnali%20Province%20is%2041%25.

h. Infrastructure and accessibility

190. Total number of electricity consumers in the province is 94,662, consuming 46,525 MWh of energy annually. According to NEA, Distribution and Consumer Service Directorate loss of electricity in the province is 15.66% for the year 2019/2020. Out of the total loss in distribution Rukum (west) provincial office, contributes the highest loss percentage of 23.96%.

191. 2725 km of road is constructed in the province. Out of total road constructed only 79 km is blacktopped, 193 km road is gravelled and 2453 km road is earthen. The challenge of infrastructure connectivity and transportation is particularly acute in Karnali due to the large land area, low population density and extremely challenging topography which results in expensive and technically complex infrastructure requirements. Karnali is connected by road to the north via Hilsa into PCR, to India via Nepalganj in neighbouring Province 5, and through Rukum (West and East) also in Province 5. Several airports and air strips connect Karnali to Kathmandu (from Surkhet) and Nepalganj (multiple routes, e.g. Jumla, Dolpa, Simikot). Freight is moved exclusively by road or tracks within Karnali. Karnali's rural road density, measured as km of roads in 100 sq. km of geographical area, is the lowest of any province. Moreover, where the road network exists and, in comparison to other provinces, the distribution of road access is very unequal, e.g. 16 of 79 municipalities are not yet connected

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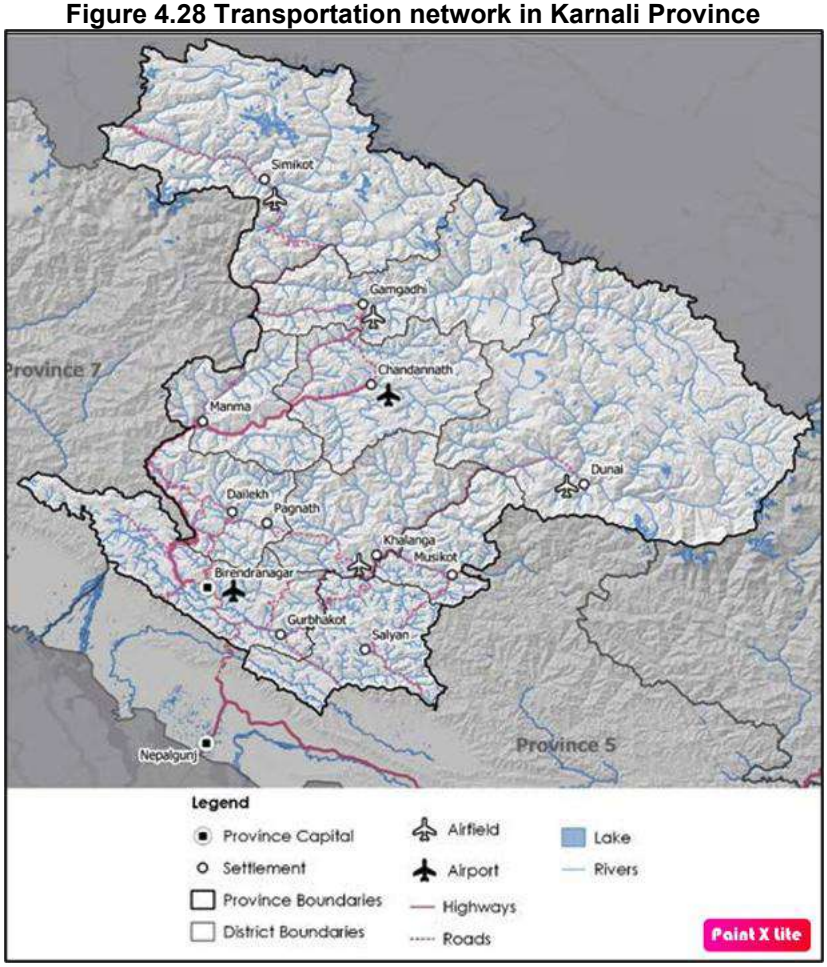
by road. Transportation map is shown as Figure 4.28.

Figure 4.28 Transportation network in Karnali Province



Source: https://kppc.karnali.gov.np/noticefile/PPC_Nepal_Regional_Report_Karnali_Province-_Final_copy_1616311073.pdf

192. Karnali's main challenge for economic development remains, to date, linking the northern high-mountain areas to the southern areas in the hills and valleys of Surkhet across approximately 200km of rugged terrain through the mid-hill area to facilitate interdependencies among clusters and deliver services for people.

i. Sensitive receptors

- Distribution lines – some schools on road are crossed; some temples/monasteries are also along ROWs, health facilities like PHC are close to some lines as seen in Jumla bazar.
- Multiple existing distribution lines are crossing residences (mostly to be rehabilitated), private lands, and croplands as the most sensitive receptors.
- Ensure lines in Bangad Kupinde Municipality's Ward Number 1 and 9 do not infringe into rights if Rautes the Nomadic Hunter Gatherer Ethnic Group of Nepal (last nomadic people).

Key Socio-Economic Features

193. Key socio-economic features in the PAI are summarized in Table 4.13.

Table 4.13 Summary of key socio-economic features in the PAI by project component

Component	Subproject	Location	Key PCR features in PAI
1684.86 km of 11kV, and low-tension distribution lines	• New 11kV covered conductor (CC) and conversion (and rehabilitation) of bare 11kV lines to covered CC:463.29 km • New LT ABC and conversion (and rehabilitation) of bare LT lines to ABC: 1221.57 km	Salyan, Kalikot, Jarkot, Mugu, Jumla and West Rukum district	• Based on government records Karnali Province is 83% has access to electricity • All lines in six districts pass through rural/IP areas. • Land use in the PAI includes settlements, forest, and cultivations (fallow and cropped). Lines will pass through settlement - both dense and isolated and some remote. • Settlement along ROWs include houses, croplands, public utility buildings, hotels/shops, markets. • Sample route alignments visited were mostly along roads, but some sections of the alignments pass along/cross croplands and some in private land over houses/shops. • Along the roads in the rural areas are entrances to private properties, houses and shops. • Many lines pass adjacent and over private properties, houses, courtyards. Individual properties were recorded within the RoWs and safety clearances in most areas are not met. • Sensitive land use like schools and were recorded in some alignments in Jumla. • Road crossings were present on many alignments. • A number of incidents/deaths related to Operational Health & Safety (OHS) of NEA staff and community health and safety regarding electrcial supply issues have been noted in the past as reported by NEA staff/locals. • The province is highly susceptible to frequent strong winds, flooding, earthquake of low magnitude, landslide, mudslide and erosion, brought about by heavy rains during the monsoon. • Human use of surface water is mostly limited to cleaning and washing whilst groundwater is used for drinking where supply water is not provided across some of the PAI.

Source: ADB's TA consultant

4. Physical Cultural Resource Setting

194. The physical cultural resources (PCR) in the Output 2(iii) distribution components PAI and surroundings, which may be directly or indirectly impacted by the distribution line works are discussed in this section.

a. World Heritage Sites

195. Presently, Karnali Province has no UNESCO Natural World Heritage Sites. However,

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there are two on the tentative World Heritage List for Cultural values – Sinja valley in Jumla district and Bhurti Temple Complex of Dailekh district.

196. Sinja Valley contains the archaeological evidence of the capital city of the well organized and influential Western Malla or Khasa Kingdom of the 12th and 14th Century. Excavations have revealed the remains of old palaces, temples (Kanak Sundari, Tripura Sundari) and the old settlement. A ring of huge monolithic stone columns was found surrounding the ruins of the ancient settlement with a Malla gateway and steps. Earthen pipes were excavated testifying to an elaborate water supply system. There are caves with ancient votive Buddhist chaityas and cliff inscriptions. Even today the ancient rites of the Masto (Shamans) are practiced in many of the stone Dewals or temples. The Sinja Valley was where the Nepali language originates from and the earliest examples of the Devanagari script from the 13th Century were found on the cliffs and in nearby Dullu. Sinja river runs through the Sinja valley before joining the Karnali in Kalikot district. The whole area is marked by paddy fields, a preserved vernacular architecture and several heritage sites -- medieval stone pillars, śikhara temples and fountains. Archaeological artefacts found throughout the area indicate the presence of Buddhism from at least the early 12th century and up until the 16th century. Hinduism is attested from approximately the 13th century and is still practiced today. Individual monuments (Figure 4.29 and Table 4.14) are:

- JUM0043 Kanakasundari Mandira
- JUM0044 Tarpibada pillars
- JUM0045 Tarpibada śikhara temple 1
- JUM0046 Tarpibada śikhara temple 2
- JUM0047 Tarpibada fountain
- JUM0048 Bistabara śikhara temple 1
- JUM0049 Bistabara śikhara temple 2
- JUM0050 Bistabara śikhara temple 3
- JUM0051 Bistabara stone memorial pillar
- JUM0052 Bistabara śikhara temple 1
- JUM0053 Bistabara stone memorial pillars
- JUM0054 Narakot stone memorial pillars
- JUM0055 Lihi stūpa and stone memorial pillar
- JUM0056 Bhirat Durbar Temples
- JUM0057 Hatsinja stone memorial pillars
- JUM0058 Jãcha fountain
- JUM0059 Sanjyalbādā śikhara temples
- JUM0060 Sahubādā archaeological artefacts
- JUM0061 Sahubādā stone inscription of Ripu Malla
- JUM0062 Sahubādā koṭa
- JUM0063 Rasipatan temple and stone memorial pillar
- JUM0064 Lekhpur Lama Mandira
- JUM0065 Kham stone memorial pillars

197. There are several sites in Karnali province which originate from the Khasa Kingdom such as the Sinja Valley and Dullu where various structures have been found; Pancha Dewal, stone columns and the ruins of palaces. With further research it would be possible to consider the nomination of both sites included on the tentative list within the context of the ancient Uttar Pata or Northern Route which linked the Gangetic plains to Western Tibet and the Silk Route.

b. National and Provincial cultural heritage sites

198. Karnali province is well-known as an origin of the Khas civilization and language and a home to the Bon religion and Musto culture. Kankre Bihar, a place well-regarded by both

Hindu and Buddhist, is located in the province. It is believed to be the oldest and largest Shikhara style stone carved temple and Bihar of Nepal (KPPC, 2020). A district wise list of natural monuments in Karnali Province, regulated by the Ministry of Culture, Tourism and Civil Aviation, Ministry of Forests and Environment and District coordination committee, Nepal is provided in Table 4.14. The sample distribution lined versus PCR sites are provided in Figure 4.29 and Figure 4.30. **The list of nationally protected monuments needs to be updated in finalizing the IEE and before the commencement of work as the details were not available from the Department of Archaeology at the time of preparing the draft, and it needs to be confirmed if the available list is correct and comprehensive and where the site boundaries are located so that it can be determined which routes (if any) will impact them. If any lines in cultural landscape sites, then it will be confirmed in updating the IEE and the selection criteria may be refined in respect of distinguishing between heritage and cultural landscapes with or without existing power lines already present.**

Table 4.14 National PCR Monuments in Karnali province

ID/Status	Name/ Description site and individual monuments	District	Nearest Sample Distribution Line	Distance (km) to nearest Sample Line	Coordinate location
WHS sites (tentative listed)					
Sinja Valley - NP-JUM-03 National Protected Monument/Site and Tentative listed WHS site	• JUM0043 Kanakasundari Mandira	Jumla	Patrasi 11kV new Line	23km	29°25'0.21"N, 82° 1'27.41"E
	• JUM0044 Tarpibada pillars		-		Location to be identified
	• JUM0045 Tarpibada śikhara temple 1		-		
	• JUM0046 Tarpibada śikhara temple 2		-		
	• JUM0047 Tarpibada fountain		-		
	• JUM0048 Bistabara śikhara temple 1		-		Location to be identified
	• JUM0049 Bistabara śikhara temple 2		-		
	• JUM0050 Bistabara śikhara temple 3		-		
	• JUM0051 Bistabara stone memorial pillar		-		
	• JUM0052 Bistabara śikhara temple 1		-		
	• JUM0053 Bistabara stone memorial pillars		-		
	• JUM0054 Narakot stone memorial pillars		Patrasi 11kV new Line	19km	29°20'49.51"N, 82° 0'48.68"E
	• JUM0055 Lihi stūpa and stone memorial pillar		-		Location to be identified
	• JUM0056 Bhirat Durbar Temples		-		Location to be identified
	• JUM0057 Hatsinja stone memorial pillars		Patrasi 11kV new Line	23km	29°24'37.42"N, 82° 1'6.28"E
	• JUM0058 Jãcha fountain		Patrasi 11kV new Line	24km	29°22'32.24"N, 81°58'27.76"E
	• JUM0059 Sanjyalbādā śikhara temples		-		Location to be identified
	• JUM0060 Sahubādā archaeological artefacts		-		

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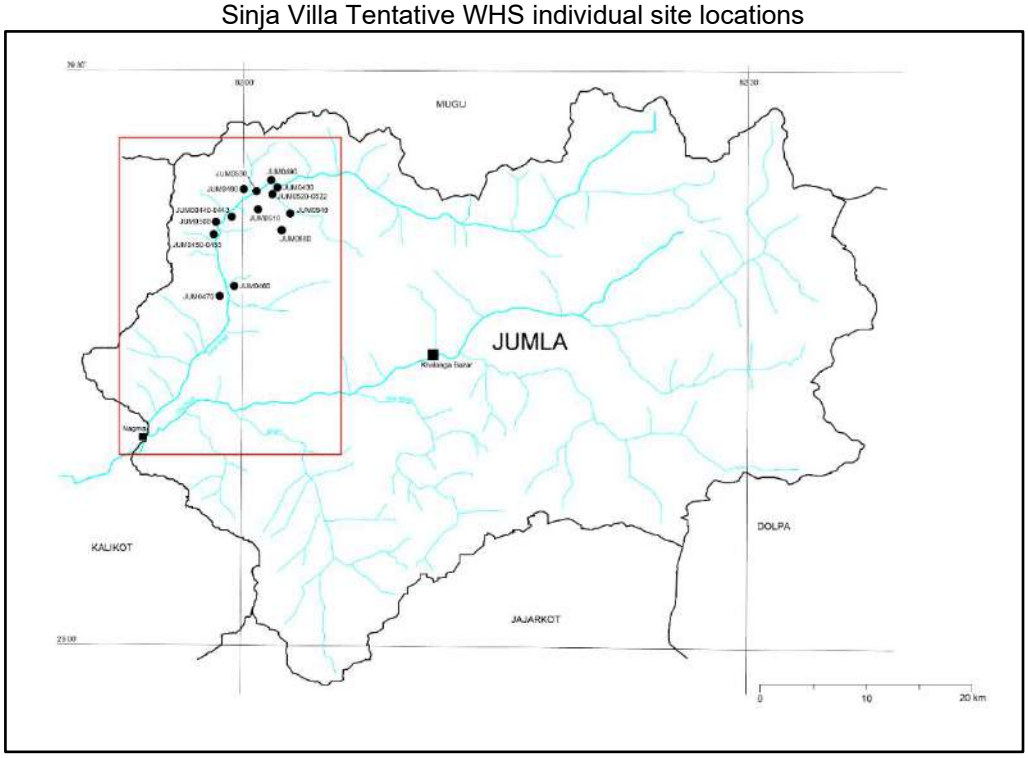
ID/Status	Name/ Description site and individual monuments	District	Nearest Sample Distribution Line	Distance (km) to nearest Sample Line	Coordinate location
	• JUM0061 Sahubādā stone inscription of Ripu Malla		--		
	• JUM0062 Sahubādā koṭa		-		
	• JUM0063 Rasipatan temple and stone memorial pillar		-		Location to be identified
	• JUM0064 Lekhpur Lama Mandira		-		Location to be identified
	• JUM0065 Kham stone memorial pillars		-		Scattered in the Sinja valley - Locations to be identified
Nationally Protected Monuments					
		Jajarkot			
-	Chalna Daab		-		Location to be identified
-	Sai Kuwari lek		-		Location to be identified
NP-JUM-01	Dansaghu Dobhan	Jumla	Patrasi 11kV new Line	22km	29°19'0.72"N, 81°59'0.10"E
NP-JUM-02	Pandava Cave		Patrasi 11kV new Line	24km	29°23'23.14"N, 81°58'55.36"E
NP-JUM-03 and WHS Tentative Listed	Sinja Valley		Patrasi 11kV new Line	22km	29°10'59.20"N, 81°34'59.56"E
NP-JUM-04	Tatopani		Patrasi 11kV new Line	15km	29°14'21.36"N, 82° 3'4.75"E
NP-JUM-05	Tila Valley		Patrasi 11kV new Line	21km	29°13'30.87"N, 81°59'29.64"E
NP-MUG-10	Rara Lake	Mugu	Soru 09 HT Line Soru Ward Number-8	9 km	29°32'24.61"N, 82° 5'0.54"E
NP-MUG-11	Rara National Park			9km	29°32'24.61"N, 82° 5'0.54"E
NP-MUG-12	Saipal				
NP-WRUK-01	Dajire Lake	West Rukum	None in 100km		28°59'49.35"N, 80°17'56.58"E
NP-WRUK-02	Khara Lake		None in 75km		28°33'5.69"N, 82°26'39.79"E
NP-WRUK-03	Sital Pokhari				28°37'5.38"N, 82°28'5.92"E
NP-WRUK-04	Sankha Lake				28°36'6.43"N, 82°32'5.36"E
NP-WRUK-05	Syarpu lake				28°41'48.88"N, 82°29'7.54"E

*Nearest components and distances subject to reconfirmation following route alignments and mapping of lines by the EPC contractor
Not located: These are recorded as protected but locational details are not available.
Source: ADB's TA Consultant.

Figure 4.29 Maps showing tentative World Heritage sites, national protected monuments/landscapes and sample distribution line areas

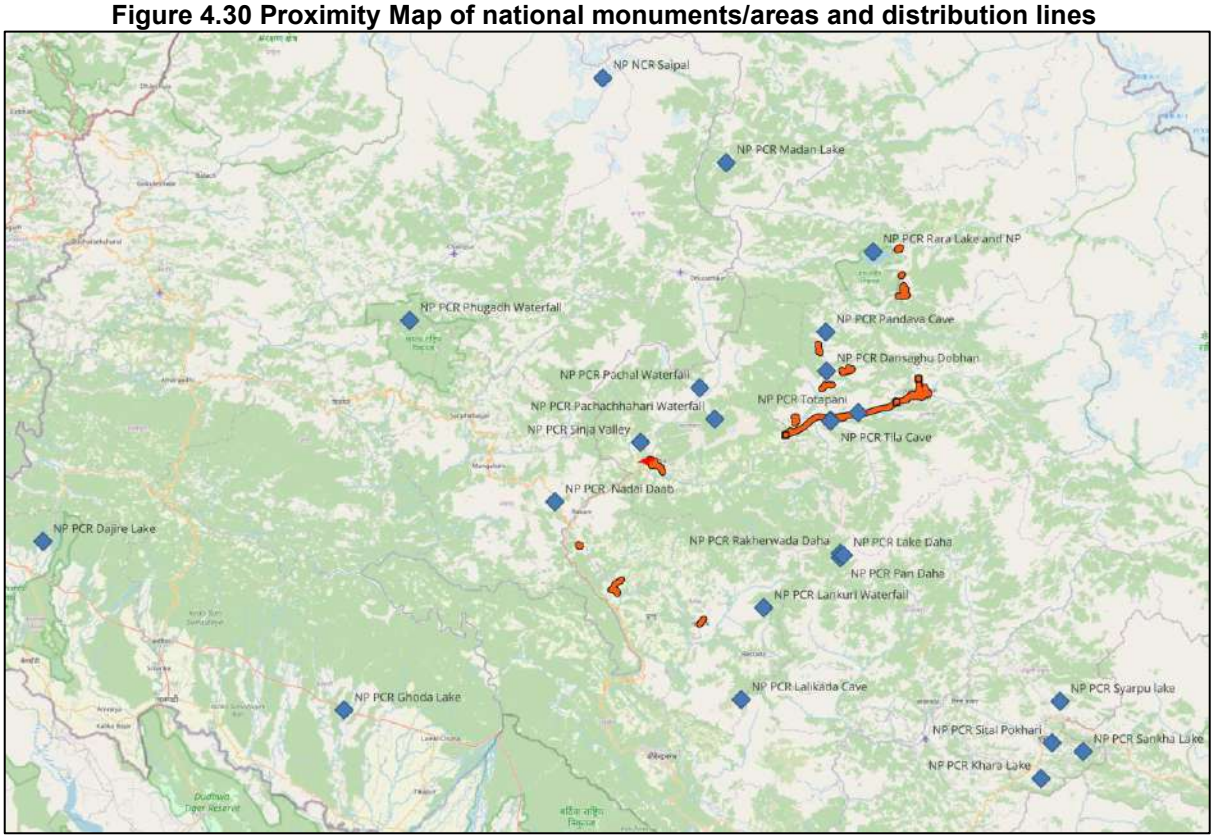
Distribution Line (Red lines), PCR (Blue)

Sinja Villa Tentative WHS individual site locations



Source: https://danam.cats.uni-heidelberg.de/heritage-foucus-area-sinja-valley/

Figure 4.30 Proximity Map of national monuments/areas and distribution lines



Source: ADB's TA Consultant

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c. Local culture and festivals

199. Karnali Province is the cultural capital of Buddhism, Bon, Khasha and Musto practitioners. Karnali Province serves both as a destination as well as a gateway to Mount Kailash and the holy Lake Manasarovar, the most sacred pilgrimage hub for pilgrims of Buddhism, Hinduism, Bon and Jainism. Shey festival, Dho Tarap festival, Raling Purni festival, Chharka Bon festival are some of the significant festivals of touristic importance in Karnali. Himalayan Amchi (Buddhist Medicines) practices are an added value for the region.[42]

200. Many traditional dances (unique to Karnali) such as Tappa Nach, Mayur Nach, Paisari Nach Singaru Nach, Lakhe Nach, Shaman/Jhankri Dance; and many festival and events such as Papini Festival, Musto Festival, Malika Festival, Chhayachhetra Festival, Janai Purnima Festival have tourism significance. Many ethnic villages such as Buraunse Village in Humla, Silpagaon in Jajarkot, Khara Village in Rukum West, Murma Top Village in Mugu, Janu/Rajigaon Village in Panchapuri (Surkhet), Limi Village in Humla, Rakam Village and Dullu Village in Dailekh can be promoted as cultural homestay villages.

d. Archeological value of the terrain

201. After Nepal Mandala (Kathmandu Valley), Karnali Province of modern day Nepal is the second richest ancient kingdoms in terms of history and outstanding archaeological monuments. The history and civilization of Karnali Province closely resembles to that of the civilization of Kailash Region (Zang Zhung) which has a proven civilization history of at least 5000 years. Kaigaon areas, Pugmo village, Rigmo village, Vijer, Chharka village are the hot spots with Bon related monasteries and monuments. Significant and oldest Bonpo monasteries include Rigmo monastery (Phoksundo Lake), Seteng Yungdrung Shuktsel Gonpa (Barley), Riwo Bumgon Gonpa (Dho Tarap), Deden Phuntsok Ling Gonpa (Tsarkha), Yungdrung Tsomo Gonpa (Pugmo) etc. Buddhist monasteries of Karnali Province with outstanding historical and archaeological values include Halji Gomba (In Limi Valley), Namkha Khyung Dzong Gomba (in Yalbang Humla), Raling Gomba (near Simkot), Shey Gomba (Shey, Dolpa), Ribo Bhumpo Gonpa (Dho Tarap), Jampa Gonpa (Dho Tarap) Margom Yetsher Gonpa (Saldang), Langgon Neser Gonpa (Bijer), and Tiyar Gomba (in Upper Mugu). The archaeological remains and inscriptions found in Surkhet, Dailekh, Jajarkot, and Jumla reveal that Karnali Province was the heart of the Khasha Kingdom, Dullu and Sija being the summer and winter palatial sites respectively. Other archaeologically important monuments include Devals, Pillars, Naulis, Chaityas, Temples and images of Buddha and Chaitya with inscriptions in Dullu, Dailekh, Kalikot, Jumla, Sinja, Jajarkot etc. Based on the available information, there is high potential for chance find in Karnail province.

[42] https://moitfe.karnali.gov.np/sites/moitfe/files/2022-01/Final%20English%20Karnali%20Province%20Tourism%20Master%20Plan.pdf

Key Physical Cultural Resources Features

202. Key PCR features in the PAI are summarized in Table 4.15.

Table 4.15 Summary of key physical features in the PAI by project component

Component	Subproject	Location	Key PCR features in PAI
1684.86 km of 11kV, and low-tension distribution lines	• New 11kV covered conductor (CC) and conversion (and rehabilitation) of bare 11kV lines to covered CC:463.29 km • New LT ABC and conversion (and rehabilitation) of bare LT lines to ABC: 1221.57 km	Salyan, Kalikot, Jarkot, Mugu, Jumla and West Rukum district	• No WHS sites: No lines passes through. • No National protected cultural landscapes are intersected by distribution line. • The Rara-Mugu area 11kV and LT lines are within 500m of the Rara Lake/NP considered as national monuments. and overlapping the Buffer zone. All such will be dropped. • Locally important cultural and religious places like small temples/monasteries are located throughout the 6 project districts and some are within/adjacent to the ROWs. • High potential for chance finds exists where there is undisturbed land (new pole)

Source: ADB's TA Consultant

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V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Introduction

203. This section identifies and assesses the potential and perceived environmental impacts and risks that can be expected from the Output 2(iii) distribution components of the project. It summarizes the potential impacts and risks identified (Table 5.4), mitigation measures to address those impacts, which are incorporated into the project level EMP and the residual impacts which will remain post mitigation.

204. Potential impacts that are expected to occur will be site-specific, and few if any of them should be irreversible. Environmental impacts and risks on the physical, biological and socioeconomic (including occupational and community health and safety, vulnerable groups, impacts on livelihood) and physical cultural resources (PCR) in the project's area of influence (PAI) were considered in terms of nature of impact (i.e., direct, or indirect), spatial nature (i.e., within the site/ROW or further), temporal nature (i.e., long/medium/short term), severity, likelihood as well as frequency and cumulative/induced nature of their occurrence.

205. The interventions will have a diverse range of impacts and risks on the environment, both from the location of the components and the scope of the proposed works across two distinct phases (i) pre-construction and construction, including survey, detailed design, preparatory works, site or ROW clearance, construction, and installation, and (ii) operation, including maintenance (O&M) as described in Chapter III of this report. The preconstruction phase will influence the impacts of the subsequent phases, but it is evaluated along with construction, as it will have minimal impact being mostly desk based with some survey and site investigation. Mitigation for construction and operation will, however, need to be considered upfront during the pre-construction phase. For the purposes of this IEE, the following mitigation hierarchy is adopted, the priority being to first avoid or reduce the source of impacts and then to address the impacts that do occur via mitigation to reduce the significance of the impact, and then as a last resort using compensatory or offset measures.

206. The potential impacts and risks from the Output 2(iii) distribution component works were assessed based on available project information. As NEA have still to prepare the individual distribution lines list and the NEA have still to prepare the individual distribution lines list and the detailed design will be undertaken by the EPC Contractor, the distribution line routings are only an indicative sample. The IEE report, including EMP will need to be revisited and updated after the list has been drafted and again after route surveys/detailed design of distribution lines by the EPC contractors is complete. The updated assessment will need to be reviewed and cleared by ADB before the issue of bid documents and then again before the commencement of the related works. Preparations for construction, include establishing the EPC contractor's EHS management arrangements (including preparing a contractor's environmental management plan (CEMP)) to ensure mitigation of construction related impacts by the contractor in accordance with the EMP.

B. Methodology

207. The initial step was to identify the potential impacts and risk based on the component activities that may occur across different phases and their nature (i.e., positive, negative, direct or indirect, cumulative or induced). The activity – impact/risk interaction matrix is presented in Table 5.1.

208. Following the impact/risk identification, scoping of impact significance (for impacts

primarily based on magnitude and for risks based on consequence versus the sensitivity of receptors including workers, local communities, and the surrounding environment) informed by professional judgement following review of preliminary project scope, site visits, meaningful consultations, reference to international good practice guidance and primary and secondary baseline data analysis was conducted as presented in Table 5.4. Significance also considers the likelihood, frequency or duration of the impact and parameters such as: (i) spatial extent (i.e., site specific, localized, or widespread); (ii) temporal nature and reversibility (i.e., temporary during construction, permanent, short term, or long term); (iii) opportunities for mitigation and (vi) legal standards and established international good practice guidelines – i.e., the eventual significance may not directly correspond to a function of magnitude and sensitivity in all cases.

209. For the assessment, impacts and risks have been categorized as being of Maximum, High, Medium, Low or Minimal significance based on Figure 5.1 and Tables 5.2 to 5.3. Significance is determined pre-mitigation but including the standard design features that would be incorporated by NEA in accordance with national environment, health and safety requirements.

210. Following scoping, the impacts of Maximum or High significance were subject to detailed assessment and/or quantification. Impacts of Medium significance also required a thorough understanding to define suitable mitigation measures. Assessment methods used include quantitative, semi-quantitative and qualitative techniques. The assessment of environmental impacts during pre-construction/construction and operation and maintenance are discussed along with a summary of their recommended mitigation. For the full details of mitigation measures the EMP is to be referred.

211. Mitigation is required for all potential impacts to ensure residual significance is reduced to the extent possible. While sensitivity factors cannot be influenced, mitigation measures can be put in place to decrease the magnitude, likelihood or consequences of impacts and risks to decrease the overall significance. Considering the mitigation measures proposed the environmental impacts and risks have then been re-categorized to reflect their expected post-mitigation levels and estimate residual impacts.

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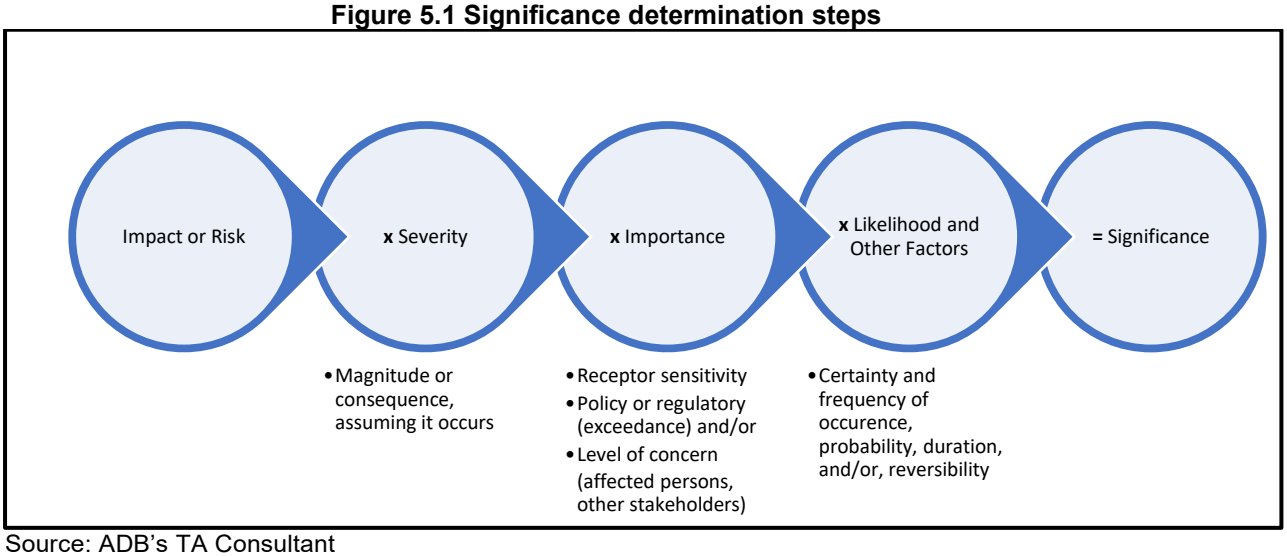
Table 5.1 Output 2(iii) Activity Impact/Risk Identification Matrix

Component Activities	Environmental Impacts and Risks												
	Biological		Physical							Socio-economic			Physical Cultural Resources
	Vegetation/trees	Wildlife	Topography/ Terrain/ Drainage	Ambient air quality	Noise and vibration	Soil	Water Resources	Natural resources and waste generation	Climate change	Occupational Health & Safety including discrimination and SEAH in workforce	Community Health and Safety/Labour influx and conflicts	Land and Livelihoods including traffic congestion/ utilities	Physical Cultural Resources
Pre-Construction and Construction													
Detailed design survey work		√								√	√	√	
Labour influx and establishment accommodations/facilities	√	√	√	√	√	√	√	√		√	√	√	√
Mobilization/transport of construction material and equipment, etc.		√		√	√		√	√		√	√	√	
Storage of materials etc.	√	√	√	√		√	√			√	√	√	√
Selective clearing of vegetation/trees in distribution line ROW	√	√						√		√	√	√	√
Foundations for and erection of poles (OHL)	√	√	√	√	√	√	√	√		√	√	√	√
Stringing/reconductoring activities		√			√			√		√	√	√	
New DTRs (on poles, no ground mounted requiring foundations)	√	√	√	√	√	√	√	√		√	√	√	√
Site restoration	√ (+)		√					√					
Operation and Maintenance (Decommissioning)													
Power line presence		√				√	√			√	√		
Power line maintenance	√	√			√	√	√	√		√	√	√	√
DTR presence/O&M		√			√	√	√	√		√	√		
Disposal of any defunct equipment/ conductors/ poles/ during O&M						√	√	√		√	√		

Parameters that are likely to be influenced by output 2(iii) component activities are marked (√) and (+) – positive impact
Source: ADB's TA Consultant

Figure 5.1 Significance determination steps



Source: ADB's TA Consultant

Table 5.2 Significance Factors

Category	Maximum	High	Medium	Low	Minimal
Factors to determine Severity and Importance:					
Magnitude Change	Very Large	Large	Medium	Small	Very Small (negligible)
Consequence	Critical (catastrophic)	Major	Moderate	Minor	Minimal (negligible)
Receptor Sensitivity	International	National/State	District	Local / Community	Individual
Receptor Resilience and Adaptability	No capacity to absorb proposed changes	Minimal capacity to absorb changes	Some capacity to absorb changes	Good capacity to absorb changes	Very good capacity to absorb changes
Receptor Vulnerability	Far above average vulnerability	Above average vulnerability	Average vulnerability	Below average vulnerability	Far below average vulnerability
Policy or Regulatory (exceedance)	Large	Medium	Small	None	Not Regulated
Level of Concern	Global / National	Regional/State	District	Community	Individual
Factors to determine Likelihood:					
Likelihood	Continuous	Frequent	Occasional	Infrequent	Rare
Probability	Certain	Likely	Possible	Unlikely	Improbable
Duration (temporal extent)	Very long term, > 3 years	Long term, > 1 year	Medium term, < 1 year	Short term, < 1 month	Very short term, < 1 week
Other Factors to determine significance:					
Spatial extent	Far beyond project site boundaries (>500m)	Beyond project site boundaries (<500m)	Immediately adjacent to project site (<50m)	In project site	Confined location in project site
Reversibility	Irreversible	Reversible with effort in long term	Reversible with ease in long term	Reversible with effort in short term	Reversible with ease in short term
Opportunities for mitigation	No or minimal opportunities for mitigation	Few opportunities for mitigation	Some opportunities for mitigation	Several opportunities for mitigation	Numerous opportunities for full mitigation

Category	Maximum	High	Medium	Low	Minimal
Legal standards	Breaches national standards and international good practice guidelines	Complies with international good practice guidelines but breaches more stringent national standards	Complies with national standards but breaches more stringent international good practice guidelines	Meets national standards and international good practice guidelines	Not applicable

Source: ADB's TA Consultant

Table 5.3: Impact and Risk Significance Determination Matrices

Impact Severity / Receptor Importance	Maximum	High	Medium	Low	Minimal
Maximum	Maximum	Maximum	High	Medium	Medium
High	Maximum	High	Medium	Medium	Low
Medium	High	High	Medium	Low	Low
Low	High	Medium	Low	Low	Minimal
Minimal	Medium	Medium	Low	Minimal	Minimal

Risk Consequence / Receptor Importance	Maximum	High	Medium	Low	Minimal
Maximum	Maximum	Maximum	High	Medium	Medium
High	Maximum	High	Medium	Medium	Low
Medium	High	High	Medium	Low	Low
Low	High	Medium	Low	Low	Minimal
Minimal	Medium	Medium	Low	Minimal	Minimal

Source: ADB's TA Consultant

C. Environmental Impacts and Mitigation Measures

212. Scoping of impacts to determine impact significance across different phases is presented in Table 5.4. Potentially significant impacts pre-mitigation given further consideration relate to disturbance to trees, vegetation and wildlife during construction, occupational and community health and safety. Impacts scoped out as being of low-minimal significance in Table 5.4 are not assessed in further detail within this IEE, although brief description is provided. For potential environmental impacts related to operation and maintenance (O&M) activities that are similar but of same or lesser magnitude than those during construction, further assessment was not conducted.

213. Prior to construction, activities undertaken during the detailed design and pre-construction phase will influence the subsequent impacts of the project. Mitigation for construction, including site establishment, mobilization and clearance for construction work, and operational impacts will need to be considered upfront during the detailed design and preconstruction stages. Preparations for construction, including establishing the contractor's environment, health and safety management arrangements to mitigate construction related impacts will occur during pre-construction. This will include the development of a CEMP and a health and safety risk assessment and plan to provide details on how the contractor plans to implement the EMP and relevant parts of the IFC EHS Guidelines on Construction and Demolition and ILO Safety and Health in Construction guidelines.

214. The CEMP will identify the temporary construction facilities required for the

construction package be that for the distribution lines e.g., laydown area, stores, temporary workers facilities etc. There will also be surveying of the route alignments and procurement of equipment and materials to transport to the site ready for their installation. No works, including site establishment and vegetation clearance will commence on site until NEA has approved the detailed designs (after having received ADB clearance of their IEE update in respect of final alignments) and CEMP as if not properly planned in the pre-construction stage, the construction phase will have potential significant impacts on the natural and human environment.

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Table 5.4 Impact and Risk Scoping Matrix for Output 2(iii) Distribution Components

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
BIOLOGICAL ENVIRONMENT							
Vegetation/ trees	Presence of workers; storage of material/equipment; any clearance of vegetation and lopping of trees required along distribution lines to install pole foundations/conductors or to maintain safety clearances; trimming of trees during O&M of distribution lines. As per NEA felling of few trees is envisaged, the number of trees to be cut cannot be determined until the route alignments are confirmed by the EPC contractor. National Parks/Buffer Zone/KBA/IBA/ Ramsar Zone/KBA/IBA/ Ramsar sites will be avoided potentially in NH and community forest but some lines (to be confirmed). Few threatened and endemic species occur in Karnali province and	Construction and to a lesser extent during distribution line O&M	Low to Medium Locally important receptor, mostly modified habitat, but some natural habitat in DL footprint. Natural habitat above average vulnerability as minimal capacity to absorb changes, district concern. High to Maximum Some distribution lines in Natural Habitats/community forest Some threatened or endemic flora and fauna species are potentially present along planned distribution lines area (most risk of presence in Jumla and in vicinity of national parks) with any critically endangered, endangered and endemic/restricted	Low to Medium Low to medium magnitude for new lines as vegetation clearance is required in the RoW of 33kV, 11kV and LT lines and in footprint of poles; rehabilitated distribution lines will mostly be following existing line alignments where vegetation will have been previously cleared, and most sampled new alignments were along modified habitats. However, some new 33kV line will pass natural habitats/valleys through community forests (off road).	High to Low Adverse High to Medium Adverse for lines in natural habitat.	Yes, including routing to avoid critical habitat qualifying plant species during detailed survey. In NH/community forest areas new distribution lines to be routed along roads as far as practical and rehabilitation to follow existing ROWs where vegetation will have previously been cleared.	Medium to Low Adverse (Medium Adverse for 11kV and low-tension lines in natural habitat/ community forests)

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	need detailed survey during distribution line route surveys. Site restoration to have positive impacts.		range species triggering critical habitat having far above average vulnerability	Low magnitude for rehabilitation of existing lines on same alignment If critical habitat-qualifying species occur along planned ROW, there is potential for irreversible impact on individuals if trees were cut or plants uprooted, but significant impacts are unlikely at the population level.			
	Unintended disturbance to vegetation and trees outside distribution line ROWs and pole footprints due to construction works, potential for accidental forest fire or illegal cutting of trees or collection of non-timber forest products by workers. National Park/Buffer	Construction and to a lesser extent during distribution line O&M	Low to Medium. Locally important receptor, even if modified habitat in project footprint, there may be some natural habitat beyond the distribution line ROWs in which case there is above average	Low to Medium Minor to medium consequence if unintended disturbance occurred. Unlikely impacts will occur beyond project footprints and ROWs and most sampled alignments were along modified	High to Low Adverse High Adverse for 11kV and low-tension lines in NH/community forest especially where new ROW is planned to open natural habitats to human activities.	Yes, full time ecological supervision can ensure disturbance is minimized.	Medium to Low Adverse (Medium Adverse for 11kV and ABC low-tension lines in natural habitat/community forest.)

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Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	Zones/KBA/IBA/Ramsar Sites will be avoided but some lines potentially in NH and community forest (to be confirmed). Some threatened occur in Karnali province and need detailed survey during distribution line route surveys. Existing bare LT and 11kV conductors replaced by ABC and CC, and also the new CC and ABC lines, will reduce the risk of accidental forest fire and so have a positive impact.		vulnerability as minimal capacity to absorb changes, district importance High to Maximum Some distribution lines in NH/community forest Some threatened or endemic flora and fauna species are potentially present along planned distribution lines area (most risk of occurrence in Jumla and in the vicinity of national parks) with any critically endangered, endangered and endemic/restricted range species triggering critical habitat having far above average vulnerability	habitats. But disturbance may occur for some lines especially for new ROWs for the 11kV lines in natural habitats. If critical habitat-qualifying species occur, there is potential for irreversible impact on individuals if trees were cut or plants uprooted, but significant impacts are unlikely at the population level.			
Wildlife	Disturbance of wildlife from works and from labor influx in area; noise; light; dust; etc.; clearance of vegetation	Construction and, to a lesser extent, during	Low to Maximum Some threatened species of global concern (and nationally protected)	Low to Medium Habitat loss for wildlife is confined to the project footprint.	High to Low Adverse (especially for 11kV and low-	Yes. full time ecological supervision can ensure	Medium to Low Adverse (especially for 11kV and low-

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	and lopping/trimming of trees can affect nesting birds, including trimming of vegetation during O&M. A number of threatened occur in Karnali province (including those declared protected species by GoN regulation) and confirmation of presence/absence needs detailed survey during distribution line route surveys. Project will avoid undertaking works in National Parks/buffer zones/KBA/IBA/Ramsar sites/conservation forest where greatest potential for disturbance to wildlife exists.	distribution line O&M	and endemic species including three critical habitat qualifying amphibians and a dragonfly are potentially present, critically endangered , endangered and endemic/restricted range species triggering critical habitat having far above average vulnerability.	Rehabilitated distribution lines will mostly be following existing line alignments minimizing habitat loss and fragmentation. Magnitude of impact beyond project footprints and ROWs will be small in most cases, disturbance may occur for some lines/poles especially in those passing through natural habitat/community forest. If critical habitat-qualifying species occur, there is potential for irreversible impact on individuals, but significant impacts are unlikely at the population level.	tension lines in natural habitat)	disturbance is minimized.	tension lines in natural habitat)

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Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	Potential wildlife mortality during construction/O&M, e.g., increased risk of road accidents, or illegal hunting and poaching by workers.	Construction and, to a lesser extent, during distribution line O&M	Low to Maximum Some threatened species of global concern (and nationally protected) and endemic species including three critical habitat qualifying amphibians and a dragonfly are potentially present, critically endangered and endangered species triggering critical habitat having far above average vulnerability	Low to Moderate Minor to medium consequence if unintended disturbance occurred. Unlikely impacts will occur beyond project footprints and ROWs, but disturbance may occur for some lines since new ROWs. In most cases the consequences will be minor. If critical habitat-qualifying species occur, there is potential for irreversible impact on individuals, but significant impacts are unlikely at the population level.	High to Low Adverse	Yes. full time ecological supervision can ensure disturbance is minimized.	Medium to Low Adverse
	Electrocution and collision risks to wildlife, especially birds, due to live electrical infrastructure (electrocution for climbing wildlife, birds)	Operation of overhead distribution lines	Low to Maximum While many potentially impacted species are widespread and common, there are some threatened	Medium Rehabilitated distribution lines will mostly be following existing line alignments so not	Medium to High Adverse (especially for 11kV and low-tension lines in natural	Yes, lines to include bird sensitive design with adequate spacing and insulation on	Medium Adverse (especially for 11kV and low-tension lines in natural habitat/community forest)

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	and collision risk associated with distribution lines. Only covered conductors and ABC will be used for the project. Where existing 11kV and LT bare conductors will be replaced by covered conductor and ABC there will be a positive impact in reducing electrocution risk.		species of global concern potentially present, critically endangered and endangered species triggering critical habitat having far above average vulnerability.	introducing additional collision risk. Electrocution by climbing wildlife and birds on conductors will be avoided due to use of CC and ABC, but risk increased due to introduction of additional lines without insultation on pole equipment. If critical habitat-qualifying species occur, there is potential for irreversible impact on individuals, but significant impacts are unlikely at the population level.	habitat/community forest)	the poles to avoid electrocution risk. In NH/community forest areas new distribution lines to be routed along roads as far as practical	
PHYSICAL ENVIRONMENT							
Elevation, topography and drainage	Potential change in topography and terrain during earthworks and installation of foundations for new OHL poles and	Construction	Low Mostly complex terrain. Good capacity to absorb changes, but above average	Minimal changes in topography and terrain will mostly be of very small magnitude. Pole	Low to Minimal Adverse	No	Low to Minimal Adverse

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Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	associated substation works		vulnerability in complex terrain areas.	footprints are very small.			
	Potential change in drainage patterns and surface water runoff due to construction for OHL poles. No alteration to natural drainage flow pattern by any earthworks envisaged	Construction	Low Locally important receptor, some capacity to absorb changes	Low to Minimal Pole footprints are very small. Minimal risk of waterlogging or flood risk on alignment adjacent land is envisaged.	Low to Minimal Adverse	No	Minimal Adverse
Soil	Excavation and compaction (change in structure) of topsoil and subsoil from installation of foundations for poles, as well as soil erosion due to clearance of vegetation and surface water runoff across bare ground, especially during the monsoon season.	Construction	Low to Medium Medium sensitivity in croplands, natural habitat, and areas with complex terrain, community concern	Low Small magnitude for OHL poles which will require some groundwork preparations for foundations footprints are small.	Low Adverse	Yes	Low Adverse
	Storage of fuel, oil, chemicals during construction, operation, and maintenance works; potential for spills and leaks including transformer oils from	Construction and to a lesser extent during distribution line O&M		Low to Minimal Minor consequence due to volumes involved and unlikely to impact soils beyond immediate use or	Low to Minimal Adverse	Yes	Low to Minimal Adverse

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	DTRs to result in soil contamination	Operation of substations and DTRs		storage location, reversible with effort in long term, several opportunities for mitigation			
Water resources	Alteration of surface water resources	Construction	Low Some capacity to absorb changes, no major rivers/streams, surface water resources not used for drinking water, community concern	Minimal Some lines/poles may be in proximity to surface water once mapped. Few distribution lines are crossing over rivers/streams, including over river bridges/culverts. No large waterbodies/ wetlands will be crossed where poles would be needed in waterlogged area.	Minimal Adverse	No	Minimal Adverse
	Use of water resources including potable water supply for construction and workers	Construction	Medium Distribution lines are in water stressed zone/province; some capacity to absorb changes, community concern	Low Small magnitude as construction works require only a small crew at each site, greatest magnitude for	Low Adverse	Yes	Low Adverse

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Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	Sediment laden surface water runoff from installation of foundations for OHL poles works causing surface water pollution and affecting aquatic ecology	Construction	Low Some capacity to absorb changes, no major rivers/streams, surface water resources not used for drinking water, community concern Per secondary data analysis surface water quality generally does not meet national standards	Low Distribution lines may have surface water adjacent. Small magnitude of change, any new exceedance of national water quality standards because of project works would be very short term, some opportunities for mitigation, reversible with ease in short term	Low Adverse	Yes	Low Adverse
	Storage of fuel, oil, chemicals during construction, operation, and maintenance works; potential for spills and leaks including transformer oils from DTRs to result in water pollution	Construction and to a lesser extent during O&M of distribution lines Operation of DTRs	Low to Medium Some capacity to absorb changes, no major rivers/streams, surface water resources not used for drinking water. Groundwater used for drinking water. Average vulnerability, community concern. Per secondary data analysis surface and groundwater quality	Low Low consequence due to volumes involved, impact may affect water resources beyond site boundaries including groundwater, reversible with effort in long term, several opportunities for	Low Adverse	Yes	Low Adverse

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
			generally does not meet national standards, groundwater in some areas is used for drinking water supplies	mitigation.			
	Open defecation or disposal of untreated sanitary effluent from workers sanitation (and any septic tank) to surface or ground water causing water pollution.	Construction and to a lesser extent during O&M of distribution lines	Low to Medium Some capacity to absorb changes, no major rivers/ streams, surface water resources not used for drinking water, groundwater used for drinking water average vulnerability, community concern Per secondary data analysis surface and groundwater quality generally does not meet national standards, only groundwater in some areas is used for drinking	Moderate to Low Small magnitude as construction works require only a small crew at each project site	Medium to Low Adverse	Yes	Low Adverse
Ambient air quality	Generation of dust during foundations for OHL poles; air pollution emissions from construction plant and vehicles travelling	Construction	Medium to High Locally sensitive receptors, some capacity to absorb change although vulnerability of	Low Small magnitude of change in relation to OHL poles works	Low Adverse	Yes	Low Adverse

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Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	to/from project sites. Additional emissions from traffic congestion where distribution line ROWs are along roads (mostly unpaved and damaged) and settlements and where roads are steep, in complex terrain, and narrowed/blocked.		school children and other groups along distribution lines may be above average (although very sparce settlement and isolated houses along ROW surveyed to date). Per secondary baseline analysis and site visit/observation, consultation dust pollution is not meeting the prescribed national/international standards/ guidelines. Depending on location the airshed may be degraded in this respect, individual/community concern.	which are short term and transient. No cumulative impacts envisaged as no ongoing road or other works observed/reported works for lines near highways. Any exceedance of national air quality standards would be very short term, impact restricted to within and immediately adjacent to the project footprint, some opportunities for mitigation, reversible with ease in short term			
Noise and vibration	Presence of construction workers generating noise, noise from material mobilization, and construction vehicles travelling to/from	Construction	Medium to High Locally sensitive receptors, some capacity to absorb change although vulnerability of school children and	Low Small magnitude of change in relation to OHL poles installation works which are	Low Adverse	Yes	Low Adverse

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	project sites etc. There will be increased noise from sites in rural areas from the traffic congestion that results where roads are narrowed/blocked.		other groups may be above average, community concern. Per site secondary, primary baseline data (spot noise) noise baseline is mostly low and within national/ international standards/guidelines.	short term and transient. Any exceedance of noise standards would be very short term, impact restricted to within and immediately adjacent project footprint some opportunities for mitigation, reversible with ease in short term			
	Changes in ambient noise levels– distribution line may produce a small amount of sound energy because of corona and transformer hum from DTRs. Low level noise from corona becomes most noticeable at higher voltages (345 kV and higher) and in wet/humid conditions	Operation of distribution lines, and DTRs.		Minimal Very small magnitude of change	Low	Yes	Minimal

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Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	compared to project voltages of 11 kV and 0.4kV. Under fair weather conditions corona is rarely noticed. No other vibration generation sources and present for the distribution component						
Natural resources and waste generation	Use of raw materials from existing licensed sources: sand, fuel, oil, chemicals etc.	Construction and to a lesser extent during O&M	Low No policy or regulatory concerns as existing licensed sources will be used	Low Low magnitude in relation to construction materials: several opportunities for mitigation, impact may be beyond site boundaries	Low Adverse	Yes	Minimal
	Disposal of inert soil inappropriately on land or in nearby water bodies including lines with river/streams crossing	Construction and to a lesser extent during O&M	Medium District level concern since may be dumped outside the local community	Low Low magnitude for distribution lines; only volumes required for foundations as no cut and fill. Several opportunities for mitigation, impact may be beyond site boundaries	Low Adverse	Yes	Low Adverse
	Disposal of solid wastes inappropriately	Construction and to a	High National/state level	Low Low magnitude in terms of volumes	Medium Adverse	Yes	Medium Adverse

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	on land or in nearby water bodies	lesser extent during O&M	concern, multiple open dump sites but no sanitary landfill sites or engineered solid waste management facility in Karnali province.	generated, several opportunities for mitigation, but impact may be far beyond site boundaries			
	Disposal of hazardous wastes, inappropriately on land or in nearby water bodies	Construction and to a lesser extent during O&M	High National/state level concern as no hazardous waste management facilities in Karnali province, and no authorized recyclers/utilizers and reprocessors	Medium Low magnitude in terms of volumes generated during construction, no existing DTR removal/disposal, but there will be waste transformer oil during operations. Minimal opportunities for mitigation, and impact may be far beyond site boundaries	Medium Adverse	Yes	Medium Adverse
SOCIOECONOMIC ENVIRONMENT							
Occupational (workers) H&S including discriminatio n and SEAH in workforce	Unsanitary and unhealthy working conditions including at overnight accommodation provided by employer, leading to	Construction and to a lesser extent during O&M of all components	Medium to High Individual receptors/concern, average vulnerability, although any under 18s and foreign	High to Medium Major consequence for individual if fatality occurs, but only a small	High to Medium Adverse, pay attention to vulnerable groups who may be at greater risk	Yes	Medium Adverse, less likely worst case will occur

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Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	H&S incidents e.g., slips, trips, falls from height, interactions with equipment and machineries, electrocution, working along or within running road (extreme complex terrain in many alignments), and human health impacts from dust, noise, handling mineral oils, ponding of water for mosquitos, spread of communicable diseases including tuberculosis, influenza, malaria, dengue, Japanese encephalitis and HIV/AIDS etc.		migrant workers may be above average.	number of workers involved during construction and fewer during O&M, rare occurrence, in most cases moderate to low consequences will occur, and several opportunities for mitigation			
Community H&S/Labour Influx and Conflicts	Risks to community due to construction activities including construction traffic, storage of materials - NEA stores poles along roadside and private lands, inappropriate disposal of wastes,	Construction and to a lesser extent during O&M of all components in public domain	Medium to High Community concern, average vulnerability although children of above average vulnerability, especially where schools are located adjacent	Medium Major consequence for individual if fatality occurs, but impacts at individual not community level, rare occurrence,	Medium Adverse but pay attention to presence of schools/ vulnerable groups who may be at greater risk	Yes	Medium Adverse, less likely worst case will occur

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	presence of open pits for poles, inadequate warning signs dust, noise, live electricity etc.		to distribution lines (Jumla area). Population density low in province and settlements are small and isolated	and several opportunities for mitigation			
	Increased risk of traffic accidents involving pedestrians and vehicles due to OHL works along complex, high altitude and mostly damaged road			Medium Major consequence for individual if fatality occurs, but impacts at individual not community level, rare occurrence, and several opportunities for mitigation	Medium Adverse But pay attention to presence of schools/ vulnerable groups who may be at greater risk	Yes	Medium Adverse, less likely worst case will occur
	Spread of communicable diseases including HIV/AIDS, and other STDs from presence of migrant workers especially in rural area with risks increased due to transitory nature of the distribution line works.			Medium Major consequence for individual if fatality occurs, but only a small number of workers involved during construction and fewer during O&M, in most cases moderate to low consequences will occur,	Medium Adverse	Yes	Medium Adverse

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Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
				impacts at individual not community level, rare occurrence, and several opportunities for mitigation			
	Community interactions and conflict with project workers including sexual exploitation, abuse, and harassment from presence of migrant workers and noise and other disturbance			Medium Only a small number of workers are involved, disruption to communities greatest in rural/remote areas but noise and the presence of workers would be very short term, some opportunities for mitigation, reversible with ease in short term	Medium Adverse	Yes	Medium Adverse
	Risks to community due to electrocution (especially areas/villages where no electrification at present and no local awareness about distribution line	Operation		High to Medium Major consequence for individual if fatality occurs, but impacts at individual	High to Medium Adverse but pay attention to presence of schools/ vulnerable groups who	Yes	Medium Adverse, less likely worst case will occur

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	hazards) by coming in contact with live wires, especially during monsoon/flooding, fire risk, EMF exposure, sagging lines, damaged poles, cable break incidents etc. Most concern where property close to (along road ROWs) or houses under lines (multiple electrocution cases reported by NEA)			not community level, rare occurrence, and several opportunities for mitigation Rehabilitation will reduce electrocutions as lines are planned to be moved away from private properties/crop lands to road ROWs	may be at greater risk		
Land and livelihoods including traffic congestion	No land acquisition envisaged for OHL; private land for poles/DTR footprints will be acquired by project if required. Direct or indirect damage to community and private property and road surfaces especially from OHL crossings through private land (mostly to be rehabilitated) including agricultural fields (crops)– see RIPP for further assessment of land	Construction and to a lesser extent O&M of distribution lines	Low to Medium Locally sensitive receptors, most of average vulnerability but IPs and some small businesses along roadside may be of above average vulnerability, community level concern	Minimal Land acquired through willing seller willing buyer for pole/DTR installations if required. Possible unplanned damage to private property: croplands in rural areas (some new lines planned) and buildings in rural locations	Low to Minimal Adverse	Yes, including compensation for land acquisition and damages in accordance with RIPP, Government of Nepal/Karnali Provincial Committee guidelines and contractor to repair any	Minimal Adverse

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Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	acquisition and temporary damages			including from where property close to or encroaching in ROW of existing distribution lines along roads of narrow width etc. Several opportunities for mitigation.		damage caused	
	Temporary disturbance and loss of access to business properties resulting in OHL works affecting livelihoods of business along ROWs in built-up/market area of villages/ municipalities			Low Minor consequence at individual level, greatest impact where lines run in rural municipal built-up areas. Disruption would be very short term, some opportunities for mitigation, reversible with ease in short term	Low Adverse	Yes, including compensation for any livelihood loss in accordance with RIPP, Government of Nepal/ Karnali Provincial Committee guidelines and contractor to repair any damage caused	Low Adverse
	Loss of land / restricted usage under distribution line poles, and conductors (limitations on structures within	Operation	Low to Medium Locally sensitive receptors, most of average vulnerability but some IPs and small	Low Minor consequence for individual where property close to or	Low Adverse	Yes	Low Adverse

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	safety clearance of ROW etc.) Due to space shortage, many properties along ROWs of existing lines encroach private properties – rehabilitation will help to address this issue.		businesses or households with children and elderly may be of above average vulnerability, individual level concern	encroaching in ROW of existing distribution lines along roads of narrow width etc. Impacts at individual not community level. Several opportunities for mitigation			
	Damage to other public utilities e.g., power lines, telephone lines	Construction and to a lesser extent O&M of distribution lines	Low Locally sensitive receptors, community level concern	Medium Moderate consequences if damage/breakage to utility occurs because of construction especially in municipal areas where many people are served, supply to local community hampered until supply restored, rare occurrence, several opportunities for mitigation	Low Adverse	Yes	Low Adverse
	Temporary loss of power during works affecting existing distribution lines, impact on residences,			Low Minor consequence although greater impact in semi-	Low Adverse	Yes	Minimal Adverse

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Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	business, and livelihoods. Many areas under distribution scope have no power at the moment, so this issue only relates to rehabilitation of lines			urban area, disruption would be very short term, some opportunities for mitigation, reversible with ease in short term Villages with no power will have positive impacts. Already major power fault/failure on most days			
	Stress on use of community resources and services e.g., water supplies, hospitals	Construction , operation	Medium District level concern	Low Small magnitude as construction works require only a small crew at each project site and during operation there will be only a few staff present utilizing the water resources	Low Adverse	Yes	Minimal Adverse
	Traffic congestion including cumulative impacts if existing road works / other activities taking place in parallel with distribution line	Construction and to a lesser extent O&M of distribution lines	Medium District level concern	Low Low magnitude as most roads are having low to moderately traffic movement, most lines in	Low Adverse	Yes	Low Adverse

Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	works adjacent to roads			rural/isolated areas with very low to moderate traffic flow, congestions along some lines in village market areas. Disruption would be very short term, some opportunities for mitigation, reversible with ease in short term			
	Employment and micro level economic development opportunities from provision of accommodation for workers etc.	Construction and to a lesser extent O&M	Medium District level concern	Beneficial Very small magnitude of change in relation to construction as only small number of workers involved	Beneficial	Yes	Beneficial
	Energy supply and security	Operation	Medium to High District/State level concern	Beneficial Multiple villages/areas to be electrified	Beneficial	n/a	Beneficial
PHYSICAL CULTURAL RESOURCES							
Physical and Cultural resources	Potential risk of damage to physical cultural resources including IP resources due to distribution line	Construction and to a lesser extent O&M of	Low to Medium Local/community and district importance physical cultural resource	Medium Possible damage being caused to physical cultural resources	Medium to Low Adverse	Yes, consultation to identify PCR once distribution	Medium to Low Adverse

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Receptor (IEC)	Rationale for Potential Environment Impacts/Risks	Phases of Project	Importance	Severity (Likelihood and Other Factors)	Significance Prior to Mitigation	Mitigation Incorporated into EMP	Significance Post Mitigation
	construction. Through application of selection criteria Nepal national monuments will be avoided by distribution lines.	distribution lines	receptors, community concern	immediately adjacent to project footprint, along distribution lines. Rehabilitation of distribution lines will mostly be following existing ROWs but new ROWs have greater potential for impact on physical cultural resources in rural/remote area since not within fenced sites.		lines mapped and full-time supervision can ensure disturbance is minimized	
Chance Finds	Potential risk of damage to undiscovered physical cultural resources e.g., archaeological remains due to construction, especially during new pole installation on previously undeveloped lands	Construction	Medium Secondary data analysis shows many cultural/ archaeological sites in the province. Sensitivity unknown, but likely if any encountered will be at most local/ community or district receptor although may be higher in tentative UNESCO area	Low If encountered risk of minor damage before work halted, some opportunities for mitigation but any damage would be irreversible, confined to project footprint, rare occurrence and unlikely to occur at project site	Low Adverse	Yes	Low Adverse

Note: impacts subject to reconfirmation following route surveys and siting of poles/DTRs — once the lines and related facilities have been mapped site-specific assessment and management planning will be required.
NEA = Nepal Electrical Authority, EMP = environmental management plan, EPC = engineering, procurement and construction, EMF = electromagnetic field, GHG = greenhouse gases, OHL = overhead line, PAI = project area of influence, ROW = right of way, RIPP = resettlement and indigenous peoples plan, SEAH = sexual exploitation, abuse and harassment,
Source: ADB's TA Consultant

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D. Potential Biological Impacts and Mitigation Measures

a. Impacts and Risks

- Based on biological baseline screening (Chapter IV), consultation with forest office and locals, the six districts of Karnali province, where the distribution lines are planned, can be considered to support Critical Habitat, for two National Parks, their buffer zones including two Ramsar sites, internationally-recognized sites (both national parks also designated as KBA/IBA) and conservation forest. They also support potential Critical Habitat for four amphibians and a dragonfly plus other globally threatened or endemic floral and faunal species of concern e.g., Chinese Pangolin, Red Panda, Alpine Musk Deer, Dhole, Steppe Eagle, Red Headed Vulture, Sakar Falcon and Egyptian Vulture.
- This does not mean that the Output 2(iii) distribution component will necessarily impact any Critical Habitat qualifying biodiversity or any globally threatened or endemic species.
- The Output 2(iii) distribution component area of Salyan, West Rukum, Jarkot and Kalikot are unlikey to qualify as supporting critical habitat although Mugu and Jumla have potential since national parks/their buffers/Ramsars/KBA/IBA/community forest are in the district.
- Site walkovers and consultations did not identify any flora or fauna species of high biodiversity value in the sample surveyed but this would be subject to confirmation by conducting ecological surveys of all subproject distribution line routes during project implementation.
- Output 2(iii) distribution component impacts on habitats and species are most likely in relation to the project footprint (including RoW of distribution lines) leading to direct habitat loss and degradation, especially the loss of natural forest habitat (community forest lands) in new RoWs. Construction works, especially site establishment, vegetation clearance and earthworks, will result in the loss of terrestrial vegetation. Some indirect impacts to terrestrial vegetation and faunal species due to disturbance may also occur.
- Rehabilitation using covered conductor or ABC of 11kV and LT lines will mostly be on existing RoW alignments where vegetation should have already been cleared, such that pole installation and stringing will have limited direct impact, and significant habitat loss will not result. However, the final route alignments and the location will be determined by NEA and contractors, following the criteria/principles, set out in Chapter III.
- New 11kV and LT lines will pass new RoW (to be created) alignments (valleys and hills) where vegetation will be cleared such that pole installation and stringing will have some direct impact, but due to the RoW width required, no significant habitat loss is anticipated.
- Screening of indicative new and existing 11kV alignments, and indicative areas planned for LT lines (detailed alignments under the project scope are not yet determined by NEA for preparation of the draft IEE) has confirmed all those included in the final project scope are located outside of national parks, their buffers, Ramsar sites, KBA/IBA and conservation forest.
- Some distribution lines will likely to be in or pass through natural habitat (defined as per ADB SPS, 2009 as the biological communities supported are largely native and primary ecological functions (such as timber, soil and water conservation) are still being provided) and community forest where there is greater potential for wildlife to be impacted, hence only covered conductor and ABC will be used for all voltages installed.
- As per discussion with NEA, some trees will need to be cut (especially for the 11kV line) and lopping/trimming will be required to achieve the standard safety clearances for distribution lines. Tree felling will be avoided to the extent possible through minor

realignment/micro-siting. Realignment is preferred by NEA, so the number of trees to be lost is unlikely to be significant.

- The contractors will undertake an inventory of trees to be cut/lopped/trimmed, prior to NEA allowing any vegetation clearance. District Forest Officers will need to provide authorization for removal of any forest resources. Approvals to be sought and compensation plantation per national laws for the tree cutting (if from community forest) undertaken pre-construction.
- There is a risk that critical habitat qualifying species, globally threatened and restricted-range species may occur along the distribution lines and thus be disturbed. The risk is highest in the natural habitat/community forest, and these routes will need particular attention. Particularly in Mugu and Jumla districts and some other areas like in Sinja Valley where Red Panda have been found for example. Site-specific assessment to be undertaken during updating of the IEE will need to include detailed route surveys conducted by a team that includes a skilled ecologist before any works take place to identify the risks of species being present. This will need to be followed by realignment/micro-siting of all infrastructure to avoid any critical habitat, globally threatened or endemic flora species or fauna habitat found during these surveys, prior to any site establishment, vegetation clearance including tree cutting/lopping/trimming or earthworks being undertaken, to avoid impacts on them. Before any trees are cut, they will be subject to ecological checks for nesting birds etc.
- Some indirect impacts related to disturbance may also occur for the distribution line construction, and to a lesser extent during O&M works. In addition to clearance of vegetation and cutting/lopping/trimming of trees in the project footprint, potential impacts on biodiversity relate to disturbance of adjacent vegetation, disturbance of wildlife due to the presence of people and construction equipment (and associated sound, noise, light, etc.), and mortality (through road vehicle accidents, or if workers are involved in illegal cutting of trees, unauthorized collection of non-timber forest products, hunting or poaching of fauna). The greatest risk for disturbance is in natural habitat/community forest areas. Even if works are planned outside of these areas, it is still possible that workers could stray into these areas due to their proximity to the OHL.
- Once installed, most infrastructure will have minimal impact. The main operational biodiversity risk is from overhead power lines resulting in collision of birds/bats and electrocution risk (mainly at the poles and DTRs due to use of covered conductor and ABC which are insulated) for birds, bats, or climbing wildlife such as red panda from live infrastructure.
- The existing design of 11kV and LT bare conductor distribution lines and poles in Karnali province presents a high risk of electrocution for medium and large-sized birds (vultures mainly). As well as the bare conductors, distribution lines also include pole-mounted equipment such as surge arresters, fuses, switches, transformers, reclosers, regulators, and capacitors. If unprotected, this equipment and associated bare jumper wires also pose an electrocution risk. Representative electrocution cases shown in Figure 5.2. The introduction of up to an additional 1684.86 km of distribution lines (including 1221.57 km LT line extensions) in previously unelectrified areas could be significant in terms of increasing the risk of wildlife electrocution in those districts. However, the conversion of 58 km of distribution lines and a proportion of the 1221.57 km LT line extensions to covered conductor and ABC will be beneficial for wildlife in those districts.
- Although no bird carcasses were recorded during site visits, and none confirmed by locals or Forest Offices, surveys of similar power lines in western Rajasthan, India, found approximately one avian carcass per four poles (Harness et al, 2013). Bird Conservation Nepal has also reported large numbers of vultures being electrocuted on distribution lines in Tanahun and other districts of Nepal.[43] Scavenging prevents the

[43] https://news.mongabay.com/2023/05/nepals-hydropower-boom-is-killing-birds-via-power-lines/

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accurate identification of poles that have caused an electrocution, but it is reasonable to assume that the proportion of poles that are causing an electrocution is far greater.

Figure 5.2. Representative wildlife encounters and bird electrocution cases in Nepal

Himalayan Vulture
Source: https://news.mongabay.com/2023/05/nepals-hydropower-boom-is-killing-birds-via-power-lines/

Saurus Crane

Source: https://kathmandupost.com/climate-environment/2019/08/26/rising-death-rate-of-sarus-crane-world-s-tallest-flying-bird-raises-concerns

Common Leopard encounter with villagers in Dailekh project area
Source: NEA

Red Panda encounter in Dailekh project area

Source: NEA

Large-billed Crow (*Corvus macrorhynchos*)
Source: ADB's TA Consultant

- Electrocution of wildlife is not only a conservation concern; it also negatively impacts on distribution system reliability because many electrocutions trigger system protection. In certain habitats, wildlife electrocutions are a significant cause of wildfire ignitions.
- Risks will be minimized by only installing covered conductors and ABC with wildlife sensitive design features incorporated at the poles and DTRs (e.g., adequate spacing and insulation, including all accessories) as part of the project to minimize electrocution risk.

215. The overall impact significance of the project pre-mitigation is assessed as **High to Low Adverse** for distribution lines depending on final routes. Most distribution lines will have **Low Adverse** impacts but for powerlines in natural habitat/community forest impacts may be **Medium Adverse** with potential for **High Adverse** impacts for new lines or for rehabilitation where existing ROWs are not followed resulting in new vegetation clearance in areas with critical habitat, globally threatened or endemic plant species or faunal habitat found to be present. If High Adverse impacts were to result these would be **Significant.**

Mitigation

- The detailed route alignments of the various 11kV and LT distribution lines and the location of related equipment will be determined by NEA and the contractors, following the criteria/principles set out in Chapter III.
- Since the distribution routes assessed are only indicative and will not be finalized until NEA have prepared the individual distribution lines list and the contractors are on board, during project implementation site-specific assessment checklist and consultation proformas will be completed by NEA and updated by the contractors. The completed checklists will be verified in the field by the PMC environment safeguards team. Based on the checklists this IEE and EMP will need to be updated and cleared by ADB with any government clearances or permissions obtained before routings are approved by NEA and works commence. It will be for the contractor to decide the final distribution line routes for NEA approval and, given their presence in the six districts, they need to be aware of routes in close proximity to national parks, their buffers, Ramsar sites, KBA/IBA, and conservation forest. Further since they cannot be avoided in all cases they also need to be aware of routes in natural habitats/community forest and understand the ecological constraints of working in these sensitive environments which may also support critical habitat, globally threatened or endemic species.
- No distribution lines will enter the two Government of Nepal protected national parks and their buffers, although some may be in close proximity to them. This will be reconfirmed during route surveys by the contractor who will ensure that their final 11kV alignments maintain this position, and that the LT lines also meet the requirement.
- Distribution lines (existing and new ROWs) in the community forest will only be taken up with intimation to and the confirmation of the community forest user group, local administartion, District Forest Offices, MoAFE of Nepal, and complying to any national, provincoanl requirements. **The detailsof community forests need to be obtained in finalizing the IEE so that it can be determined which routes will impact them, as the details were not available from MOAFE at the time of preparing the draft.**
- The key mitigation measure after the application of the criteria/principles in route planning will be pre-construction ecological checks along all distribution line routes for natural habitat and Critical Habitat-qualifying species by an ecological team including skilled taxonomists familiar with the biodiversity of Nepal, followed by realignment/micro-siting of all infrastructure to avoid any such species found during these surveys, prior to tree trimming/lopping/vegetation clearance or pole installation. The results of the ecological walkover survey shall inform the completion of the site-specific assessment checklist to inform any additional assessment and the updated IEE.

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- For all distribution lines the District Forest Officers of Mugu, Salyan, Jalikot, Kalikot, West Rukum and Jumla will be consulted by the ecologists on potential species occurrence during site specific assessments and actively engaged by NEA and contractors throughout project implementation.
- The contractor will conduct an inventory of trees to be cut/lopped/trimmed prior to the start of vegetation clearance at all sites, avoiding cutting of trees to the extent possible (including new ROWs to be created) and obtaining DoF permission for cutting/lopping/trimming.
- If trees in community forests were to be cut, they would as per requirements of Forest Acts 2076BS and Forest Regulations 2079BS. Overall, for no net loss of biodiversity the tree types and locations selected for plantation need to be matched with the tree/habitat loss they are mitigating for, and ensure a natural-like habitat is created not plantation (as per Nepal Forest Act 2019) is the result. NEA will need to work with the District Forest Offices and the MoAFE to ensure the compensatory reforestation program is structured in such a way to achieve this outcome.
- Inventory of invasive plant species (as per DFO) (especially *Chromolaena odorata* and *Lantana camara)* by an experienced ecologist and in consultation with District Forest Officers, and then removal during site clearance (to also be followed by NEA in O&M during routine vegetation maintenance).
- Ecologists will be employed by the contractors and as well as conducting surveys they will supervise full-time works at all distribution lines requiring tree cutting/lopping/trimming or in sections supporting natural forest habitat or community forests, or within 500m of the national parks, their buffers, the Ramsar sites, KBA/IBA and conservation forest. The works will be carried out under full time ecological supervision to minimize disturbance.
- Ecologists will conduct induction and regular awareness training for workers regarding avoiding disturbance to wildlife.
- Demarcation of the working area by the contractor and avoidance of encroachment outside the agreed corridor of impact.
- No construction works to be undertaken from one hour before dusk to one hour after dawn in areas where there is no existing human disturbances e.g. rural and remote areas where lines are away from the RoW of existing roads, in areas of KBA/IBA, natural habitat, or community forest land.
- NEA will assign an Environment Specialist within PMD who will be delegated authority to be able to halt construction works if any wildlife that needs to be rescued is observed etc.
- A wildlife identification and rescue protocol will be adopted by the contractor, to be developed in consultation with district forest officials as per site-specific requirements with all vegetation clearance and earthworks under ecological supervision.
- Prompt revegetation of disturbed areas on the completion of works with plant species native to the districts.
- Covered conductor and ABC lines and poles will adopt a “wildlife sensitive design” such that, at the poles, all equipment will be adequately spaced, and live infrastructure insulated in 2m of any earthed infrastructure.
- Analysis of existing covered conductors and ABC in Karnali province on which the technical specification will be based on other ADB project report as provided in **Appendix 8** (Page 185) and with good quality installation will be wildlife sensitive.
- DTRs on the distribution lines will also have all live infrastructure insulated in 2m of any earthed infrastructure and all ground mounted transformers will be robustly fenced and secured.
- For operations, NEA to maintain specified height of the distribution lines, and regular monitoring and maintenance of their condition during operation to ensure no broken or damaged pole/lines.

Residual Impacts

216. Mitigation measures will be adopted by NEA and their EPC contractor to ensure no net loss of biodiversity (NNL) is achieved. With mitigation, the residual impact is considered **Medium to Low Adverse** and **Not Significant**. Medium Adverse impacts will remain for the powerlines in areas of higher biodiversity value, but the mitigation and the achievement of NNL will reduce the magnitude of the residual impact. The replacement of existing uncovered conductors with covered conductors and ABC will also have a beneficial impact by significantly reducing the existing collision and electrocution risk to wildlife in the electrified districts of Karnali province.

E. Potential Physical Impacts and Mitigation Measures

217. The construction works especially site establishment, vegetation clearance and earthworks required for the distribution components, could have impacts on the physical environment. No significant impact (**High Adverse**) on the physical environment related to the Output 2(iii) distribution component is envisaged, whilst less significant impacts (**Medium Adverse**) relate to storage of fuel/oil/chemicals and sanitation affecting the quality of soil and water resources, ambient air quality due to construction works, solid and hazardous waste generation and disposal, which are discussed in the following sections. Other physical impacts of the Output 2(iii) distribution components pre-mitigation are assessed as **Low to Minimal Adverse** and Not Significant. However, mitigation measures will still be adopted by NEA and their contractor.

218. The contractors will ensure during distribution line route survey, including DTR siting and design, that the final layouts and alignments have not greater impact than predicted by the IEE by having cognizance of international good industry practice per the IFC EHS General Guidelines and Power Transmission and Distribution Sector Guidelines and the presence of adjacent ecological and human receptors. The construction environmental management plan (CEMP) to prepared by the EPC contractors before construction commences will incorporate mitigation measures required to control impacts on the physical environment during construction elaborating on those included in this section.

a. Elevation, Topography, Drainage and Soils

Impacts

- Output 2(iii) distribution components [lines and DTRs] will involve very small changes in topography/terrain although 90% of the distribution scope is in mild complex to highly complex terrain.
- Only small areas of a few meters square will need to be excavated for the distribution line pole (augured) foundations. Most distribution line alignments are along roads/settlements with already disturbed soil condition although some pass more fertile agricultural land and natural forest habitat, whilst many cross hills and valleys where soil is undisturbed.
- Storage of hazardous materials like fuels, oils, chemicals and wastes generated, if not adequate may contaminate the soil. As soil is mostly sandy in PAI, risk of percolation to lower depths will be present.

219. Overall pre-mitigation the impact on topography/terrain, drainage and soil structure is **Low to Minimal Adverse** requiring some mitigation but **Not Significant,** the impact is permanent and will remain post-construction except the risk of soil erosion following prompt revegetation of disturbed areas on the completion of works with plant species native to the districts.

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Mitigation

220. The CEMP to include:

- In all cases seismic design requirements will be followed. All new infrastructure, including distribution poles and DTRs, to be located away from the banks of rivers/streams and outside of their flood/inundation zones.
- For all distribution lines in complex terrain slope stability measures will need to be identified during detailed design to minimize the risk of pole uprooting and OHL fall, especially for those poles which will have a slope or embankment on one or both sides.
- Minimizing removal of existing vegetation and topsoil, and, promptly revegetating with native species or surfacing any areas where excavation and other earthworks are done
- Excavation and other earthworks will be conducted during the dry season to minimize soil erosion and sedimentation of watercourses although this has potential to exacerbate dust impact.
- Topsoil disturbed will be separately stored and used to restore the surface of the excavated area.
- Infertile and rocky material will where possible be reused as fill material, if it needs to be taken off site it will be disposed by licensed waste management operator at designated disposal area suitable for inert waste. It must be ensured that this inert waste is not contaminated with solid and hazardous waste (including oil spills) by maintaining good housekeeping for the waste segregation/storage/transport/ disposal.

b. Water Resources

- Additional water requirement including potable water during construction phase is envisaged. Distribution line installation will need low quantity of water. Water is planned to be sourced from nearby springs for distribution lines.
- Oils from DTRs may leak or spill during installation.
- Additional sanitary wastewater will be generated during construction, including from construction camps. Sanitary wastewater, if not properly treated and disposed of will pollute adjacent surface waterbodies and may contaminate groundwater. However, the amount of sanitary wastewater generated would be limited as construction works and operation will involve only a few workers.
- There may also be wastewater from washing of construction equipment and vehicles.

221. The use of water resources and the risk of water pollution during construction or operation is assessed as **Low to Minimal Adverse** requiring mitigation but **Not Significant**.

Mitigation

- Permissions for any additional or new surface water abstractions or borewell installation shall be obtained including permission from Ground Water Development Board of Nepal together with agreement of Karnali District Committees and municipal/ward communities before drilling and/or abstraction.
- Use of pit latrines will be prohibited during both the construction and operation phases.
- To reduce the risk of leaks of spills causing soil or water pollution, and for emergency response, clean-up, and contaminated soil remediation the General EHS Guidelines will be followed including the following measures:
  - All DTRs installed on the distribution network will be sited more than 50m from surface water.
  - Given the remote nature of the distribution network in Karnali province the use of dry DTRs is to be preferred, to avoid oil leakage which goes unattended due to lack of

observation.

- The CEMP to include:
    - Provision of adequate on-site sanitation facilities including septic tanks and soak- away pits or alternative temporary sanitary facilities that do not allow untreated disposal of sewage to adjacent water bodies e.g., portable toilets where the wastewater generated is enclosed in a container and will later be taken offsite for wastewater treatment and disposal, or composting toilets where the waste is retained in a container with biomass added to support the compost process before the end product can be used for landscaping if correctly composted.
    - For the transient works in rural areas access to alternative sanitary facilities (e.g., existing public toilets or arrangement with private householders) that do not allow the untreated disposal of sewage to adjacent water bodies may be provided. If no alternative is available the contractor will need to provide a portable toilet or composting toilet – traditional pit latrine must not be used due to the risks posed to groundwater.
    - Sanitation facilities will include an adequate number of toilets (one per six workers) and sinks with water and soap for handwashing facility for the workers.
    - Same requirement applies to any construction camps; the use of locally hired workers may eliminate the need for the establishment of temporary construction camps by contractors.
    - Provision of designated hard standing areas for equipment servicing, refueling and wash down at least 50m from watercourses and wells, with drainage directed through oil and grease interceptors before being discharged into a settling pond prior to discharge offsite.
    - Storage of oil, fuels and chemicals and mounting of equipment containing oil and diesel on drip trays to catch leaks.
    - Oil spill clean-up materials (sorbent pads, loose sorbent material, etc.) should be stationed at site and stationed in/outside any oil/fuel/chemical storage area in clearly labelled containers.
    - Excavated soil will be covered with canvas or tarpaulin when spoil heaps are not active and stored on flat land at least 10m from and not on steep slope above watercourses.
    - No wastewater will be discharged direct to surface waterbodies or groundwater without adequate treatment.
    - Use of pit latrines will be prohibited at all times including in remote areas as will open defecation and urination and uncivil use of roads or private premises by construction workers

c. Ambient air quality

- The distribution poles will involve only limited earthworks for the installation of foundations mostly in rural areas with high dust levels from unpaved/damaged roads and any distribution line implementation dust generated is unlikely to cause additional nuisance outside of the settlements as works are transient, but in settlements especially near residential areas poorly managed construction may result in dust nuisance to adjacent receptors.
- Transport of loose construction materials in uncovered trucks or on unsurfaced roads may also increase the levels of dust. Road conditions are mostly bad/damaged and dusty in the Karnali province.
- Some distribution line works in rural market/dense settlement areas are likely to cause road traffic congestion (narrow and complex terrain road) and thus further increase the levels of dust as well as increasing vehicle emissions.

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- Congestion in certain stretches (e.g. Kalikot and Jumla area) where works for road surfacing are ongoing (if still during project implementation) may have a cumulative adverse impact.

222. Overall pre-mitigation the impact of dust is **Medium to Low Adverse** requiring mitigation but **Not Significant.** Ambient air quality impacts for the distribution lines will be transient in nature for only a short period of time; following construction any ambient air quality impacts will be reversible, and the baseline will quickly return to the pre-construction conditions.

Mitigation

223. The CEMP will include the following measures:

- Minimizing removal of existing vegetation and topsoil, and, promptly revegetating with native species or surfacing any areas where pole excavation and other earthworks are done.
- Central covered warehouse for storage of construction materials will be provided while construction vehicles transporting stone, sand, and other dust generating materials will be covered with a canvas or tarpaulin.
- Good housekeeping will be required with stockpiles of soil and other dust generating materials kept to a minimum and covered with a canvas or tarpaulin.
- Water to be sprayed using specialized water tankers to suppress dust during works in the vicinity of communities. The water should be sprayed at least twice a day on unpaved access roads and unsurfaced areas adjacent to the distribution lines.
- Soil scattered from pole installation on pavements and roads shall be immediately swept up to avoid windblown dust.
- Vehicles and construction equipment shall be regularly serviced and well maintained
- Vehicles and construction equipment shall comply with vehicle emission requirements.
- Providing workers with N95 dust masks to be worn when dust generating activities take place
- Open burning of construction related waste will be strictly prohibited
- If there is an increase in existing background air pollution or complaints are received contractor will be required to implement additional dust mitigation e.g., barricading/isolating sources of dust, use of wheel wash etc.

d. Ambient noise and vibration

- The use of construction equipment for earthworks and building works and the use of construction vehicles may increase the noise levels in and near the sites. No blasting or piling activities are planned.
- The equipment and machinery used for construction activity will produce cumulative noise at the properties depending on the source type, sound power, number, weather condition, distance, and duration of working period.
- The distribution poles will involve limited earthworks for the installation of pole foundations and no drilling; in rural and remote areas any noise generated is unlikely to cause a nuisance outside of the settlements as works are transient but in settlements especially near residential areas poorly managed construction may result in short-term noise nuisance to adjacent receptors.
- Noise will mostly affect the sensitive receivers located within about 50m if they are not informed in advance of the works and the scheduling of installation is not properly organized.
- Road traffic congestion associated with pole installation may further increase the levels of noise from vehicle engines and the honking of horns in congested settlement areas/market areas.

- DTRs can also emit hum and must similarly the contractor meet the noise levels through appropriate siting although the noise level is generally in the region of 50dB(A) maintaining a safe distance from properties would usually be sufficient to manage the impact.[44]

224. Overall pre-mitigation, the impact of noise is **Low Adverse** requiring mitigation but **Not Significant.** Construction noise impacts will be temporary for the distribution lines and transient in nature for only a short period of time; following construction any noise impacts will be reversible, and the baseline will quickly return to the pre-construction conditions.

Mitigation:

- Ensure that noise levels generated do not exceed statutory limits at the site boundary and nearest receptor within/outside the site as applicable to the site (Table 5.5).
- Maximum allowable noise levels for rural residential areas are 45 dB(A) during daytime (0600–2200hrs) and 40 dB(A) during nighttime (2200–0600hrs) and in silent zones is 50 dB(A) during daytime (0600–2200hrs) and 40 dB(A) during nighttime (2200–0600hrs) and these are not to be exceeded (these local levels are more stringent than WHO guidelines). If after detailed design the noise levels at the site boundary will exceed the required noise levels for either daytime (construction) or night-time (operation) (which is not currently anticipated) then an acoustically designed noise barrier will need to be installed around the perimeter to bring the noise level down to the required noise level. This can be temporary for construction noise, but as operational noise is permanent the acoustic noise barrier will need to be a permanent installation as part of the detailed design. Monitoring as per Environmental Monitoring Plan (EMoP) to be conducted.

Table 5.5 Noise Standards and Guidelines in dB(A)

Area	GoN Standard LAeq, 24 hr		IFC EHS LAeq, 1 hr		Prescribed Standard to be followed. LAeq, 1 hr	
	Day	Night	Day	Night	Day	Night
Industrial	75	70	70	70	70	70
Commercial	65	55	70	70	65	55
Urban Residential	55	50	55	45	45	40
Rural Residential Area	45	40				
Mixed Residential Area	63	55				
Peaceful/silent Area	50	40	-	-	50	40

For the operational standard, design to nighttime noise level as substations operate 24/7
Source: ADB's TA Consultant

- CEMP to include:
  - If works that exceed these noise levels or result in an increase of >3dB(A) compared to the baseline situation cannot be timed to avoid disturbing sensitive receptors temporary noise barriers will be placed around construction equipment. Temporary noise barriers are available that can theoretically reduce noise levels by up to 30dB(A) which would be sufficient to mitigate the noise impact in the sensitive receptors.
  - No noisy works at night, on the weekends, public holidays, religious festivals, and for works in proximity to schools, during exam periods – any noisy works within these periods to only be undertaken with the agreement of local community and residents within 50m.
  - Use of low noise generating equipment e.g., less than 55dBA sound pressure level at 1m

[44] https://www.redalyc.org/journal/4139/413954888006/html/

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- Drivers will be required to observe low speed wherever necessary and no blowing of horns.
- Vehicles and construction equipment shall be regularly serviced and well maintained.
- Vehicles and construction equipment shall comply with statutory emission standards.
- Traffic management controls will be implemented to reduce noise from traffic congestion.
- Construction workers exposure to noise should not exceed the levels set out in the General EHS Guidelines on Occupational Health and Safety otherwise the hearing protection is to be provided.
- If there is an increase in existing background noise levels >3dBA or complaints are received contractor will be required to implement additional noise mitigation at the construction site.

e. Waste generation

- The installation of poles will involve some waste generation, especially as existing RoWs will be used which will require the removal of poles (including some wooden) and conductors in some distribution line alignments. Unwanted/damaged cables and poles are usually stored outside of NEA substations boundary and road side until reused or repaired by NEA.
- Some hazardous waste may be generated during both construction and operation (DTR) such as waste oil, oily cloths, and lubricants. If it were inappropriately dumped it could lead to soil and water pollution and be a community health hazard.
- On the existing distribution line, the existing pole mounted transformers are mostly not maintained with some (usually low) levels of leakage and oil contamination observed, so same risk will exist for new DTRs installed under the scope of the project.
- For new distribution transformers there will not be any concern that those on the distribution lines will contain PCBs as they will be new supply. All old transformers on the distribution network must be considered at risk of containing PCBs.

225. Though the volume of waste will be low due to lack of sanitary landfill sites or engineered solid waste management facility in Karnali province risk from waste generation is assessed as **Medium Adverse** requiring mitigation but **Not Significant**.

Figure 5.3 Existing Waste Generation and Oil Contamination

Oil contamination in existing DTR in Jumla

Source: ADB's TA Consultant

Mitigation

- New DTR transformers will need to be certified PCB free.
- A GEF funded project[45] successfully advocated for the Government of Nepal to support the dichlorination of thousands of liters of PCB-containing transformer oil. The project also led to the developing of the GEF Medium-Sized project "Environmentally Sound Management and Disposal of POPs Pesticides and PCBs" which helped to completely neutralize PCBs in transformer oil stockpiled in Nepal. However, there may be some transformers remaining on the distribution network that contain PCBs so cautions shall be taken.
- No asbestos containing materials must be used during the construction, etc.
- The CEMP to include:
    - Provision of construction waste and domestic solid waste collection and disposal system.
    - Solid and hazardous waste generated during construction will be limited in volume but should be temporarily stored on site in segregated, labeled, sealed, and covered garbage bins.
    - Records of materials used, generated waste, and transfer records will be kept by the contractor.
    - Only sanitary landfill sites or engineered solid waste management facility will be used for disposal; no open dump sites will be used – provision of small incinerator with pollution control and composting facilities are recommended to be installed at the new substations.
    - Any vegetation material that is not handed over to a landowner will be immediately disposed using appropriately licensed waste management operator.
    - Existing DTRs with soil contamination/exposed to oil leakage to be assessed for potential contamination and appropriate removal and/or remediation

[45] https://www.sgp.org.np/assets/docs/PCB_brochure.pdf

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measures for any oil or PCB contamination of soils implemented, as addressed in the section on contaminated land contained in the General EHS Guidelines.
- NEA and contractors involved with disposal of oil waste will be required to follow the Acid and Other Hazardous Chemical Act 2022 and the Solid Waste Management Act, 2012 plus good international industry practice from UNIDO for transport, storage, and disposal of potentially PCB oil containing transformers.
- Disposal must involve facilities capable of safely transporting (closed trucks) and disposing of hazardous waste containing PCBs. In stores or other designated storage areas, the transformers will need to be stored on a bunded concrete pad or drip tray enough to contain 110% of the liquid contents should they spill or leak. The storage area should also ideally have a roof to prevent precipitation from collecting in the storage area.

F. Potential Socio-economic Impacts and Mitigation Measures

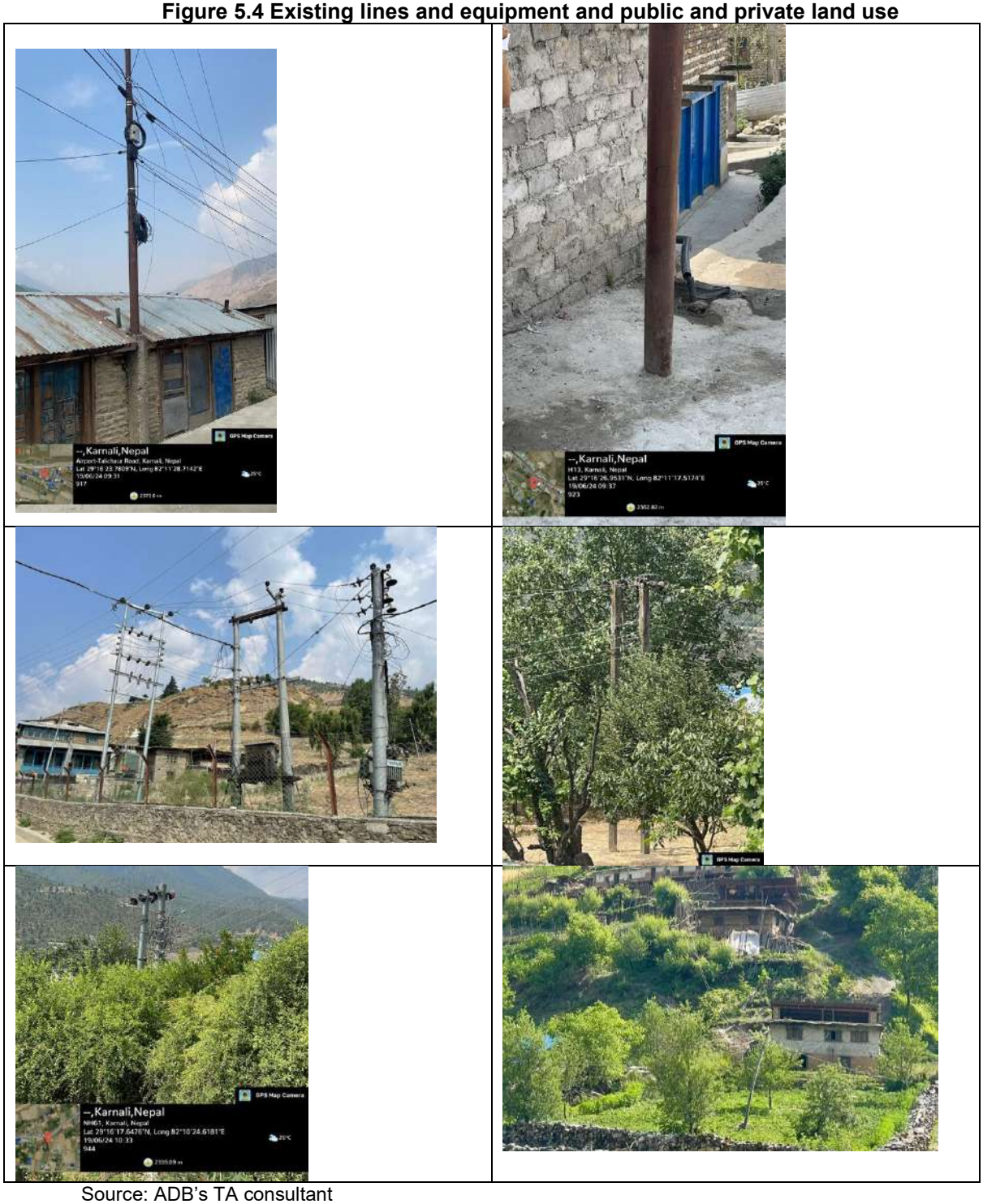
a. Land use, Livelihoods and Access Restrictions

- The rehabilitated distribution lines will follow existing ROWs, so no land use changes are anticipated. Refer Figure 5.5 showing existing distribution lines crossing private properties in PAI. Mostly existing lines in private land and crop land are planned to be moved to road ROWs to improve safety conditions. Some sections of new lines are planned. For the new poles and lines, some private areas may be used as per NEA. Some lines/poles will pass in croplands, although no land use changes will occur, but some damage to crops will take place, if standing crops are present. The land acquisition and compensation for temporary damages in such cases will be conducted in accordance with the Resettlement and Indigenous Peoples Plan.
- Impacts due to construction of the distribution lines (and rehabilitation of existing lines) include damage to private and public properties as many of the existing ROWs are passing through private lands/over roofs of houses/shops or market areas/shops; interference with other utilities like existing OHL power; traffic congestion and blockage of access ways to residences and business will occur during construction; and temporary power outages during installations.
- Most roads in rural area and market/settlement areas are relatively narrow, in complex terrain and mostly in bad condition, and movement of trucks/tractors (usual mode used by NEA for transporting materials to sites) along these roads carrying the electric cables/poles and other materials might cause temporary blockage and nuisance to the locals.
- Some sections of distribution lines will traverse narrow single/two-lane roads in populated settlement areas (especially in Jumla and Kalikot area) which can cause interference to the normal flow of traffic. As there may be limited space for the temporary storage of the materials, the contractor may park vehicles carrying these materials on the road/roadside further causing traffic congestion and hazards to pedestrian and vehicle commuters (already an issue in project area, refer Figure 5.4).
- Potential negative impacts include inconvenience during O&M works for the local community when there may be power outages for maintenance, which may affect business and residences although this impact would be short term and already being done for the existing system.

226. Overall, the construction of the distribution components will have **Low to Minimal Adverse** impacts that are **Not Significant** to land use and livelihoods of the local community although these impacts will need to be well managed to avoid conflict situation with the local community. The impact of the distribution component on the socio-economic environment will be beneficial as improved access to uninterrupted electricity supply will help stimulate economic growth,

particularly in rural and remote areas of the province.

Figure 5.4 Existing lines and equipment and public and private land use



Source: ADB's TA consultant

Mitigation

- The EPC contractors will ensure during route surveys that the final alignments have not greater impact than predicted by the IEE.
- Per national regulations it is mandatory for NEA to seek requisite clearances prior to construction from agencies like, Departments of Roads/Telecommunication, and Ward committee members/authorities that could be affected by the construction of power distribution infrastructure.

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- The CEMP to prepared by the EPC contractors before construction commences will incorporate mitigation measures required to manage land and livelihood related impacts (temporary damages compensation paid as per RIPP) during construction elaborating on those included in this IEE and the EMP. It will include a construction traffic management sub-plan (especially for lines in the congested/market areas. To minimize adverse impacts of the project on traffic, the contractor will be required to properly plan and execute a traffic management plan in accordance with national regulations and the IFC General EHS Guidelines that is supported by good site supervision.
- The CEMP will be including the following measures:
    - Ongoing consultation is to be taken up/implemented along with disclosure of distribution component impacts and activities. GRM to be operational for the new and rehabilitated distribution lines, and all stakeholders to be aware of it, including how to register grievances.
    - Community awareness raising regarding the distribution component with concerned local government/ward authorities and media dissemination for all communities living and working nearby so they know what to expect in advance.
    - Conflict situations to be avoided by early consultation before the start of work and keeping open communication channels throughout.
    - In case there is a need for temporary storage, locations to be agreed and any impacts on private land and assets to be compensated in line with national requirements. Cut vegetation, excavated soil, replaced conductors and poles will need to be stored away from the running road, croplands and habitation (as well as natural habitat/community forest lands).
    - Contractors will be required to ensure that safe access ways to public and private amenities are maintained throughout the construction period.
    - Traffic management will need to be done in consultation with the affected communities to ensure they are aware of likely disruption.
    - Post warning signs and manage traffic movements to protect the travelling public and its workers as necessary and ensure drivers obey road rules and travel at a safe speed given the nature of local roads in some areas and size of vehicles involved. Road safety and warning signs must be posted at 500m, 100m, and immediately in advance of the distribution line works at least two weeks prior to the works commencing to inform the public of turning vehicles and the temporary blockage of one lane of the road during pole installation works.
    - For congested and narrow roads flagmen should be utilized to warn road users of the situation.
    - If stringing conductors presents a possible risk to traffic on roads, and community for lines over residents, scaffolds will be constructed to protect locals, pedestrians and vehicles (and the conductor itself) from potential injury/damage during conductor stringing.
    - During construction, benefits to local people can be maximized if the contractor recruits construction workers locally. However, precedence must be given to ensuring that all workers are appropriately skilled given the hazardous nature of distribution works and so local workers will be limited to few unskilled positions.
    - Wherever possible, the contractor should not discriminate and should proactively encourage the employment of suitably skilled women on the project.

b. Occupational health and safety

- The installation of 11kV and LT lines including works present occupational health and safety risks (refer Figure 5.5) including from unsanitary and unhealthy working

conditions including at overnight accommodation provided by employer, leading to H&S incidents/accidents e.g., slips, trips, falls from height, interactions with equipment and machineries, electrocution, working along or within running roads, working in complex terrain, heavy monsoon, flooding and human health impacts from dust, noise, handling mineral oils, PCBs in existing DTRs (while undertaking rehabilitation), ponding of water for mosquitos, spread of communicable diseases, HIV/AIDS etc. If not managed, injuries are likely to occur.

- Due to construction works for distribution lines being undertaken along roads, some of which (e.g., Jumla area) are busy, they may give rise to slow moving traffic and congestion increasing the risk of a traffic incident involving workers. Works crossing streams/rivers, culverts, river bridge crossings, in complex flat terrain, also pose a risk.
- Other health and safety risks to construction workers include exposure to vector borne diseases such as malaria, dengue, encephalitis, exposure to other communicable diseases, exposure to hazardous chemicals including PCB exposure risk (DTRs), unsanitary conditions at the work sites and in overnight accommodation provided by their employer, toppling of poles and falls from height, working in complex terrain and slopes, electrocutions, dust, and noise exposure etc.
- The existing health services in the parts of the project districts of Karnail province that are rural/remote are inadequate may not be able to accommodate additional patients from the construction workforce during emergencies.

Figure 5.5 Occupational H&S Risks

No PPE in line stringing works - Mugu

No PPE in line DTR works- Mugu

Unsurfaced and damaged road in project ROW

Narrow and complex terrain road in project area

Source: ADB's TA consultant

- The main occupational health and safety issues inherent to the operation of the distribution lines include hazards due to exposure of workers to live power lines, working at heights, and potential exposure to electric and magnetic fields. Government of Nepal has no limits of exposure to electric and magnetic fields. However, international exposure limits will be applied to the project (**Appendix 1**).
- In terms of operation, some electricity workers are killed or disabled as reported by NEA due to electrical accidents due to accidental contact with live wire/equipment,

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violation/neglect of safety measures, defective equipment, lack of supervision etc. The main reason is gaps in communication/communication interference when power is requested to be shut down, but they are turned on due to miscommunication. The quality of existing installations and the H&S practices of NEA (with poor supervision of workers) is cause of concern in terms of poor installation increasing exposure to OHS risks.

227. Overall, pre-mitigation the Output 2(iii) distribution components pose a **High to Medium Adverse** risk which is Significant to the health and safety of workers. The probability of an incident resulting in fatality will be higher if appropriate health and safety measures are not enforced.

Mitigation

- The EPC contractors will ensure during route surveys for distribution lines that the final layouts and alignments have no greater risk to occupational health and safety than predicted by the IEE by having cognizance of international good industry practice per the IFC EHS General Guidelines and Power Transmission and Distribution Sector Guidelines, NEA requirements, recommendations and notifications ensuring all safety clearances are met.
- Sanitation and welfare facilities should meet the requirements of the IFC EHS General Guidelines,[46] EBRD,[47] and ILO[48], especially - Fundamental Conventions:[49], Forced Labor, Equal Renumeration, Abolition of Forced Labor, Minimum Age and Worst Forms of Child Labor etc.
- The CEMP will include an occupational health and safety risk assessment and management plan including an emergency response plan to be developed in accordance with national requirements, the project EMP and IFC EHS Guidelines and ILO guidance[50] and approved by NEA prior to works. The risk assessment should be undertaken through a facilitated risk assessment workshop involving contractor, NEA H&S officers, Project Management Department (PMD) engineering team and O&M teams from the districts. The occupational health and safety plan should follow the health and safety hierarchy including measures set out in the IFC EHS General Guidelines on Occupational Health and Safety and those on Electric Power Transmission and Distribution plus the ILO Safety and Health in Construction guidelines. The emergency response plan will be including emergency response and preparedness procedures, communication systems and protocols to report any emergency, including interaction with local and provincial emergency and health authorities. Communication channels and protocols with local and regional emergency and health authorities will need to be established in case of an incident, with transport given the rural/remote area.
- CEMP H&S sub-plans will include the following measures:
    - Provision of personal protective equipment (PPE) such as hard hats and safety gloves/boots for every worker (with use mandatory and subject to no work conditions if not compliant) as a last resort where risks cannot be avoided.
    - Provide readily available first-aid for workers as well as an ambulance for more serious cases.

[46] https://www.ifc.org/wps/wcm/connect/1d19c1ab-3ef8-42d4-bd6b-cb79648af3fe/2%2BOccupational%2BHealth%2Band%2BSafety.pdf?MOD=AJPERES&CVID=nPtgxyx

[47] https://www.ebrd.com/downloads/about/sustainability/Workers_accomodation.pdf

[48] https://www.ilo.org/publications/workers-housing

[49] https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:102691

[50] Safety and health in construction (Revised edition) | International Labour Organization (ilo.org)

- Orientation regarding not to leave project footprint and potential risks of working close to international borders depending on final routings (Karnali-PCR/India border).
- Hire local workers and staff as far as possible especially as all distribution component works.
- Consider the use of security personnel, capacity development, trainings and awareness raisings, feedback to ensure workers comply with the code of conduct especially adjacent to the international border and in other areas with a higher conflict risk.
- All workers will receive health and safety induction and those working with live electricity and at heights will attend specialist health and safety trainings and be certified to do so following medical check. Untrained workers will not be permitted to work with live electricity or at height.
- Live lines will be deactivated and properly grounded before work is performed on, or in proximity, to the lines and this will be checked and certified in writing by the contractor's Health and Safety Officer in advance.
- If working under live lines (HV or LV) then a safety scaffold will be installed so that the workers cannot come in contact with the OHL, with warning signs provided.
- Information relay/telephonic communication system needs to be checked/improved using better network provider/infrastructure, as one case of electrocution resulted from miscommunication/clarity between line worker and substation staff responsible for switching on/off the line power
- While working at heights personal safety measures such as harnesses, tool bags, ropes etc. will need to be provided.
- Sufficient sanitary toilets (one per six workers) and hand washing facilities, clean eating area, and shaded rest area to accommodate the number of workers on site must be accessible at all construction sites including rural/remote sites.
- Drinking water that meets Government of Nepal drinking water standards must be provided, if an authorized supplier of canned water is not used the source must be regularly tested to confirm it meets these standards – 4 liters per worker per day minimum.
- If a construction camp is provided it must be similarly adequately equipped with sufficient toilets, hand washing facilities, showers or baths, food preparation and clean eating area, etc.

- NEA H&S Specialist and the resident EHS supervisor will be delegated authority under the contract to be able to halt construction works if occupational health and safety risk that poses a risk to life is present.
- Given the operational occupational health and safety risks once facilities are handed over to NEA they will need to adopt the following measures:
  - NEA to be guided by the "Environmental, Health, and Safety Guidelines – Electric Power Transmission and Distribution" (IFC 2007) when working with distribution components.
  - Risk assessment and occupational health and safety plan (SOP) for the maintenance of distribution lines will be developed and adhered to during their operation. Emergency situations considered will include fire and electrocution of workers.[51]
  - Training program for all workers responsible for maintenance of distribution lines to be provided.

[51] Including an emergency response plan with emergency response and preparedness procedures, communication systems and protocols to report any emergency, including interaction with commune and provincial emergency and health authorities.

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- O&M to be performed only by adequately and regularly trained and experienced staff of NEA Karnali Province under supervision of a Health and Safety Officer.
- Workers to observe guidelines to minimum approach distances for tools, vehicles, pruning, and other activities when working around power lines.
- Restricting working at height only by workers who are trained and certified to do so.
- Testing of structural integrity prior to proceeding with the work and the use of fall protection measures such as harnesses, tool bags, ropes etc.
- Restricting access to electrical equipment only by workers who are trained and certified to work on electrical equipment.
- Proper grounding and deactivation of live power lines during maintenance work or when working near the lines.
- Provision of PPE for workers, safety guidelines, personal safety devices such as harnesses, tool bags, ropes etc., and other precautions.
- For O&M staff occupational health and safety measures include ensuring they are not exposed to excess EMF in line with international guideline levels (**Appendix 1**).
- Sanitation and welfare facilities as per construction will also be required for operation and maintenance workers.

c. Community health and safety

- The operation of the 11kV and LT distribution lines which are mostly near community areas/settlements may expose the locals to electrocution hazards because of direct contact with live conductors or flashover from the conductor to a pole, particularly if the person or structure is near a live line where the safe horizontal or ground clearances are compromised.
- Nepal Electricity Regulations 2050 (1993) provide for safety clearances to the ground, roads and habitations to ensure safety of human beings living or working in the vicinity of distribution networks which in some instances are not currently met – with the worst case seen during the site visit being a distribution line pole actually within a house structure. Minor rerouting where safety clearances are not currently met (some lines will be rehabilitated and moved from private lands/property to road ROWs) and the use of covered conductor and ABC where existing lines are reconductored reduces these health and safety risks.
- Presence of overhead distribution lines (new/rehabilitated and conversion of 11kV bare to covered conductor and conversion of LT to ABC) in settlement areas will reduce exposure of the local communities to fire risks, EMF, and potential electrocution from touching live wires passing over rooftops, during storms if wires snap and poles fall on houses and roads etc. Houses made of flammable material roofs and walls like wood, in rural areas of distribution component in all project districts, are at particular risk from fire hazards from cable snapping and exposure of live wire due to breakage and such fires may easily result in fatalities.
- In terms of operation, every year many members of the public (as reported by NEA staff) are killed or disabled in the project districts due to electrical accidents due to snaping of conductors, accidental contact with live wire/equipment, violation/neglect of safety measures, defective equipment, inadequate maintenance, and unauthorized works.
- Topographically Nepal faces a lot of problems to maintain the electric cables in hilly and mountainous regions. In addition, broken cables, low hanging cables, culture of throwing waste or pasting advertisement on the electric poles, distribution transformers (which do not have any caution signs and fencing) are common findings here. Lack of vigilance of power supply systems as well as cables have resulted in many electrical

accidents and fatalities. Six people were electrocuted when a passenger bus touched a low hanging 11,000-volt transmission line during January 2019[52]. Since mid-April 2018 upto June 2024, Nepal Police has recorded 518 cases of electrical accidents which killed 289 and critically injured 297 people. Data maintained by the police show that there were 520 cases of electrocution which resulted in 321 deaths and 260 severe injuries between mid-April 2017 and mid-April 2018.[53]

- As with OHS the quality of existing installations in the public domain is a major cause of concern in terms of poor installation and non-maintenance/regular checks in complex terrain, increasing exposure to risks. Very few pole ground mounted transformers, as observed during site visits, are fenced and they are not being maintained/damaged (Figure 5.8).
- To protect against EMF the International Commission for Non- Ionizing Radiation Protection (ICNIRP) for the public (up to 24 hours a day) will be adopted (**Appendix 1**). EMF levels associated with distribution lines are significantly lower than those associated with overhead transmission lines. The EMF from distribution networks can vary widely depending upon the number of phases. A US study states typical 11kV overhead distribution line with 300amps current can result in magnetic field of 22mG immediately below the line dropping to 15mG at 7.5m from the line and 8mG at 14m distance. In the UK for an 11kV line under the line itself the maximum magnetic field is 7uT and the electric field is 700V/m, but typically 0.2-0.5uT and 200V/m. This is well below the applicable guideline levels in **Appendix 1**. Therefore, the health impact of the electric field is negligible. The impact of EMF is dependent on the duration of exposure but provided the ICNIRP guideline exposure levels are complied with for community exposure to the distribution components no significant adverse impacts are envisaged.
- Potential nuisance to nearby properties during construction includes dust, noise, from earthworks and the operation of any construction equipment, and the passage of heavy vehicles/tractors transporting materials to the sites.
- Some of the distribution lines will pass through agricultural and other private land (most of the existing lines are planned to be rehabilitated to road ROWs) but in many cases the new distribution lines will follow routes along existing road RoWs, such that activities will mostly be performed in the road corridor, but some works will be in private lands/over houses (even for removal to rehabilitate) posing increased risks to the public.
- The use of roadside and adjacent spaces during construction works will cause traffic congestion and increase the risk of a traffic incident in some of the busy market areas and considering that the roads are narrow, broken, and in complex terrain, even though traffic movement is low to medium and nearly negligible in some of the remote villages to be electrified.
- Sample photographs of ROW housing/commercial activities in the route alignments are shown in Figure 5.6. Since works are in the public domain, impacts on the community during construction works may include health and safety incidents due to the presence of open pole foundation pit, road blockages and congestion, exposure to pollution and wastes, conflicts with workers and staff of NEA due to sexual exploitation, or harassment of locals by workers, spread of communicable diseases like STDs, and cultural conflicts in project areas.
- There could be occasional cases (as seen during site visits) where dilapidated/hanging/twisted distribution poles need to be replaced, poles are currently located on private property, or lines do not comply with safety clearances. The project plans to electrify multiple villages/areas that are very remote (poor road access) and

[52] http://elibrary.nhrc.gov.np:8080/bitstream/20.500.14356/1089/1/3257-Manuscript-21580-1-10-20210425.pdf
[53] https://myrepublica.nagariknetwork.com/news/electrocutions-killed-289-people-in-six-months/

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in very complex terrain. Locals of these areas mostly have no knowledge of H&S risks from living close to powerlines. In the settlement they will be in very close proximity to nearby residences, businesses, etc. Many houses and shop/business porches have been built under the existing power lines, thus increasing vulnerability, and violating the safety clearances and there is no education as to why this should be avoided. Poles and lines will be removed and stored temporarily on site/along the roads (rehabilitation). Although existing RoWs will be used to undertake such activities, working in private properties will increase potential risk for incidents or conflicts between the public and workers.

- The risks from the distribution line works are short term given the transient nature of distribution line works concentrated on each short section and activities being for a relatively short time. However, they will be greater if communities are not informed in advance (especially for villages that are to be newly electrified) about the works and appropriate health and safety measures (e.g., dust and noise management, community awareness, hazard warning boards for on-going construction activities, temporary works boundary fences, and traffic management controls) are not enforced at the construction sites.

Figure 5.6 Community H&S Risks Associated with Distribution Line ROW and Operation of Distribution Network

Unstable pole in Jumla area

Locals near DTR

School gate in LT ROW, Jumla

Pole inside private property

House set on fire due to wire snapping
Source: https://myrepublica.nagariknetwork.com/news/the-fire-by-electrical-short-circuit-caused-4-8-million-loss-in-khotang/

Pole in cropland

Wire stringing in progress, cables layed on road

ROW in private areas- lines over roof

Pole stored on road

Source: ADB's TA consultant

228. Overall, pre-mitigation, the distribution components poses **High to Medium Adverse** risk which may be significant to the health and safety of local communities in some sites if safety clearances are not maintained, but overall would be not significant. The probability of an incident resulting in fatality will be higher if appropriate health and safety measures (including awareness for villages to be electrified under the project) are not enforced by the EPC contractor and NEA.

Mitigation

- The EPC contractors will ensure during route surveys for distribution lines that the final layouts and alignments have not greater risk to community health and safety than predicted by the IEE by having cognizance of international good industry practice per the IFC EHS General Guidelines and Power Transmission and Distribution Sector Guidelines. Community health and safety measures e.g., signage will be incorporated into the detailed design:
  - Lightning arresters to be provided along the lines.
  - There should also be provision for ensuring security of the cable to avoid damage.
  - Each pole should also have installed a sign warning about the safety hazard from the power lines, for ground mounted transformers these should be fenced off with a locked gate.
- In all cases including rehabilitation of distribution lines where safety clearances are currently encroached upon the minimum electrical clearance, as required by the Nepal Electricity Regulations, 2050 (1993) [54,55] are to be maintained with respect to the ground, roads and habitations, to ensure safety of human beings and livestock in the vicinity of the distribution lines.
- If safety distances are found not to be complied with during rehabilitation the distribution line will have a minor realignment to facilitate compliance – both horizontal and vertical distances must be met.
- In addition to these safety clearances, given greater vulnerability of children to health and safety risk, the crossing of school compounds (if any) will be avoided by routing new distribution lines outside them and any other similar community facilities during survey work. For any lines within 5m of such facilities (e.g., as seen in Jumla area) the arrangement plan will be included in the site-specific assessment checklist, to inform the updated IEE, following detailed route surveys being completed during detailed

[54] https://www.nea.org.np/admin/assets/uploads/supportive_docs/Electricity_Regulation_2050-english.pdf

[55] https://lawcommission.gov.np/en/?p=5065

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design. Existing distribution lines being rehabilitated which cross school compounds, playgrounds and other similar community facilities will also be realigned to ensure that the same requirements as for new lines are met. The arrangements plan for any such realignments needed will be included in the site-specific assessment checklist, to inform the updated IEE following detailed route surveys being completed by the contractor.

- Once operational, NEA staff need to conduct regular inspections (at least monthly) on all the distribution lines no matter how remote to ensure that the clearances are maintained. The inspection protocol should include possible conductor snapping and de-energizing of the line within three cycles to avoid the potential for electrocution from a breakage.
- The community needs to be educated by the contractor and NEA with respect to the importance of maintaining the horizontal clearance from buildings in order that they do not erect new buildings within this zone as has reportedly occurred in all the instances where safety clearances are breached.
- The CEMP will include a community health and safety risk assessment and management plan including an emergency response plan to be developed in accordance with national regulations, the project EMP and IFC EHS Guidelines and approved by NEA prior to works. The risk assessment should be undertaken through a facilitated risk assessment workshop involving contractor, NEA health and safety officers, and PMD engineering team and O&M staff. The community health and safety plan should follow the health and safety hierarchy including measures set out in the IFC EHS General Guidelines on Community Health and Safety and those on Electric Power Transmission and Distribution. The emergency response plan will be including emergency response and preparedness procedures, communication systems and protocols to report any emergency, including interaction with commune and provincial emergency and health authorities. Communication channels and protocols with local and regional emergency and health authorities will need to be established in case of an incident.
- CEMP H&S sub-plans will include the following measures:

    - Measures for the physical environment will be adopted to reduce disturbance; notably construction works will be restricted to daytime unless in agreement with the local community adjacent, so the noise limit is 45dB(A) in rural residential areas and 50dB(A) in peaceful/silence areas.
    - If works are not completed within the day the contractor must not leave any hazardous conditions (e.g., unsigned, unfenced, and unlit open pits without means of escape and emergency contacts in case an accident occurs) overnight unless absolutely no access by public can be ensured.
    - Construction workers including subcontractors will be given awareness raising in HIV/AIDS, other communicable diseases, and sexual, exploitation, abuse, and harassment with strict penalties (e.g., immediate removal from site) for any violations.
    - Contractors staff will also be given awareness raising in HIV/AIDS and sexual, exploitation, abuse, and harassment.
    - Contractor and NEA with the support of CSOs/external experts and institutions/NGOs as part of its regular health and safety practices to organize health and safety community campaigns prior to construction regarding construction risks and from coming into contact with live electrical equipment prior to energizing the distribution lines as well as in relation to smart meters about how to avoid electrical incidents.
    - Awareness programs will use distribution of social media, posters, leaflets, and safety booklets to all households in Nepali/Jumli/Khas and other local languages within 50m of OHL distribution line ROWs as well as face-to-face

orientation at the village/community level. These posters and safety booklets will be available within substations and local electrical offices of NEA.

- PMD H&S officer and EHS supervisor will be delegated authority under the contract to be able to halt construction works if community health and safety risk that pose a risk to life is present.
- Given the operational community health and safety risks once facilities are handed over to NEA they will need to adopt the following measures:

    - Risk assessment and community health and safety plan for the maintenance of substations and distribution lines will be developed and adhered to during their operation.
    - Emergency situations considered will include fire and electrocution of members of the public.
    - NEA, with the support of CSOs/external experts and institutions/NGOs and the Ward/Municipal Committee, as part of its regular health and safety practices to continue to organize health and safety campaigns for the community to be educated with respect to the hazards associated with meeting electrical equipment.
    - In case of fire events, explosion, and other related situations, given the NEA may not be available immediately in rural/remote locations or in case roads are damaged due to flooding, very complex terrain, etc., the community should be educated with respect to emergency response with 24/7 emergency contact numbers for NEA included on signs; NEA will need to ensure this is manned 24/7 to ensure that it is effective reporting route.
    - Regular inspections of the line and the facilities would help identify missing or damaged/corroded parts that need immediate replacement.

G. Potential Physical Cultural Impacts and Mitigation Measures

229. The potential impacts on physical cultural resources include potential damage to existing structures and potential for undiscovered underground resources during earthworks for pole. Presence of religious and cultural places is anticipated along distribution line routes (refer Figure 5.7), which need to be inventoried with details after route alignments are surveyed and finalized. Based on baseline analysis (Chapter IV) the Output 2(iii) distribution component districts have some hilly terrain/natural habitats and there have been many finds. It is although unlikely that chance find will occur as most poles are in modified habitat, although a chance find procedure will still be adopted.

a. World Heritage Sites and National/State Monuments

230. There are no international and national important archaeological, historical, religious are along the indicative 11kV and LT OHL alignments/PAI. Adherence to the criteria/principles in Chater III is to be confirmed during final survey. No distribution lines are/will be passing within national protected monuments. Rule 4.1 of the Ancient Monument Preservation Rules 1989, directs on obtaining permission through application to the Department of Archaeology for installing electricity or any other infrastructure in protected cultural sites, similar permission will be obtained for works in the tentative WHS.

b. Impacts on other physical cultural resources

231. Local PCRs such as temples are found in the wider project area as discussed in Chapter IV under baseline and some lines are currently passing over them. There may also be IP physical cultural resources present. Although no potential damage is anticipated to such

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structures, movement of construction vehicles, dust and noise is anticipated disturbing users. The distribution lines could have visual impact/create visual clutter in the vicinity of physical cultural resources. However, there are existing power lines and telecommunication lines in villages and along the road RoW in most locations so the new and converted lines will not be a new component in the landscape in these parts of the districts. This will although be an issue for villages which are to be newly electrified, although the houses are scattered in hill/valley with minimal local PCR it will be important local communities are consulted before the distribution lines are installed to get their agreement.

c. Chance finds

232. It is also possible that chance finds could occur during excavation works for all components.

Figure 5.7 Local PCR in visited ROWs

ROW near Temple in Jumla

Source: ADB's TA consultant

233. Overall, pre-mitigation the distribution components poses **Medium to Low Adverse** risk which is **Not Significant** to impacts on physical cultural resources.

Mitigation

- EPC contractors will ensure during route surveys that the final alignments do not have any impact greater than predicted in the IEE, including ensuring that none of distribution lines pass through national monument sites. The detailed route surveys of the 11kV/low tension distribution lines will need to confirm this in the case with the completion of the site-specific assessment checklist to inform the updated IEE before any works commence.
- EPC Contractor for all components will be required to conduct an inventory of physical cultural resources in and adjacent to the RoW prior to the start of any works. This will be collated in consultation with local communities including indigenous peoples. Where any PCR is identified within the RoW they will be demarcated and where any are found to be directly impacted, due to their presence within the RoW micro-siting/realignment changes will be made to avoid impacts to the sites. Visual impacts/amount of visual clutter will be managed through sensitive route alignment of overhead cables and poles.

- Demarcation of the working area by the contractor and avoidance of encroachment outside the agreed corridor of impact. All local PCR adjacent to worksites will be identified and temporary barriers placed around them to ensure no damage by equipment and machinery.
- No temporary or permanent project facilities shall be established within the national protected monuments.
- PMD Environment Safeguards Officer will be delegated authority under the contract to be able to halt construction works if any damage to known physical cultural resources is caused or chance finds are encountered.
- A Chance Find Procedure will be developed for implementation for all distribution components in the event physical cultural resources are found. The procedure will include at least the following:
    - If suspected physical cultural resources are encountered, all works at the find site should be immediately halted and local administration (Ward President) to be informed.
    - The find should be assessed by a competent local official managing cultural issues (Department of Archaeology Nepal), and procedures to avoid, minimize or mitigate impacts to such physical cultural objects should be agreed in writing with them.
    - Work should not begin until the procedures to avoid, minimize or mitigate impacts to the physical cultural resources have been agreed and implemented in full.
    - If avoidance is not feasible, and no alternatives to removal exist, and the project benefits outweigh the anticipated cultural heritage loss from removal which is unlikely unless in case of resource of local value, following clearance of ADB the physical cultural resources should be removed and preserved using the best available technique in accordance with relevant provisions of national heritage protection laws and decrees.
    - Records should be maintained of all finds, including chain of custody instructions for movable finds.
    - All construction workers to be made aware of the chance-find procedure and types of finds to be reported.

H. Post-Mitigation (Residual) Impacts

234. Overall post mitigation impact significance is provided (refer the last column of the matrix) in the Table 5.4, there are no significant residual impacts anticipated provided the EMP is satisfactorily implemented by NEA and their contractor.

I. Cumulative and Induced Impacts

235. Cumulative impacts are defined as the combination of multiple impacts from ongoing projects/works, the proposed intervention, and anticipated future projects that may result in significant adverse and/or beneficial impacts that cannot be expected in the case of a stand-alone project.

236. The distribution line activities, including construction, will mostly take place across Mugu, West Rukum, Salyan, Kalikot, Jarkot and Jumla district. A detailed assessment of other ongoing or planned activities is not possible at this stage. However, during the distribution line site visits, it was observed that along one stretch of planned line, highways (Jumla-Dailekh) widening is ongoing.

237. Cumulative impacts are anticipated in such ROWs where roads and other activities are ongoing and/or planned in the future in parallel with the planned distribution line work

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implementation. Impacts would mainly relate to construction works increasing the significance of those impacts predicted from the distribution lines alone: dust generation, noise emission, soil erosion, sediment flow along steep roads, and occupational and community health risks from reducing the effective width of the road an' affecting people's access and traffic flows. Possible conflicts among workers along with workers on the other works may also take place.

238. To manage these impacts the EPC contractor will be required to coordinate with Department of Roads, Nepal, and other utility sectors having planned works. The works should not be scheduled in parallel given the difficult working environment. O&M impacts may occur when other works/activities do not pay respect to the presence of the distribution line and damage it, which could expose their workers to electrocution risk as well as increasing risks to others from the damaged distribution line. NEA can provide awareness raising to road and other utility sectors (contractors) regarding safe working practices around its distribution lines and undertake regular inspections and maintenance to identify any damage that has been caused.

239. The distribution component of the project will add to the quantum of 11kV and LT distribution lines in Karnali province. Some of the 11kV and LT lines. Since bare conductors which pose greatest risk to biodiversity will be avoided, significant cumulative biodiversity impacts from expansion of the distribution network are not anticipated. Cumulative community health and safety impacts are considered positive; the installation of covered conductors/ABC will reduce O&M risks in areas containing settlements.

240. Induced impacts are the adverse and/or beneficial impacts on areas and communities from unintended but predictable developments caused by a project which may even occur later or at a different location. There may be some induced socioeconomic development because of implementation of the project. During construction roadside eateries/grocery stores may be able to provide services for construction workers. However, as both the substations are already under construction, and distribution lines works are transient in nature, any such impacts are anticipated to be negligible (minimal).

241. Whilst most new lines will seek to follow existing road ROWs, there will be some induced impact from opening sensitive habitat areas (natural habitat/community forest) to human access since the ROW may provide easier access to locals. Improved quality of electricity supply during operation may contribute to improved socioeconomic development (especially for remote areas without electricity) in Karnali province, however, given the distribution network already exists in greater part of project province, any such impacts are considered at most as being minor. Any such induced development due to improved supplies will need to be in accordance with the national laws and regulations of Nepal. It should also be noted that any such future development is entirely independent of the distribution components of the project.

VI. CONSULTATIONS, PARTICIPATION, AND INFORMATION DISCLOSURE

A. Introduction

242. The purpose of the stakeholder consultation and public participation process is to ensure that interested stakeholders, affected communities as well as the public are informed about NEA's plans and to solicit their views and opinions. According to ADB's SPS, 2009: "*The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. Meaningful consultation is a process that*:

(i) Begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle.
(ii) Provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people.
(iii) Is undertaken in an atmosphere free of intimidation or coercion.
(iv) Is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and
(v) Enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.
(vi) Consultation will be carried out in a manner commensurate with the impacts on affected communities.
(vii) The consultation process and its results are to be documented and reflected in the environmental assessment report."

243. This chapter summarizes the outcome of public consultations conducted as part of the environmental assessment for the Output 2(iii) distribution components of the proposed project.

B. Public Consultations

244. Consultations were held with local communities at 11 locations in June 2024 and 4 places in May-June 2025. Consultations were held along the ROW of sample distribution lines with residents within 50m of the sites, wherever available. During the site visits, NEA staff (nearest neighbor) and the Ward Presidents, Municipal Head/Committee members were interviewed. In total, 4 villages/towns (4 locations) were consulted, including villages along the distribution lines.

245. The total number of members of the public consulted for this project was 88 participants of which 61 were male and 27 were female. Locations and number of participants are described in Table 6.1, consultation details in Table 6.2 and details on consultation records are provided in **Appendix 6.** During each consultation, the project details were conveyed, project awareness was raised, project stages, process and EHS impacts, and risk discussed along with how they will be mitigated. During the stakeholder consultations, the grievance redressal mechanism (GRM) process/complaint registration/mode and redressal were also disclosed.

Table 6.1 Locations and Participants

#	Name of Village /Town	Male Participants	Female Participants	Total Participants
1	Narayan Art, Dailekh	04	01	05
2	Sinja, Kalikot	10	0	10

#	Name of Village /Town	Male Participants	Female Participants	Total Participants
3	Bagbazar area, Jumla	04	03	07
4	Mofla Village, Jumla	03	0	03
5	Rugagaon, Badhgaon	05	0	05
6	Humla Village, Jumla	05	02	07
7	Jumla Powerhouse	06	0	06
8	Jumla Bazar	03	0	03
9	Chandannath	00	03	03
10	Chandannath, Ward 2	05	03	08
11	Mugu, Ganguti	06	02	08
12	Jumla, Lumtoli	00	05	05
13	Salyan, Salchaur	04	00	04
14	Salyan, Sunchaur	01	00	01
15	Salyan, Andheri	05	08	13
Total		**61**	**27**	**88**

Source: ADB's TA Consultant

Table 6.2 Sample Distribution Line and Substation Site Public Consultation Summary

Location	Date	Number of participants			Issues Raised/ Concerns	IEE follow-up/Project Response
		M	F	T		
Distribution Line						
Distribution Line Route: **11kV and LT lines rehabilitation,** alignment - Narayan Art, Dailekh, along road - passes settlement. House and shop entry inside ROW observed	16.06.2024	04	01	05	• Avoid lines over houses. • Along road is acceptable • Improve the power lines and poles • Major issues of voltage drop and power failure hampering livelihood	• Distribution line works helps reduce power outages • Consultation and disclosure before work starts • Specific measures to help manage community safety risks and comply to horizontal and vertical safety clearances, have been included in the EMP • Community awareness in project village to be conducted • NEA is rehabilitating lines from private areas/houses and converting them to CC/ABC under project scope • NEA assured they would be obtaining necessary permission for works and also addressing grievances/compensation and would continue consultations/awareness raising during implementation. • NEA will also take permission for obtaining any new land/pole site and line works within these areas
Distribution Line Route: **33kV, 11kV and LT lines rehabilitation,** alignment – Gora, Sinja Line and 33kV Jumla 132kV to Kalikot substation, along road - passes settlement, hills/valleys, some house and shop entry inside ROW	17.06.2024	10	0	10	• Some electrocution reported in villages • Happy to support the project • Road needs to be improved	• Distribution line works helps reduce power outages • Consultation and disclosure before work starts • Community awareness in project village to be conducted • NEA is rehabilitating lines from private areas/houses and converting them to CC/ABC under project scope
Distribution Line Route: **11kV and LT lines – new and rehabilitation,** alignment – Mofla, Jumla area, along road - passes settlement, hills/valleys, some house and shop entry inside ROW	18.06.2024	03	0	03	• No issues with poles in cropland • GRM and consultations are most welcome and will be utilized if required • Water scarcity in the area; and has to be fetched from far away • Ghotiputal Community Forest is in the area	• Distribution line work helps reduce power outages and improve livelihood • Consultation and disclosure before work starts • Community awareness in project village to be conducted

Location	Date	Number of participants			Issues Raised/ Concerns	IEE follow-up/Project Response
		M	F	T		
					• Forest use - cooking fuel, house construction, fodder, medicinal plants • Key species in the area: vultures, bear, fox, small and large sized monkeys, wild boar. Monkey, bear and wild boar incidents are during crop ripening season	• NEA assured they would be obtaining necessary permission for works and also addressing grievances/compensation and will do continue consultations/awareness raising during implementation. • NEA will also take permission for obtaining any new land/pole site (crop lands) and line works within these areas
Distribution Line Route: **11kV and LT lines new and rehabilitation,** alignment – Bagbajar, Jumla area, along road - passes settlement, hills/valleys, some house and shop entry inside ROW observed	18.06.2024	04	03	07	• Major issues of power cut and voltage drop in the area • Houses and school are run by limited solar power • Student studies and house works by women are hampered by power cuts • Project will improve household works-electrical gadgets, cooking, internet network • Electrical accidents will not occur if project is implemented. • Water scarcity in the area • Key species in the area: jackal and vultures.	• Distribution line work helps reduce power outages and improve livelihood • Consultation and disclosure before work starts • Specific measures to help manage community safety risks and comply to horizontal and vertical safety clearances, have been included in the EMP
Distribution Line Route: **11kV and LT lines – new and rehabilitation,** alignment – Humla, Jumla, along road - passes settlement, croplands, some house and shop entry inside ROW	18.06.2024	05	02	07	• Power failure is hampering cooking (unable to use mixers, hot plates, etc.). Impacting business like saw mills - main livelihood of the area • Child education using solar is not adequate • Construct a motorable road connecting to the village (presently through narrow suspended bridge) to improve business. Footpaths are also broken, and bridges get damaged during rainy seasons. • Major power failure with voltage drop during the evening in the villages of the area. • Cooking and eating is mostly in the dark and very difficult	• Distribution line work helps reduce power outages and improve livelihood • Consultation and disclosure before work starts • Specific measures to help manage community safety risks and comply to horizontal and vertical safety clearances, have been included in the EMP

Location	Date	Number of participants			Issues Raised/ Concerns	IEE follow-up/Project Response
		M	F	T		
					• Women have to walk 2-3 hours to the forest areas to collect firewood. If village is electrified, then this time will be saved and more time to do household works. Can use heaters/induction cookers if electrified • Happy to hear about GRM and will use if required	
Distribution Line Route: **11kV and LT lines – new and rehabilitation,** alignment – Rugagaon, Bhadgaon, non-electrified village, along road - passes isolated settlement, croplands, some house inside ROW	18.06.2024	05	0	05	• Flour mills needs electricity, presently using manual methods or inadequate power - hampers business • Schools need power to operate computers and internet • Drinking water lifting is manually done, electric pump is needed to meet demands • Irrigation is hampered and water extraction using pumps is needed. • Presently monsoon dependent cropping as water scarcity during other seasons.	• Distribution line work helps reduce power outages and improve livelihood • Consultation and disclosure before work starts • Specific measures to help manage community safety risks and comply to horizontal and vertical safety clearances, have been included in the EMP
Distribution Line Route: **11kV and LT lines – new and rehabilitation,** alignment – Jumla bazar area, along road - passes settlement, croplands, some house/shops inside ROW	19.06.2024	03	0	03	• Works are requested to be extra careful or not done during 7am -10am as local children goes to school and 3pm-5pm return back. • They can take an alternate road if this blocked due to powerline installation • Inform locals before work starts • GRM is most welcome • Sparks from DTR is observed occasionally and need to be repaired or prevented	• Distribution line work helps reduce power outages and electrical faults • Consultation and disclosure before work starts, especially with guardians regarding school timings and routes taken by student during works • Specific measures to help manage community safety risks and comply to horizontal and vertical safety clearances, have been included in the EMP • Community awareness in project village to be conducted • NEA assured they would be obtaining necessary permission for works and also addressing grievances/compensation and will continue consultations/awareness raising during implementation.

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Location	Date	Number of participants			Issues Raised/ Concerns	IEE follow-up/Project Response
		M	F	T		
Distribution Line Route: **11kV and LT lines – new and rehabilitation,** alignment – Chandannath, along road - passes settlement, croplands, some house/shops inside ROW	19.06.2024	0	03	03	• Remove the power lines and poles from house compound • Replace the damaged poles and lines in the area. • DTR and pole sparks need to be prevented as some are close to houses • Do not install poles in front of houses and shops • Lines above the houses are not safe • Cables are low hanging and need to high clearance for safety • Crow/pigeon electrocution takes place regularly	• Consultation and disclosure before work starts • Specific measures to help manage community safety risks and comply to horizontal and vertical safety clearances, have been included in the EMP • NEA is rehabilitating lines from private areas/houses to road ROWs and converting bare to CC/ABC under project scope • NEA assured they would be obtaining necessary permission for works and also addressing grievances/compensation and would continue consultations/awareness raising during implementation. • NEA will also take permission for obtaining any new land/pole site (especially in front of houses) and relocate if there is objection to line works within these areas
Distribution Line Route: **11kV and LT lines – new and rehabilitation,** alignment – Chandannath Ward 2, along road -passes settlement, croplands, some house/shops inside ROW	19.06.2024	05	03	08	• Low voltage is hampering work and household works • No continuous electric supply as frequent tripping • Takes long time to repair any power failure • Major short circuits during monsoons, Sparks are observed • ROWs must not be over houses • NEA worker electrocuted 2 years back due to miscommunication during repair as power was turned on (communication signal issue and no voice clarity) • Locals were also electrocuted in some cases due to cable brakes on roads	• Consultation and disclosure before work starts • Specific measures to help manage community safety risks and comply to horizontal and vertical safety clearances, have been included in the EMP • NEA is rehabilitating lines from private areas/houses to road ROWs and converting bare to CC/ABC under project scope • NEA assured they would be obtaining necessary permission for works and also addressing grievances/compensation and would continue consultations/awareness raising during implementation. • NEA will also take permission for obtaining any new land/pole site (especially in front of houses) and relocate if there is objection and line works within these areas
Distribution Line Route: **11kV and LT lines – new and rehabilitation,** alignment – Mugu	19.06.2024	06	02	08	• Major voltage drop due to long distance from the main grid • Hampering business and livelihoods	• Distribution line works helps reduce power outages and improve livelihood

Location	Date	Number of participants			Issues Raised/ Concerns	IEE follow-up/Project Response
		M	F	T		
area, along road - passes settlement, croplands, some house/shops inside ROW					• Roads need repair • Major issue of water scarcity in the area • Issues with pole locations - realign away from front of houses • Full support during construction will be provided.	• Consultation and disclosure before work starts • Specific measures to help manage community safety risks and comply to horizontal and vertical safety clearances, have been included in the EMP • NEA assured they would be obtaining necessary permission for works and also addressing grievances/compensation and would continue consultations/awareness raising during implementation. • NEA will also take permission for obtaining any new land/pole site (especially in front of houses) and relocate if there is objection and line works within these areas
Jumla, Lumitole	5/24/2025	0	5	5	• Use of forest for medicinal plants and NTFP and firewood by locals should not be disturbed • Wildlife found in the area fox, leopard vultures, phesant, chakura should not be disturbed. • Improving power conditions by the project is encouraged.	• Project will do as laws permit. • Project will improve power conditions in the area and be sensitive to environment of the area.
Salyan Salyan, Salchaur	5/25/2025	04	00		• Not aware of the project, information to be provided • Complaint for the power outage should be addressed through the phone call • Road condition in the area is not good, if project can support it will be good • Having hospitals in the area will be beneficial • The major wildlife found in the area is wild boar, porcupine, leoapard, ghoral, vultures are rarely seen, sensitivity towards the wildlife needs to be maintained. • Current power quality in the area is poor and expect the project to ensure	• Project will do as laws permit. • Project will improve power conditions in the area and be sensitive to environment of the area.

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Location	Date	Number of participants			Issues Raised/ Concerns	IEE follow-up/Project Response
		M	F	T		
					better operation of mills, TV, and fridge.	
Salyan, Sunchaur	5/25/2025	01	00	01	• Happy to know of improvement of power in the area, by the project	•
Salyan, Andheri	5/26/2025	05	08	13	• The village's name is Andheri or darkness because of no power connection in the area and the community will be happy to receive connection. • When will be project commence • Because of no light difficulty and people have been emigrating from the village.	• The project will begin as the early as possible.
Total		**61**	**27**	**88**		

Source: ADB's TA Consultant

246. The major issues identified during consultation was the power failure, emigration problem in village because of difficulties from lack of power, voltage drop and non-electrified situation hampering livelihood and household works and also the presence of poles and power lines in and close to private properties. No other major issues were raised.

247. The analysis of the consultations brought out that impacts on the consumers of electricity distribution services as well as the safety of those along/adjacent to route alignments (including many houses/croplands over which OHL currently pass or poles are present) will be positive as many of the lines will be rehabilitated from private lands to road ROWs, there are also likely to be negative impacts on other affected parties including RoWs in which poles (new/existing/rehabilitated) and OHL may pass. Particular attention will be needed to health and safety given the poor experience of consultees to date with safety issues. The impacts on private lands (during removal/rehabilitation) and crop lands along which route alignments will pass during construction with land use restrictions in operation, temporary impacts and inconvenience to communities residing along the distribution line alignments during construction, temporary economic impacts on businesses along the alignments (busy market areas – Jumla Bazar, Nagma, others), and temporary inconvenience for traffic where distribution line alignments are along complex terrain and narrow/busy and densely built-up/market areas.

248. These consultations are considered sufficient and meaningful in regard to this IEE study, which is based on trends in issues emerging from the consultees. However, the alignment of distribution lines consulted on was only indicative so the detailed impacts of the distribution lines on the local community were uncertain. Further consultations will be conducted for all components before construction and continue throughout the project implementation.

C. Other Stakeholder Consultations

249. Karnali province project district ward/municipal heads/committee stakeholders, and District Forest Officer were also consulted (Tables 6.3). Further, other stakeholders such as Bird Conservation Nepal were consulted as part of the overall project and taken into account in preparation of this IEE.

Table 6.3 Summary Stakeholder Consultation for Distribution Component

Consultation Location and Date	Name	Discussion/Issues Raised	Project Response
Distribution line area, Karnali Province 21.06.2024	Binod Kumar Shah, Minister of Land Management, Agriculture and Co-operative, Karnali Province	• Very happy to know about the project • Project is well supported • Any issues during implementation can be brought to him for redressal • The province needs development and specially in the remote areas where economic hardship are prevalent - this project will help this cause	• NEA assured they would be obtaining necessary permission from Ward committee for works and also addressing grievances/ compensation and would continue consultations/ awareness raising during implementation. • NEA will also coordinate with ward office and locals for obtaining any new land/pole site and for line works within these areas • NEA will share a copy of the draft IEE with Ward Committee when available

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Consultation Location and Date	Name	Discussion/Issues Raised	Project Response
Distribution line area, Karnali Province 22.06.2024	Ms. Gomati BK, Karnali Province Parliament Member and Province Minister	• Project is most welcome and will be well supported • The province will benefit from project and improve livelihood of locals	• NEA will also coordinate with ward office and locals for obtaining any new land/pole site and for line works within these areas • NEA will share a copy of the IEE with Ward Committee when available
Distribution line area, Attabish 16.06.2024	Bil Bahadur Sahi, Chief Administrator, Attabish	• Project is welcome and full support will be provided and very positive • Any issues during implementation can be consulted with him for redressal • Provide employment to poor locals under project • No issues regarding community H&S in the area • Must take permission from this office to implement the project in the area • Locals are not aware of the H&S regulations, laws, etc. so build houses under powerlines • Ethnic conflicts are common in the area • Karnali River is flooded every year and causes damages to crop, houses and buildings. In rainy season many dead bodies are washed up in the river • Mudslide and landslide is a major issue in the area • Key species in the area: tiger, wolf, fox, common leopard. • Tiger was observed in the settlement area and attacked a woman on 12/06/2024. • The area is connected with Rara NP through forest/natural habitat and potential pathway for tiger movement in this area	• Distribution line works helps reduce power outages and electrical faults • NEA assured they would be obtaining necessary permission from Ward committee for works and also addressing grievances/ compensation and would continue consultations/ awareness raising during implementation. • NEA will also coordinate with ward office and locals for obtaining any new land/pole site and for line works within these areas • NEA will share a copy of the IEE with Ward Committee when available • EMP implementation
Distribution line area, Singodi 16.06.2024	Kalam Bahadur, Ward Chairperson And Pakash Pal Thapa, Secretary Ward	• Not aware of project • Full support to the project • No electrification in many villages • No issues if power lines pass over croplands • Solar power used in the non-electrified villages is not sufficient • Issue of water scarcity in the area • Multidimensional poverty in the district • Roads to villages nearby not usable and needs to be upgraded	• Distribution line work helps reduce power outages and electrical faults, especially electrifying non-electrified village in remote areas • NEA will also coordinate with ward office and locals for obtaining any new land/pole site and for line works within these areas • NEA will share a copy of the IEE with Ward Committee when available • EMP implementation

Consultation Location and Date	Name	Discussion/Issues Raised	Project Response
Distribution line area, Hima, Jumla 18.06.2024	Dhan Veer Rokiya, Ward President, Humla Rural	• Power failure is the major issue in the area causing economic issues/business operations • Schools and primary health centers run using limited solar power and mostly inadequate • No regulated forest the area • Archeological ruins, Chemkote Raja is at 1km from village (no lines planned) • Small temples in the area • No pollution and waste disposal issue in the area • Sufficient water is available and of good quality • GRM will be disclosed in villages by the ward committee	• Distribution line work helps reduce power outages and electrical faults, especially electrifying non-electrified village in remote areas • NEA will also coordinate with ward office and locals for obtaining any new land/pole site and for line works within these areas • NEA will share a copy of the IEE with Ward Committee when available • EMP implementation
Distribution line area, Sanigaon, Sinja 18.06.2024	Krishna Bahadur Rokiya, Ward President	• Full support to the project • No electricity is hampering the local economy and livelihood • Multidimensional poverty in the area • The roads also need improvement before work starts • Electricity in essential for irrigation purpose	• Distribution line work helps reduce power outages and electrical faults, especially electrifying non-electrified village in remote areas • NEA will also coordinate with ward office and locals for obtaining any new land/pole site and for line works within these areas • NEA will share a copy of the IEE with Ward Committee when available • EMP implementation
Distribution line area, Chandannath 19.06.2024	D.B.Thapa Head, District Ward Committee	• Will coordinate with contractors and locals for any issues • Major power faults in the area - schools are affected • Household activities are affected due to frequent power cuts and low voltage	• Distribution line work helps reduce power outages and electrical faults, especially electrifying non-electrified village in remote areas • NEA will also coordinate with ward office and locals for obtaining any new land/pole site and for line works within these areas
Distribution line area, Chandannath Ward 7, Jumla 19.06.2024	Rajiv Singh Kathayal, Mayor of Jumla; Ms.Ram Devi Kherka, Deputy Major; Nouraj Sahi, Ward Chairperson -No 10 Bim Bahadur Rayoth, Ward Chairperson -No 9	• The project is very welcome, and all support will be provided • Major issue in the area is some poles are located close to houses and they needs to be relocated • Will coordinate with contractors and locals for any issues	• NEA will coordinate with ward office and locals for obtaining any new land/pole site and for line works within these areas • NEA will share a copy of the IEE with Ward Committee when available • EMP implementation
Distribution line area, Khar and Dousar, Dailekh 21.06.2024	Prem Bahadur Raul Ward President	• Power failure on regular basis and non-electrification of some villages is major issue for locals and administration • Support and coordination will be provided by local administration • Pre work intimation should be given to office and locals	• Distribution line work helps reduce power outages and electrical faults, especially electrifying non-electrified village in remote areas • NEA will also coordinate with ward office and locals for obtaining any new land/pole site and for line works within these areas

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Consultation Location and Date	Name	Discussion/Issues Raised	Project Response
			• NEA will share a copy of the IEE with Ward Committee when available
Divisional Forest Office, Jumla 19.06.2024	Bharat Budthapa, DFO, Jumla, Ministry of Forest and Environment of Nepal	• No protected area in Jumla • For any line (existing or new) in protected area (Rara NP) - take permission/clearance from Ministry of Forest and Environment of Nepal and also Karnali Province Government. DFO not authorized to provide permission. • Environmental study required if forest land required is upto 1 hectare, IEE if more than 1 hectare and upto 5 hectare and EIA if more than 5 hectares. • Ministry gives permission to priority sector projects like powerline in forest/NP areas • Existing powerlines must have followed and completed all permission procedures/ clearances. For any use of forest land, even for LT works, it will need permission/FC. • Forest land usage permission is based on quantum of land required and not on voltage of line. • For forest maps/data - NEA has to apply to Ministry of Forest and Environment, Kathmandu, Forest Research Center office • Time line for clearance is about 2-3 months for priority sector like powerline. • No projects in prime habitats of wildlife; studies to confirm this • Recommendations: all project works to comply to laws, process and requirements. • Key species in area – Musk Deer, Red Panda, Himalayan Monal (national bird of Nepal), Cheer Pheasant, Himalayan Black Beer (reported conflicts with humans) and Vultures. • Ecosystem function – forest resources are basic energy sources for locals - fire wood, construction material, food, medicinal plants • Forest fire not reported in the area • If conflict with wildlife during works - contact nearest NP/WL offices or DFO	• Ongoing consultation and liaison with Forest Officials during project implementation • Although no incidents and/or sittings, implement EMP including wildlife measures • Data is to be received from Ministry of Forest and Environment of Nepal to inform the updated IEE • 80km of new 33kV bare distribution components identified as passing through protected areas/ their buffer, Rara National Park and buffer and Ramsar site/also KBA/IBA are dropped from the scope. Any lines/infrastructure requiring new ROW in community forests will be dropped. Only existing ROW usage in community forest with permission from Community forest user group/local authority. • Some existing 11kV and low-tension lines RoW are inside natural habitat for which covered conductor/ABC are already planned • CHA report to be prepared to screen critical and natural habitats in distribution component area once list prepared by NEA to inform updated IEE/EMP.

Consultation Location and Date	Name	Discussion/Issues Raised	Project Response
Divisional Forest Office, Kalikot 21.06.2024	Prakash Dapkota DFO, Kalikot, Ministry of Forest and Environment of Nepal	• Not aware of project • Get community forest user group for permission, through DFO/Ministry • BES is required upto 1ha; IEE required for above 1 ha upto 5ha and EIA for above 5 ha of forest land usage • There are no reserve/protected forest or conservation/hunting reserves in the Kalikot District • Out of forest areas in Nepal – GoN allocates land to local community. User communities are usually annual or seasonal user type. • Coordinate with the user groups and committee and main forest department/DFO during works • EPC contractor should liaise with user community if lines in area before work starts • Any trees felled – 100% compensation is to be provided to the user community and 13% tax to the GoN. • Key species in the area: Wild Boar, Red Panda, Black Beer, Common Leopard, Musk Deer-sometimes in settlement area; birds - Vultures, Eagle, Himalayan Monal • No electrocution cases reported • Human-Wildlife Conflict: reported cases of Human-Bear and Human-Leopard conflicts in Subhkalidu area - in January-May 2024 • Install lines in open areas of forest and not dense areas • Avoid prime forest habitats of forest – identify prime lands by survey – animal droppings and avoid areas	• Ongoing consultation and liaison with Forest Officials during project implementation • Data is to be received from Ministry of Forest and Environment of Nepal to inform the updated IEE • 80km of new 33kV bare distribution components identified as passing through protected areas/Rara National Park and Ramsar site/also KBA/IBA are dropped from the scope. Any lines/infrastructure requiring new ROW in community forests will be dropped. Existing RoWs only to be used after permission from Community forest user group/local authority • Some existing 11kV and low-tension lines RoW are inside natural habitat for which covered conductor/ABC are already planned • CNHA report to be prepared to screen critical and natural habitats in distribution component area from list available from NEA and inform updated IEE/EMP.
Divisional Forest Office, Dailekh 21.06.2024	Dharamraj Upadhyay DFO, Dailekh, Bed Prakash Dhakal, Forest Officer, Dailekh DFO, Ministry of Forest and Environment of Nepal	• There are no protected areas or reserved/conservation forest in Dailekh district • Some locally important PCR are in the district • Key species in the areas: Common Leopard, Vultures, Black Bear, Red Panda, (captured in Upper Naumile village – Chomurda, Thatkali, Aatibish areas – and released.) Project lines are planned in this area. Leopard conflict in the Dullu area-6 months back. • Provide awareness programme to contractors and locals regarding wildlife in area and	• Ongoing consultation and liaison with Forest Officials during project implementation • Wildlife protocol will be prepared and project staff, locals and contractors will be trained • Although no incidents and/or sittings, implement EMP including wildlife measures • Data is to be received from Ministry of Forest and Environment of Nepal to inform the updated IEE

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Consultation Location and Date	Name	Discussion/Issues Raised	Project Response
		encounter/finds occur through project • For conflicts - contact Sub Divisional Offices at Ramaghat and Karnale • Provide training to workers and locals on wildlife rescue for animals that may have been pushed into settlement areas due to project works/powerline in their habitats • Prepare and implement wild life rescue process and protocol under project, as most other projects (like roads) do not implement this and amounts to impacts on wildlife driven out of natural habitats due to disturbance	• 80km of new 33kV bare distribution components identified as passing through protected areas/Rara National Park and Ramsar site/also KBA/IBA are dropped from the scope. Any lines/infrastructure requiring new ROW in community forests will be dropped. Existing RoWs only to be used after permission from Community forest user group/local authority • Some existing 11kV and low-tension lines RoW are inside natural habitat for which covered conductor/ABC are already planned • CNHA report to be prepared to screen critical and natural habitats in distribution component area once list available from NEA and inform updated IEE/EMP.
19 May 2025	Office of Director General, Department Forest, Kathmandu Director General (Forest)	• Forest GIS maps- forest plots not finalized and identified • GPS coordinates of plot boundaries available from Dept. of Forest Resource Survey • Community forest in power line/TL alignment – Identify TL alignment, tower footings, how much land is required, how many trees, compensate land by land or payment, Trees in 1:10 afforestation • Forest development fund: for cash compensation for National Projects (Govt.); for NEA -which is Govt. but profit-making organisation and distributes profits to staffs -so treated as different from other public sector companies -so NEA projects may not be treated as National Projects • Suggestions: o Community forest – if lines within - community/user group ward	•

Consultation Location and Date	Name	Discussion/Issues Raised	Project Response
		level/parishad level to be consulted; DFO of forest dept is in charge based on the forest location o TL tower height to be increased so no tree cutting is envisaged, and no tree compensation is required o Installation the 66kV, 132kV and other power lines in such large numbers have dissected the landscape, impacted avian species movement, so create a single transmission corridor for all lines in close proximity and minimize the small HV lines. Then from this corridor link the small distribution lines. Minimize HV lines and towers in forest and high biodiversity areas o UG for TL is not feasible • Chure Conservation Area – Consider the Eco fragility of the landscape and minimize the disturbance. Get permission as per requirement • Forest fire issues – wielding works, etc. causes and spreads fire in forest area; cyclone/storms also snap wire and cause fires; Forest fire not significant in relation to DL/TL • Heritage Trees – Banyan/Peepal trees in forest area – rituals/Kull puja/worship – particular concern – realign the lines to minimize damage to such identified trees/sites	

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Consultation Location and Date	Name	Discussion/Issues Raised	Project Response
19 May 2025	Office of Forest Survey, Department Forest, Kathmandu Director General (Forest Survey)	• Digital Maps- Check for alternate alignment and routes to avoid forest; discussion with forest dept is most important to identify alternate alignment • Be more sensitive to avoid environmental impacts in forest; design should be forest/environment sensitive • Increase height of transmission tower – impacts on avian species, but forest dept. considers this so that tree cutting in minimized • Depart has no policy of sharing GIS files without fees • Create one corridor for all TL and move existing lines into one corridor - locals are also complaining. Presently much power lines dissect the forests • During phase- include the forest dept. during routing the lines to avoid delays if forest dept. does not allow a particular route, then it must be rerouted • Tools being developed, like Indian Parivesh 2.0 system funded by ADB to create GIS shape files layers from where all locations and assessment can be done and identify sensitivities in ROW/corridors • Construct one big ROW/corridor and not multiple alignments • Below HT lines ROW open area. – plant bushes/shrubs for habitat creation and like medicinal plants • Towers – here climbers' species and invasive species, due to non-maintenance act as conductors and affects wildlife coming in contact with this vegetation.	•
6 June 2025	Department of Archaeology, Director General Office, Kathmandu	• To consult with Department of Archaeology (DoA) the Implementing Agency needs to register a Letter with	•

Consultation Location and Date	Name	Discussion/Issues Raised	Project Response
	Meeting with Director General	information on the project and a soft copy of the project location GIS file. On this basis the department will allocate an expert who will need to be assisted to the site for assessment and the department will provide a letter based on this assessment for the project. Conducting a Heritage Impact Assessment (HIA) will be an important step in identifying any sensitive sites early on. DoA has standard procedure with well qualified Archaeological Experts who will be accompanied by Architect Engineer in conducting the HIA or even supporting the International HIA team. • Ancient Monument Preservation Act 2013 has put criteria of over 100 years old to come under this law and its relocation is not allowed. • Currently archaeologically important sites of World Heritage Sites (WHS) and Tentative WHS have designated core and buffer zone another site have not have it. However, usually old monuments have settlements around it and safety of the residents are taken by project construction works so no specific nation regulation from Department of Archaeology is present as to the distance of safety from the monuments. • Asian Development Bank with Nepal Electricity Authority has been actively involved in consulting with DoA on safeguarding the heritage sites which DoA appreciates on the seriousness shown. • There have been cases of other infrastructure projects who have not consulted DoA and have displaced ancient monuments from their	

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Consultation Location and Date	Name	Discussion/Issues Raised	Project Response
		historic location and court cases are filed (traditional user groups of the ancient monuments) against the constructing agency as well as to DoA. Hence early consultation is good thing to do and • Jumla Districts could have sensitive areas (Sinja Valley of Jumla are sensitive sites there is possibility of uncovering undiscovered forts as well).	

Source: ADB's TA Consultant

D. IEE Disclosure

250. Apart from meeting the requirements under ADB's SPS, 2009, meaningful consultation is important for information disclosure under the GoN Right to Information Act, 2064 (2007) and the Right to Information Rules, 2065 (2009).

251. During the due diligence conducted for the project, information related to the location of the two substations, and distribution alignments; land requirements for OHL ROW and procedures; potential environmental, health and safety impacts of the project, positive and negative, direct and indirect; and grievance redress procedures were shared with affected persons during consultations.

252. NEA will continue its communications with affected persons and other stakeholders and disclose information such as dates of EPC contractor's surveys and census of affected households, project related impacts and measures included in the environmental management plan, specific entitlements of the affected persons, grievance redress procedures and dates for commencement of civil works. The EPC contractor will also undertake further consultations to inform the detailed design and subsequently disseminate information ahead of the start of civil works.

253. Brochures and posters on the main findings of the IEE study and where the full version can be accessed, as well as a translation of the executive summary of the IEE, will be printed in Nepali/Jumli/Khas and they will be made available/displayed for public scrutiny at places easily accessible to affected persons and other interested parties – including, but not limited to nearest NEA substations, provincial offices and on the construction site and if requested access to a printed copy of the full IEE will be provided and if required, translated free of charge. The draft IEE will be disclosed on ADB's website as well as on NEA's website upon project approval. Once the draft IEE is finalized with updated information, or upon any subsequent updates during project implementation if any, the same procedure of disclosure will be followed.

254. NEA through its PMD is responsible for environmental and social safeguards monitoring and reporting. In addition to providing safeguard updates in the quarterly progress report using the template in **Appendix 13**, NEA will submit environmental safeguard monitoring reports to ADB. Monitoring of EMP implementation and overall environment safeguard compliance with be internal by NEA and NEA will submit to ADB regular environmental monitoring reports (EMRs) semi-annual semi-annually starting from loan

effectiveness covering the period from Jan-Jun and Jul-Dec up until the ADB project completion report is issued, or longer if stated therein. Semi-environmental monitoring reports will be submitted before the 15th of the month following period end. Annual EMRs during the operation stages will be submitted by NEA to ADB for review and clearance till issuance of project completion report by ADB under the Project. After ADB's clearance of the EMRs, it shall be disclosed on ADB's and NEA's websites.

E. Ongoing Consultations and Disclosure

255. During project implementation, additional meaningful environmental consultations will be completed for the new/rehabilitated and existing distribution lines including placement of new poles/DTRs, prior to the commencement of any construction works. NEA will lead on consultations prior to the first update of the IEE before contract award with contractors leading on consultations with support of NEA during detailed design. For future consultations during the implementation, the following processes are envisaged:

(i) Identification of key stakeholders will be done first by NEA and then by the contractors in due consultation with officials of NEA.
(ii) NEA and contractors concerned with guidance from the PMC will identify appropriate methods for consultation at each location and dissemination platforms for broader reach.
(iii) NEA and the contractors with guidance from PMC will develop appropriate communication materials in local language, especially where affected people include scheduled tribes/indigenous peoples.
(iv) For disclosure purposes, the communication materials will include the positive and negative impacts, mitigation measures, grievance redress mechanism, construction schedule etc.
(v) NEA and the contractor will give advance notice about the consultations or other engagement and will disseminate properly for wider participation of beneficiaries or affected people especially women and the scheduled tribes/indigenous peoples.
(vi) Consultation process will be utilized to address the concerns and project implementation issues raised by the affected people during the consultation.
(vii) There will be budgetary provision to implement the future consultation and dissemination strategy.

256. For the consultations, the dates, attendees, male/female split, details of any participants vulnerabilities, topics covered and views and opinions raised will be recorded along with details of how the subproject has responded to them. Consultation meetings are to be attended by at least 10% of the village population and have at least 30% representation of women excluding NEA and consultant/contractor representatives. If it is not possible at the public consultation, a separate gender focus group must be held with women to ensure their concerns are heard. There must also be adequate representation of other vulnerable groups.

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VII. GRIEVANCE REDRESS MECHANISM

257. A grievance is an issue, concern, problem, or claim (perceived or actual) that an individual or community group wants to see resolved by the project. A Grievance Redress Mechanism (GRM) is a locally based, project-specific extra-legal way to deal with and resolve project-related grievances/complaints faster than legal mechanisms and thus enhance project performance standards in terms of environmental and social safeguards. NEA will take relevant concerns of affected persons and other stakeholders seriously and ensure that they are actively able to raise and discuss their concerns throughout the project cycle by setting up GRMs.

258. The GRM will aim to provide affected persons and other stakeholders with a clear and simple way of filing a suggestion or complaint on the environmental, health and safety performance of the project. The GRM will also cover social safeguards. According to ADB's SPS 2009, a GRM must address complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to the affected persons at no costs and without retribution. Given these requirements, handling of grievances on the implementation of the distribution component will be as discussed in this chapter.

259. NEA will establish project component-specific Grievance Redress Mechanisms (GRM) to receive and manage any grievances (complaints) that may arise from the distribution component of the project works and facilitate prompt resolution of affected persons' issues, concerns, problems, or claims. Affected persons may include members of the local community or construction workers. The GRMs will address environmental and social safeguard and other related eligible grievances/complaints raised by affected persons, in a timely and culturally appropriate manner.

260. The GRMs will ensure that:

(i) physically or economically displaced people receive appropriate compensation in accordance with the RIPP;
(ii) the basic rights and interests of every person affected by the environmental and social performance of NEA and their contractors on the project are protected; and
(iii) issues, concerns, problems, or claims arising from any poor environmental (or social) performance of NEA and their contractors during the conduct of pre-construction, construction, operation and maintenance activities are promptly and effectively addressed.

261. Recourse to the GRMs does not impede access to the country's judicial or administrative remedies. Affected peoples can approach the court of law at any time and independently of the project's grievance redress process. Affected peoples may (subject to eligibility criteria) also access ADB's Accountability Mechanism[56] whereby people adversely affected by ADB-financed projects can express their grievances, seek solutions, and report alleged violations of ADB's operational policies and procedures, including ADB's safeguard Policy Statement 2009.

262. The GRMs will be set up by NEA for the Output 2(iii) distribution component and overall project, upon loan effectiveness and be fully operationalized prior to the commencement of any civil works, including enabling works. NEA and the contractor will appoint GRM focals.

[56] There are two parts to ADB's Accountability Mechanism, problem solving led by ADB's special project facilitator can assist the complainant in finding solutions to their problems, while compliance review, led by a three-member panel, can investigate alleged violations of ADB's operational policies and procedures, including safeguard policies, and recommend corrective actions to ensure project compliance.

The NEA focals may be a different person during the construction and operation. All staff of NEA PMD, the Output 2(iii) component PMU site engineers/staff, PMC and the Contractors, as well as local and associated government and other entities directly involved in the GRM process will receive a training prior to the start of works to fully grasp their roles and responsibilities within the GRM as well as approaches to constructively resolve project-related grievances/complaints. Upon completion of works similar training will be provided to NEA O&M staff.

263. Communities within the project's area of influence (in 50m of RoWs) will be made aware of this GRM as well as how to access it, including addresses and contact numbers, through (i) community awareness raising during community or one-on-one meetings; (ii) pamphlets distributed to the general public in the direct vicinity of the distribution line sites, in Nepali/Jumli/Khas and other local languages; and (iii) notices on the social media/cable and/or local newspaper, as well as notice boards on project-sites, NEA's local offices, in local government/Ward offices, and on NEA's website etc. with details of the GRM together with details of the project and where the IEE/EMRs can be obtained to capture a wider audience.

264. Pre-construction and once operational, NEA will be responsible to post clearly visible signboards at the project sites (banner on mobile vans/trucks carrying distribution line materials and workers) with contact details including the name and phone number of their GRM focal person, together with suggestion boxes (mobile that can be placed next to working area) that will be regularly checked for any grievances received. During construction, the contractor will be responsible for posting these signboards, including contact details with the names and phone numbers of both NEA and contractor's GRM focal persons as well as the suggestion box to be regularly checked at the construction site. Any concerned person or group of people can file a complaint through the project's GRM, at any time and at no cost. The time frame for receiving a response will be made known to the grievant. Investigations and deliberations on the grievances will be communicated to the grievant and outcomes publicly disclosed.

265. **NEA existing GRM system**. NEA has an existing GRM system, catering mostly to power disruption issues. NEA Electricity Helplines: Consumers can call local Distribution Centre to lodge complaints about electricity services or streetlights, provided in the Consumer Information of DCs page of the portal. If not resolved, to contact Regional Office by calling on the provided helpline numbers:

Regional Office	Phone Number
Biratnagar	021436057
Janakpur	041521078
Hetauda	057524468
Kathmandu	014153156
Butwal	071438584
Pokhara	061466401
Nepalgunj	081524271

266. Consumers can also send an email to info@nea.org.np with issue related to power supply. Steps to file an online complaint:

- Visit the official NEA website (nea.org.np) 2.
- Navigate to the 'Consumer Service' section.
- Click "Post your complaint" to open the online complaint form.
- Fill out the form with required details including customer ID, type of electricity issue, and fault location (if known).
- Submit the form.

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- Finally, note down the reference/ticket ID to track status. If not resolved, visit nearest divisional office to submit a written complaint letter with the reference ID.

267. Escalation to Head Office: If the issue is not resolved, you may escalate it to the appointed Head of Customer Service at Nepal Electricity Authority by contacting the Central Office in Kathmandu or using the email provided:

Phone Numbers: +97714153051, +97714153009 (fax)
Email: info@nea.org.np
Address: Central Office, Nepal Electricity Authority, Durbarmarg, Kathmandu, Nepal.

268. The above system is mostly for electrical complaints but can be tied into the project GRM operationalization.

269. NEA, PMC and contractor's focals will actively engage with the affected local communities and construction workers throughout pre-construction, construction and at the onset of operation, providing an opportunity for community members or workers to approach them with any grievance/complaint. Affected peoples may also lodge grievances/complaints online through NEA's website with dedicated link/message box, by phone/WhatsApp at numbers provided, by submitting a note in a suggestion box kept on site, by sending a letter, or in person at a project-site office or at the NEA's closest office or through the local government representatives.

270. All staff and workers of NEA/PMD/PMU/PMC and Contractors and subcontractors (if any) will be made aware of the existence of the GRM and must know who to direct any complainant to if approached regarding a grievance. Local government representatives/Ward/Municipal committee/ward members will also be briefed by NEA on the GRM and so be able to take up complaints and pass them onto NEA or the contractor to be addressed. NEA management will have overall responsibility for timely grievance redressal on safeguard issues with the support of their GRM focal for ensuring disclosure, registration of grievances, and communication with the grievant.

271. A grievance log must be kept at all times on-site by the contractor's focal and collated at PMD level by the Output 2(iii) GRM focal – environment safeguards officer for collation in the project EMRs. Any grievance/complaint received, whether minor or major, whoever it was first addressed to, must be reported and documented when it is received, including: name of the person making the complaint; date and time the complaint was received; location and relation of the complaint to the project; nature of the complaint; dates of subsequent communications; details of all meetings held, including participants, date, issues discussed and decisions taken; details of all actions taken towards resolution of the grievance; log of all formal communication sent to the complainant informing of the evolution of the process etc.

272. All entries to the grievance register, no matter how minor or whether resolved at an initial informal level on site or at any of the formal levels of the GRM, along with updates on ongoing or completed actions taken to address the grievance will be included in monthly reports by the contractor to NEA and detailed in the quarterly project reports and environmental monitoring reports to be submitted by NEA to ADB. NEA will also notify ADB immediately of any grievances that enter the third stage (GRC) of the GRMs or are related to immediate risk to human life, or impending damage to structures, flora or fauna, or physical cultural resources.

273. In grievance redress, it is important for grievance handlers to be clear on the issues involved and why the grievant is dissatisfied. The first step is an honest appraisal of whether the grievance received is proactive or reactive to a situation, how it is relevant to the proposed project, and if it falls under the national and ADB policy and legal framework as described in Chapter II. This will enable ineligible grievances to be identified. For those that are eligible the

facts must then be established in full through soliciting information and observations in the field, in communication with the grievant and others to clearly define the problem to be resolved. The grievance handlers need to be able to clearly appraise the grievant of their grievance's relevance to the project, and the applicable national and ADB policy and legal framework, so that both sides have common understanding of the context.

274. Once the problem is clear, options for resolution can then be analysed, and a time bound grievance resolution action plan agreed with the grievant for implementation by NEA or their contractor. Once a resolution has been proposed to the complainant, the grievant will be asked to sign a form acknowledging receipt of that proposal and providing their approval or refusal, as applicable; this form will be added to the grievance/complaint register and once all actions are taken the associated entry will be closed but not deleted. Implementation of the actions must then be monitored by the NEA GRM focal with regular follow-ups.

275. Whilst resolution may be quickly reached, the grievance can only be fully closed out once all actions have been completed and the grievant has confirmed their satisfaction. Implementation of the actions must therefore be undertaken by NEA as promptly as is possible and ideally within 15 working days of being agreed, though this will depend on the nature of grievances involved. PMC will also monitor the operationalization of the GRM and the effectiveness of the grievance resolution process along with NEA PMD and both will recommend improvements to increase the efficiency, timeliness and fairness of the process.

276. The GRMs will follow a three-tier formal structure with a first informal level. Figure 7.1 and 7.2 summarizes the process.

a. First level/Site grievance handling protocol – Informal Contractor/Karnali Provincial Electrical Office Level

i. The contractors will define a site-level grievance handling protocol, as initial informal input to the GRM.
ii. For any urgent matter, in particular emergency and health and safety issues, the contractor's site-level focal will take note of the grievance/complaint and get immediately in contact with their site supervisor for immediate action. Short-term issues (e.g. dust, noise, leaks, inappropriate behaviour, conflict, health and safety etc.) may be corrected by the construction workers immediately under the direction of the focal and site supervisor. If it cannot be readily resolved by the contractor, then the on-site NEA Electrical Subdivision field staff will provide the most easily accessible first informal level of contact to address it.
iii. In case of immediate risk to human life, or impending damage to structures, flora or fauna, or physical cultural resources, the NEA Electrical Subdivision field staff shall get in immediate contact with the PMU Environment Officer or H&S Officer or resident EHS Supervisor who shall have the power to halt works until corrective action is taken.
iv. The electrical subdivision for distribution line, will take over this level once operational. If construction workers wish to file a complaint and are not comfortable logging it informally with the contractor, then they can also raise it informally with the on-site NEA Karnali Provincial Electrical Office staff.
v. Whatever the source and the form in which the grievance/complaint is received and its nature, and however minor, it should be accepted by the focal and registered in the grievance register and reported to NEA GRM focal.[57] A template for recording grievances is provided in **Appendix 7**.
vi. A log of all active complaints, even if resolved at this informal level of GRM, must be communicated to NEA focal fortnightly by the contractor's on-site focal.

[57] If the complaint is not eligible, the complainant should be informed of the reasons in writing and directed onto other appropriate mechanisms if applicable.

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vii. Grievances to be redressed within three working days of the grievance first being raised.

b. Second level/PIU level of GRM – Formal Karnali Provincial Electrical Office Level

i. The second level for distribution component is headed by the NEA Provincial Electrical Office staff (the PIU).
ii. If no resolution or understanding on the grievance is informally reached after three working days, or the grievant chooses, they can direct their grievance directly to the formal GRM process, or if an informal grievance is deemed more than minor, the grievance will be formally registered by the on-site NEA Provincial Electrical Office staff and taken up by the NEA Provincial Electrical Office staff/Project Engineer/Site Supervisor in the first formal level of the GRM to be resolved within seven working days of being filed.
iii. All grievances/complaints will be sorted by the NEA focal for their eligibility, level of urgency and by nature (suggestions or comments, grievances/complaints related to adverse impacts of the project on an individual or group, violations of law, etc.). The focal will send a formal reply to the complainant within 3 working days of the receipt of the grievance/complaint, to acknowledge receipt, provide the complaint's registration number, and set up a meeting in presence of the contractor's project manager. Through the first formal reply,[58] the complainant will be informed of the process and of his/her possibility to subsequently escalate the complaint in case no resolution were found at this stage; contacts to the second level GRM will be included.
iv. During the meeting other participants may be called upon, including but not limited to the contractor's environment, health and safety expert and the PMC on-site EHS team. The affected person(s) may come in presence of two representatives of their choice (selected so as to be gender inclusive), including a representative of their IP group if applicable.
v. This first meeting shall take place no later than one week after receipt of the grievance/complaint.[59] During the meeting, the complainant and contractor's site-level focal will agree on the course of action to be taken and timeline to resolution. Details of the meeting will be documented; minutes of meeting will be signed by both complainant and the contractor's site-level focal and annexed to the grievance's file. If both parties do not agree on a resolution, the complaint may be escalated to the second level of GRM. If both parties agree, the contractor (and subcontractors, as applicable) will take remedial action, keeping the complainant informed at each stage or every fortnight, whichever the shortest. Such actions should be taken in the briefest delay, within a maximum timeframe of 30 days. However, all simple complaints, will be resolved within 7 days of the meeting being held. Following resolution, if the complainant is not happy with the resolution or if no action has been taken within the agreed timeframe, they can escalate the grievance to the second level of GRM.

c. Third level of GRM – Formal PMU Level

i. The third level of the GRM is headed by the PMU project manager, supported by Karnali Provincial Electrical Office Staff.
ii. If no resolution or understanding on the grievance is reached at the first level after 7 working days, or earlier if the Provincial Electrical Office feel they are unable to resolve it themselves, the grievance will be formally filed with the second stage and taken up by the PMU for it to be resolved within 15 working days of being filed.
iii. All complaints will be sorted by eligibility and level of urgency and by nature (suggestions or comments, grievances/complaints related to adverse impacts of the project on an individual or group, violations of law, etc.).

[58] Same template of this first communication is recommended to be followed project wide.
[59] This timeline may only be extended if the affected person/group requests for a later date for the meeting based on availability. If the complainant has difficulty to travel to meeting location upon short notice, the location of the meeting may be flexible.

iv. Just as for the first level, all grievances will be properly recorded, and the concerned person or group will be informed formally of receipt; timeline; and resolution. NEA PMU GRM focal – environment safeguards officer- will send within 3 days of receipt a letter to the complainant acknowledging receipt; within 15 days a meeting should be held and resolution action plan and timeline agreed upon with the complainant.
v. The meeting should include PMU's project manager, the complainant who may be accompanied by or represented by two representative including one female and IP representative if applicable, PMD's Environment Specialist and H&S Specialist, PMC national experts, as well as other members if applicable, including contractor's representative, ward committee representative, other community organization representative etc.
vi. As in the first level, the second level may have two outcomes: if the parties found a resolution and the complainant signed their approval of the resolution, such actions should be taken in the briefest delay, within a maximum timeframe of 30 days. However, all simple complaints, will be resolved within 7 days of the meeting being held.
vii. If no resolution has been reached, the grievance is forwarded to the third level of the GRM.

d. Fourth level of GRM – Formal PMD/CDO level

i. The same process of logging the grievance complaint, communicating with the complainant and reporting will be followed.
ii. The fourth level of GRM is handled by Chief District Officer (CDO), District Administration Office who will form a grievance redress committee and chair the meeting made up of NEA PMD Director, PMD Environmental Officer and H&S Officer, PMD's focal and environment or health and safety officers (depending on the nature of the complaint), two representatives of the complainant including indigenous peoples representative if applicable, as well as, as applicable, a representative of the contractor, government representatives for environment or social issues (such as but not limited to land revenue, survey, forest office, agriculture office, municipality representatives etc.), NGOs or CSOs representatives, etc. For ease of discussion, the meeting will try to gather no more than 10 participants.
iii. The GRC will be convened and will meet at short intervals subject to the number of grievances to resolve.
iv. The grievance redress committee will agree on the resolution approach and action plan, inform concerned parties about actions to be taken and their timeline, and will monitor progress through regular follow-ups. Resolution will be as prompt as possible; receipt of complaint will be acknowledged to the complainant within 3 days, the resolution approach agreed upon within 15 days and actions taken within 45 days. However, all simple complaints will be resolved within 7 days of the meeting being held.
v. Approval of the resolution by the complainant will be sought in writing. If the complainant is still dissatisfied after this stage, they may avail of the court of law or ADB's Accountability Mechanism.

277. **Budget.** NEA and the contractor will need to provide staff for and allocate budget for the GRM that will sufficiently cover the costs of its operations including initial awareness raising, capacity development trainings, support services, field inspections, meetings, documentation, and supplies etc.

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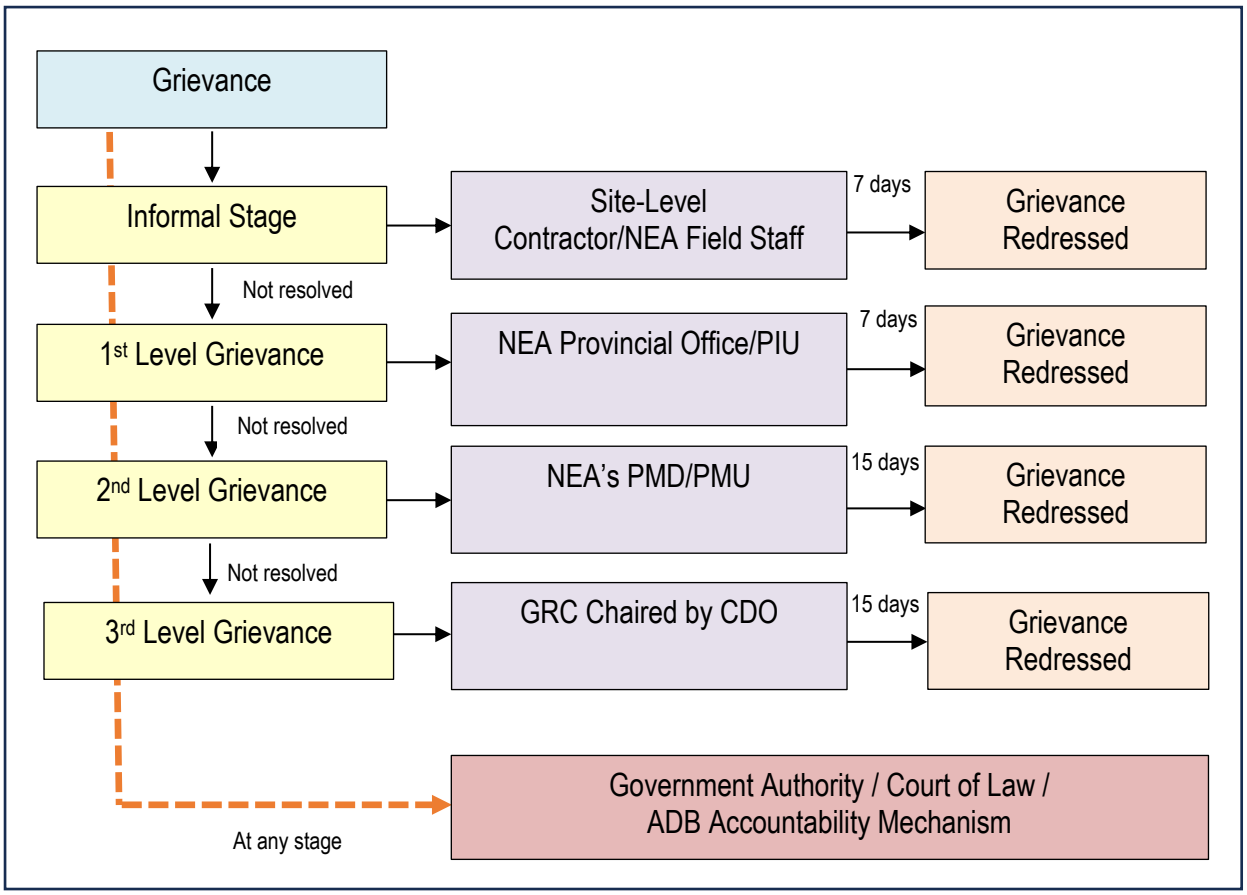
Figure 7.1 Structure of Grievance Redress Mechanism for Distribution Component



Source: ADB's TA consultant

278. **Unresolved Grievances.** If the established GRM is not able to resolve the issue, then it must pass to the courts of law or alternatively an affected person can use the ADB Accountability Mechanism through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or ADB Nepal Resident Mission. A complaint can be submitted in any of the official languages of ADB's developing member countries. The ADB Accountability Mechanism information will be included in the project-relevant information to be distributed to the affected communities, as part of disclosing the GRM. Despite the GRM, a grievant shall have access to the country's legal system at any stage and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the outcome of the GRM resolution.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A. Introduction

279. ADB's Safeguard Policy Statement (SPS) 2009 requires that an Environmental Management Plan (EMP) be prepared to ensure construction and operation of the Output 2(iii) distribution components of the project will be undertaken in accordance with its safeguard requirements. It is an overarching document that will guide environmental management implementation, supervision, and monitoring by Nepal Electrical Authority (NEA) and their contractor's activities on the Output 2(iii) distribution components under the project. The Environmental Management Plan (EMP) aims to (i) ensure project implementation by NEA will comply with ADB's Safeguard Policy Statement 2009 requirements and international good practice as set out in the IFC Environment, Health and Safety (EHS) general and sector guidelines and (International Labour Organisation (ILO) safety and health in construction and worker accommodation guidelines, (ii) ensure project implementation will comply with applicable environmental, health and safety requirements of the Government of Nepal (including international agreements it is a signatory too) as well as Karnali Province and local laws, and (iii) ensure local biological and human receptor sensitivities are taken into account.

280. This EMP summarizes the anticipated adverse environmental impacts and risks, measures required to mitigate, and compensate/offset for the impacts and risks identified, and monitoring requirements with respect to the following stages: (i) pre-construction, and construction, and (ii) operation and maintenance, of the expansion and augmentation of the distribution network in the Karnali province of Nepal (Output 2(iii)). It also includes an environmental assessment checklist and consultation proforma for distribution lines/poles to inform the IEE update prior to construction. Prior to the approval of the sites/routes/designs, NEA will consult ADB regarding the need to update the Initial Environmental Examination (IEE).

281. This EMP is the first update before the issue of bidding documents and based on a revised Output 2(iii) scope provided by NEA. This EMP will again be updated (second update of IEE) once the contractors are on board to cover environmental impacts and mitigation measures after the finalization of the individual distribution line route alignments including the sites for the poles and DTRs by Engineering Procurement Construction (EPC) contractors. This first update was based on a screening of the distribution lines (after scope revision by NEA) against the selection criteria to ensure risks and impacts to environmentally sensitive areas are appropriately mitigated, and has been based on site specific assessment and consultations before the contract is bided out. The second IEE update will be informed by site specific assessment checklist and consultation proformas updated by the contractors. This first update is a full update of the IEE report. The second IEE update may be in the form of addendums prepared in phased manner (based on finalized detailed design/route alignments for the distribution lines) as per suggested format given in Appendix 11 of the IEE. The updated IEE reports including the EMP shall be submitted by NEA to ADB for review and endorsement before (i) issue of bidding documents and (ii) before approval of the contractor's detailed design and commencement of work.

282. As part of this EMP, general mitigation and distribution line-specific mitigation and monitoring plans to be implemented by NEA and their contractors during the project implementation have been developed. To ensure the mitigation and monitoring plans for Output 2(iii) are implemented by the project management division (PMD) and contractor, NEA will undertake a program of environmental supervision and monitoring supported by a Project Management Consultant (PMC) during the project implementation.

283. The most recent version disclosed on the ADB website will serve as the definitive

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version of the project-level EMP cleared by ADB. The EMP is dynamic and should be updated as appropriate during the project implementation. However, any update to the EMP will first need to be cleared by ADB before being followed by NEA or the contractor. In addition, any unanticipated impacts, or requirements for corrective action due to non-compliance identified during project implementation will be reported by NEA to ADB, appropriate action will be agreed and taken by NEA, and their contractors to address them and bring the project implementation back on track.

284. The EMP contains a number of components crucial to effective environmental management within the project, these include:

i. **Appendix 8, Table A1**: General mitigation plan, including performance standards to be implemented during detailed design and pre-construction, construction, and operation and maintenance phases.
ii. **Appendix 8, Table A2**: Distribution line-specific mitigation plan, including performance standards to be implemented during detailed design and pre-construction, construction, and operation and maintenance phases.
iii. **Appendix 9**: Environmental, health and safety codes of practice (ECOP) elaborating on the mitigation measures to be implemented during the construction, and operation and maintenance phases.
iv. **Appendix 10**: Environmental, health and safety guidelines for worker accommodation.
v. **Appendix 11**: Environmental assessment checklist, consultation proforma to confirm siting/routing and design meets the environmental principles and to inform the IEE update (as required) prior to construction.
vi. **Appendix 12**: Table 1 (general EMoP) and Table 2 (Monitoring parameter details). Environmental monitoring plan (EMoP) including performance standards for quantitative monitoring to be undertaken during pre-construction, construction, and operation and maintenance phases.
vii. **Appendix 13**: Environmental monitoring report (EMRs) template for Contractors to be submitted to NEA on a monthly basis.
viii. Implementation arrangements, including organizational roles and responsibilities for mitigation, supervision, monitoring and reporting, training requirements for NEA and their contractors on various aspects of EMP implementation, and preliminary cost estimates/budget covering the various aspects of EMP implementation.
ix. Grievance Redress Mechanism (GRM) which sets out the roles and responsibilities for NEA and their contractors and their respective GRM focal points in provided as separate section of this IEE.

285. For operational management, NEA will develop and implement standard operating procedures (SOP) addressing the environment, health and safety impacts and risks of its distribution lines operation and maintenance works including recording of any occupational and community health and safety incidents.

B. Impacts, Mitigation and Monitoring

1. Summary of main impacts

286. Potential environmental impacts were identified in relation to the design, location, construction, operation and maintenance of distribution infrastructure and mitigation measures have been developed in respect of all impacts identified, and potentially significant ones provided below:

- The Output 2(iii) distribution components area of Salyan, West Rukum, Jajarkot and Kalikot are unlikely to qualify as supporting critical habitat although Mugu and Jumla

have potential since national parks/their buffers/Ramsar sites/(key biodiversity areas (KBA)/important bird and biodiversity areas (IBA)/conservation forest are in the districts.

- Site walkovers and consultations did not identify any flora or fauna species of high biodiversity value in the sample surveyed but this would be subject to confirmation by conducting ecological surveys of all subproject distribution line routes during project implementation.
- Direct habitat loss and degradation, especially the loss of natural forest habitat (community forest lands) is the main concern with respect to potential biodiversity impacts. Proposed lines overlap with the following areas: proposed Barekot-Kuse-Mahawai Conservation Area, proposed Sinja Cultural Heritage Site of Ministry of Industry, Tourism, Forest and Environment of Karnali Province, and Barekot Important Bird and Biodiversity Areas (IBA) Barekot.
- Construction works, especially site establishment, vegetation clearance and earthworks, will result in the loss of terrestrial vegetation. As per discussion with NEA, some trees will need to be cut, and lopping/trimming will be required to achieve the standard safety clearances for distribution lines. Tree felling will be avoided to the extent possible through minor realignment/micro-siting. Realignment is preferred by NEA, so the number of trees to be lost is unlikely to be significant.
- Some indirect impacts to terrestrial vegetation and faunal species due to disturbance may also occur.
- There is a risk that critical habitat qualifying species, globally threatened and restricted-range species may occur along the distribution lines and thus be disturbed. The risk is highest in the natural habitat/community forest areas and these routes, including the distribution lines in Mugu and Jumla districts, have been found will need particular attention. Site-specific assessment to be undertaken during updating of the IEE will need to include detailed route surveys conducted by a team that includes a skilled ecologist before any works take place to identify the risks of species being present. This will need to be followed by realignment/micro-siting of all infrastructure to avoid any critical habitat, globally threatened or endemic flora species or fauna habitat found during these surveys, prior to any site establishment, vegetation clearance including tree cutting/lopping/trimming or earthworks being undertaken, to avoid impacts on them. Before any trees are cut, they will be subject to ecological checks for nesting birds etc.
- Occupational health and safety risks are potentially significant due to working at height and with electricity, etc. and in remote, natural disaster prone and highly complex terrain.
- Many existing distribution lines were observed to be passing over houses and shops with poles located in private compounds/crop lands.[60] It is a potentially significant community health and safety risk as many poles were also observed to be broken/hanging and non-compliant to safety clearances with lines sagging/low hanging in dense settlement areas. This may expose the locals to electrocution hazards because of direct contact with live conductors or flashover from the conductor to a pole, particularly if the person, tree, or structure is near a live line where the safe horizontal or vertical clearances are compromised.
- Other impacts are traffic congestion, noise, and dust in rural/dense settlement and market areas, and at sites with occupied properties adjacent. Pollution, health and safety risks to workers and the community will remain during operation and maintenance works. New transformers will need to be installed on securely fenced, bunded plinths of 110% capacity for ground-mounted transformers in accordance with

[60] To uphold safety clearances and minimize community health and safety risks during operation minor rerouting of existing lines may be required with great care taken in dismantling (during rehabilitation and/or reconductoring) the existing conductors.

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international good practice. Use of dry transformers for new DTRs is to be preferred, to avoid oil leakage which goes unattended due to lack of observation given the remote area.

- Though the volume of waste will be low, the lack of sanitary landfill sites or engineered solid waste management facility in Karnali province could result in a risk of improper solid waste disposal and management due to the construction and operation of Output 2(iii) distribution components.
- Local physical cultural resources were identified along few of the sample distribution lines, and at least one existing line was observed by a temple compound which may be disturbed during works if not realigned.

287. The criteria and principles that have been/will be adopted by NEA for selection of route alignments for the new and rehabilitated distribution lines are:

CRITERIA

i. No lines that require IEE or EIA under national regulations will be taken up under the Output 2(iii) distribution components[61].
ii. All lines will use only CC or ABC with adequate spacing and insulation of conductors and equipment at the distribution poles in order to prevent the electrocution of wildlife.
iii. Lines and their related equipment in natural habitat will only be installed where site-specific biodiversity assessment demonstrates significant conversion or degradation of natural habitat can be avoided.
iv. Lines and their related equipment in potential critical habitat, and KBAs and IBAs will only be installed where site-specific biodiversity assessment demonstrates significant adverse impacts can be avoided.
v. No lines or related facilities in the National Parks, their buffer zones, Ramsar Sites, and forest protection (conservation forests) areas will be taken up under the Output 2(iii) distribution components.
vi. Distribution lines or related facilities in forest land (other than forest protection (conservation forests) areas) will only be taken up under the Output 2(iii) distribution components after they have been demonstrated to be compliant with Government of Nepal (GoN) forest legislation with no objection received from Department of Forests (DoF) and local government.
vii. For lines or related facilities in community managed forests permission from the community forest user group (or for leasehold or private forest, the applicable user and owner permissions) will be sought.
viii. Only 11 kV CC and LT ABC lines following existing power line right of way (RoWs) without minor diversions, or new lines or minor deviations of existing lines remaining in existing road RoWs, and not requiring new access track construction will be taken up in community (leasehold or private) forest land and only after having first received a written no-objection from the Community Forest User Group or equivalent and only as long as site-specific biodiversity assessment demonstrates that any significant adverse impacts can be avoided.
ix. No lines or related facilities in the nationally protected monument sites of Nepal Department of Archaeology (DoA) or religious forests will be taken up under the Output 2(iii) distribution components, and in the tentative United Nations Educational, Scientific and Cultural Organization (UNESCO) sites and at all sites within 500 m of nationally protected monuments no lines or related facilities will be taken up unless no objection has been received from DoA following site-specific physical cultural resources assessment to demonstrate that any significant adverse impacts can be avoided.

[61] For routes with Brief Environmental Study being required due to community forest land NEA will obtain requisite national permissions to undertake works in the forest land before approval of the updated IEE prior to issue of the bid documents.

x. Lines and related facilities will only be installed where significant damage to local physical cultural resources can be avoided, and physical cultural resources do not need to be removed from their current location.

PRINCIPLES

a. New lines resulting in the significant conversion or degradation of natural habitats as defined by ADB SPS, 2009 or which occur in areas with presence of potential ADB Critical Habitat-qualifying biodiversity and have been demonstrated through a site-specific assessment not to comply with ADB's Safeguard Policy Statement 2009 requirements, shall not be taken up under the Output 2(iii) distribution components.
b. Lines and poles will adopt a "wildlife sensitive design" such that, at the poles, all equipment will be adequately spaced, and live infrastructure insulated in 2m of any earthed infrastructure.
c. New and rehabilitated/upgraded lines must meet all horizontal and vertical safety clearances with minor rerouting of existing lines taking place if it is required, no lines will cross over houses or other regularly occupied properties.
d. Lines will not be laid across school compounds, playgrounds, or other areas where children as vulnerable members of the community assemble without parental supervision; if adjacent "guarding nets" will be installed.
e. Lines will not be laid across areas where community groups regularly assemble such as the grounds of temples unless it is agreed with the representatives of user groups.
f. Removal or rehabilitation of existing lines must minimize damage to existing trees and properties with "guarding net" put in place during conductor removal.
g. Lines and related equipment must avoid or minimize damage to trees, especially private/community forest user trees, whilst ensuring horizontal and vertical safety clearances are maintained, and before any are cut/trimmed/lopped ensure they are subject to ecological checks for nesting birds etc.
h. Lines and related equipment must avoid or minimize damage to locally important physical cultural resources, property including structures (e.g., buildings) and roads, crops, public utilities, etc. whilst ensuring horizontal and vertical safety clearances are maintained. Any compensation payments for damages to private property must be undertaken by NEA in accordance with the social safeguards entitlement matrix before the works commence.

ii. Lines and related equipment must create minimum disturbance to existing pedestrian and traffic routes in terms of blockages or diversions.

2. Environmental Mitigation Plan

288. The Contractor for Output 2(iii) will comply with all applicable national environmental, health and safety (labor) laws and regulations, any environment, health and safety policy or procedures of NEA, and ADB's Safeguard Policy Statement (2009) environmental safeguard requirements along with the International Finance Corporation's (IFC) Environmental Health and Safety General Guidelines and the guidelines on Electric Power Transmission and Distribution, and the International Labor Organization's Safety and Health in Construction guidelines allocating the staff and budget required to ensure that such requirements are met.

289. **Table A2** in **Appendix 8** sets out the mitigation plan for the Output 2(iii) distribution components which is to be followed as well as the general mitigation plan provided in the **Appendix 8, Table A1**. The mitigation plans identify feasible and cost-effective mitigation and compensation (offset) measures to be taken to reduce potentially significant, adverse environmental impacts and risks to acceptable levels and generally ensure international good practice, and national environmental, health and safety requirements are followed. Here, mitigation and compensation (offset) measures are proposed for each potential impact and risk identified by the IEE, including details of the responsible parties for implementation, the

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budget source for supporting key activities, and the associated performance standards to be achieved. The mitigation measures in the EMP are to be implemented at all construction sites as well as at any workers camps or accommodation provided by EPC contractors or their subcontractors, on or off site. Some measures that must be commenced during the detailed design and pre-construction phase will need to continue to be implemented by the contractor during the construction phase. Operational phase mitigation measures are primarily for NEA. However, all maintenance works during this phase including by the contractors during their defect liability period and operation/maintenance obligations will be undertaken following the construction mitigation measures.

3. EHS Codes of Practice (ECOP) and Construction EMP (CEMP)

290. The EHS Codes of Practice **(Appendix 9)** further elaborate on the pollution prevention, health, and safety measures to be adopted and implemented as an integral part of the mitigation plans. The labor accommodation guidance (**Appendix 10**) is to also be followed, in respect of temporary worker accommodation during construction work.

291. The Construction EMP (CEMP) is the document that the EPC Contractor will prepare outlining how they intend to implement the project-level EMP and ensure that all the mitigation and monitoring is completed according to the implementation arrangements specified in the EMP, in the context of the wider IEE as a whole. The CEMP will describe the precise location of the required mitigation / monitoring, the persons at the contractor responsible for the mitigation / monitoring, the schedule and reporting methodology etc. The CEMP and all its subplans will be submitted to NEA for approval at least 30 days prior to taking possession of any work site including for site establishment, preparation and clearance. It will be approved by NEA with the support of PMC before work starts. Except for survey works related to the design process no access to site will be allowed before it is approved.

292. The CEMP will include the following key sub-plans –Pollution Prevention Plan and Emergency Response Plan, Biodiversity Management/Invasive Species Control Procedures and Wildlife Encounter Protocol for distribution line works, Occupational Health and Safety Plan and Emergency Response Plan informed by a risk assessment, Labour Management Plan and Code of Conduct, Construction Camp/Labor Accommodation/Sanitation and Welfare Facility Management Plan(s) including layouts, Construction Workshop and Storage Area Management Plan(s) (including layouts) if utilised, Community Health and Safety Plan and Emergency Response Plan informed by a risk assessment, Chance Find Procedure for distribution line works, Solid and Hazardous Waste Management Plan, Traffic Management Plan, Training and Induction Plan and Stakeholder Engagement (Community Consultation) Plan. The CEMP will also include construction method statements on (i) new and realigned distribution lines, pole mounted DTR installation, (ii) removal/rehabilitation of existing distribution lines including safety measures for existing conductor removal, and (iii) installation of ground mounted DTRs.

4. Environmental Monitoring Plan (EoMP)

293. The EMoP **(Appendix 12)** sets out the minimum provisions for quantitative environmental monitoring and performance standards to be achieved. Monitoring activities including drinking water (to be used by distribution line workers) quality, are to be carried out by suitably qualified and experienced third-party monitoring organisation. If performance is worse than expected, corrective action will be identified, and environmental monitoring activities adjusted accordingly by NEA to help resolve any unsatisfactory performance.

294. In addition to quantitative monitoring there will also be supervision and monitoring of EMP implementation, the performance standard being all EMP measures are implemented in full at the appropriate time. Following loan effectiveness, environmental monitoring reports

(EMRs) **(Appendix 13)** will be submitted to ADB on a semi-annual basis by NEA through design, construction and operation up to issue of the ADB project completion report (PCR) with safeguards inputs also provided to quarterly progress reports. If recommended in the PCR, annual operational monitoring reporting will continue until all issues are closed out to the satisfaction of ADB. Following loan effectiveness, semi-annual EMRs will be due for submission to ADB within 15 days of the month following period end, e.g., before mid-July and mid-January each year. EMRs will be submitted until the ADB Project Completion Report is issued, or later if required therein. The EMRs will describe project implementation progress, any scope or design changes, compliance against safeguard requirements that are covenanted in the legal agreements, progress with environment mitigation and offset implementation, quantitative monitoring results in accordance with the EMoP, and grievances received.

295. If any performance standards are breached or any of the safeguard requirements that are covenanted in the loan agreements are found to not be satisfactorily complied with by NEA and their contractors, an appropriate, time bound, budgeted, corrective action plan (CAP) will be developed and implemented as agreed upon with ADB to rectify unsatisfactory performance or safeguard noncompliance. Draft EMRs, CAP if prepared by NEA separately to their EMR submission, and updated IEE reports submitted by NEA during project implementation will first be reviewed by ADB with comments on quality and acceptability provided and then, once resubmitted to and cleared by ADB for disclosure, are to be disclosed locally (in the same places as the IEE report was originally disclosed) by NEA and on the ADB website upon receipt. Any outstanding comments will be flagged by ADB to NEA for ongoing action.

C. Institutional Arrangements and Implementation Responsibilities

296. The main parties that will be involved in environmental management and monitoring activities for this project are as follows:

297. **The Government of Nepal, Ministry of Energy, Water Resources and Irrigation (Energy Division)** is the main project coordinating body on behalf of government and will oversee implementation.

298. **NEA Management.** NEA PMD is the implementing agency for the Output 2(iii) distribution components, having responsibility for environmental, health and safety management and compliance with GoN regulatory requirements, ADB's SPS, 2009 and the ADB project's loan covenants and EMP requirements during all phases of project implementation. The responsibility for EMP implementation ultimately lies with the PMD Director and NEA's management. The overall NEA organisation chart is provided as Figure 8.1.

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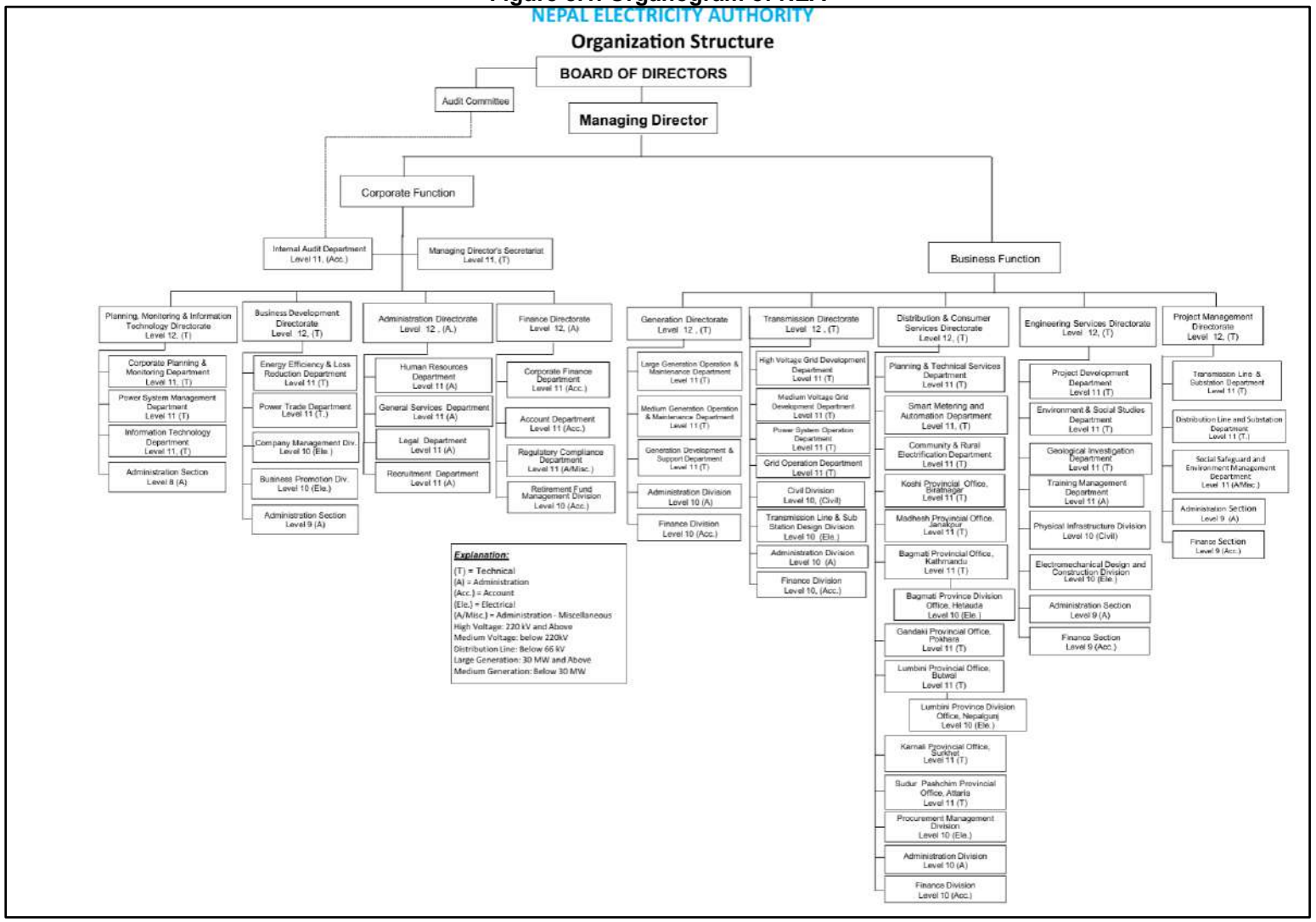
Figure 8.1. Organogram of NEA



Source: https://www.nea.org.np/organizational_structure

299. **NEA PMD/Project Management Unit.** Responsible for the overall day-to-day management of the technical, environmental, and social aspects of the project and thus compliance with GoN regulatory requirements, ADB's SPS, 2009 and the project's loan covenants and EMP requirements during the detailed design, preconstruction and construction phases, reporting to PMD Director and NEA management. The NEA PMD will include a PMU with project manager for the Output 2(iii) distribution component who will be overall resposible for EMP implementation, coordination, supervision and monitoring activities. For this, the PMU will include their own dedicated, qualified and experienced environment, health and safety safeguard staff – one environment officer and one health and safety officer [IOSH/NEBOSH certification[62] and 12-15 years' experience] both dedicated full-time to support EMP implementation for the Output 2(iii) distribution component. As such, they should be based in Karnali Province so they can regularly be on site. There will also be a social safeguard officer for the overall project to support. They will be supported by environment, health and safety specialists of the PMC.

300. There will also need to be a designated residential environment health and safety (EHS) supervisor assigned full-time for each of the six districts as part of the PMU safeguard team for day-to-day supervision of environment, health and safety related aspects on the ground and acting as GRM focal during implementation in each district and reporting to the PMU environment officer and health and safety officer.

301. NEA will source the Output 2(iii) PMU safeguard staff through direct hiring (contractual employment basis) and not deputation from the Social Safeguard and Environment Management Department (SSEMD). However, SSEMD may be used to support specific tasks such as community awareness raising etc. Upon completion of construction, since EMP implementation is ongoing during operation and maintenance (O&M), safeguard staff will need to continue in their roles sitting within the respective organization structure to provide corporate EHS support.

302. NEA PMU safeguard staff will be responsible for ensuring correct implementation of the Environmental Management Plan (EMP) and compliance with ADB's safeguards requirements and environmental (including ecology), health and safety (labor) national regulations. They will be tasked to supervise/support and if required obtain permissions, prepare the training plan, stakeholder engagement plan, consultation materials, operationalize the GRM, update the IEE, approve the EPC Contractors designs and CEMPs, prepare EMRs, and so on, in addition to undertaking day-to-day on-site supervision and monitoring activities of the contract package implementation. PMU will delegate relevant detailed design, preconstruction, and construction measures from the EMP to their contractors through the contract.

303. If any change in design including sites/routes/areas (once IEE updated and finalized) or other unanticipated environmental impacts become apparent during project implementation, PMU will be required to immediately inform ADB and (i) assess the significance of such unanticipated impacts; (ii) evaluate the options available to address them; and (iii) update the IEE and EMP for clearance by ADB taking corrective action where necessary.

304. **PMU/Karnali Provincial and District Electricity Offices of NEA.** For the Output 2(iii) distribution components, the PMD project manager and safeguards staff will be supported by the Karnali Provincial and District Electricity Offices who will be responsible for EMP implementation at site level during detailed design, preconstruction and construction. They will

[62] IOSH and NEBOSH certifications are globally recognized credentials for workplace health and safety: IOSH (Institution of Occupational Safety and Health) and NEBOSH (National Examination Board in Occupational Safety and Health).

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undertake day to day on-site management, supervision and monitoring of the contractor with respect to the technical, environmental, and social aspects of implementation and thus compliance with all requirements.

305. Residential environment, health and safety (EHS) supervisors (see above) under the PMU will be contracted staff, assigned on a full-time basis for day-to-day supervision of the Output 2(iii) distribution components in conjunction with the environment officer, health and safety officer and PMC.

306. There will also need to be adequate numbers of field officers (engineers) from the District Electricity Offices who are dedicated to EHS supervision and implementation during execution of the project.[63] EHS field officers will be responsible for supervising and monitoring the contractor's implementation, with technical field officers responsible for implementing the EMP with respect NEA responsibilities. There will need to be sufficient EHS field officers to monitor each active site of the contractor being undertaken in the district at any point in time. The District Electrical Offices (within Karnali Provincial Division) will also need to nominate the electrical safety officers with respect to overseeing the design, installation, and O&M of electrical equipment.

307. The staff nominated for EHS support from the Karnali Provincial and District Electricity Offices will form the basis of EHS units which will be established at District Electrical Office level, and which will be provided with training and continue into operation of the project. O&M staff will become fully responsible overall day to day management of the technical, environmental, and social aspects and thus EMP implementation during operation and maintenance.

308. **Contractors and their subcontractors, if any.** NEA PMD will delegate responsibility for implementing all relevant measures during detailed design, pre-construction, and construction to their contractors. The contractor will be required to comply with the ADB-cleared IEE report (as updated during project implementation) during the detailed design, preconstruction, and construction phases, and for any defect liability during the operational period, closely supervised and monitored by the NEA PMU safeguard team. The contractor will be responsible for (a) providing the relevant details/environment data after detailed design/route finalization of distribution lines to the PMU and PMC for updating the IEE reports (in the form of an addendum, in phased manner) for distribution lines; and (b) reporting environmental safeguards progress and performance at least monthly to PMU including record data required by the EMoP and providing necessary inputs to the quarterly progress reports and semi-annual EMRs for the duration of their contract. The requirement to undertake relevant mitigation and monitoring actions as set out in this EMP applies to the construction site as well as any temporary workers camps or overnight accommodation provided by them. The main EPC contractor has responsibility for EMP implementation. However, the contractor is required to ensure that the EMP requirements are cascaded down to all sub-contractors (if engaged under the Project) undertaking works, regardless they are formally or informally employed, and to be responsible for supervising and monitoring their sub-contractors in turn. The cost for implementing mitigation and monitoring measures as outlined in this EMP will be included in the EPC contract, unless specifically assigned to NEA to implement.

309. It must be ensured through the bidding document that the following staff are on the contractor's team;

- At least one dedicated environment and social manager with an environmental

[63] The number of EHS field office required in a District Electrical Office will depend on the extent of work to be undertaken in the district, they will report to the district based EHS site supervisors of PMU overseeing the distribution line works.

management bachelor's degree or similar qualification and 15 years' experience in on-site environment, health and safety supervision and monitoring[64] to be based full-time on-site (at least five days per week) for the duration of works under the contract package, to manage their safeguards team and support the contractor's EMP implementation on a day-to-day basis reporting to their management, including completing site-specific assessment forms and consultation proformas during detailed design, providing inputs to the design of ground mounted DTRs for pollution control, preparing the CEMP, and supervising and monitoring works -- preparation of weekly environment checklists to agreed formats, training for workers, record keeping and the environmental section of the monthly progress reports;

- At least one dedicated ecologist with an ecology bachelor's degree or similar qualification and 10-12 years' experience to be based full-time on-site for the duration of works under the contract package, to support with the completion of route surveys/site specific assessment forms during detailed design and the contractor's EMP implementation on a day-to-day basis (e.g., tree checks) reporting to the environment manager;
- One dedicated health and safety specialist with NEBOSH/IOSH certification or similar qualification with 10-12 years' experience[65] to be based full-time on-site (at least five days per week)[66] for the duration of works under the contract package, to conduct risk assessments, prepare health and safety (H&S) plans, provide H&S trainings to workers and ensuring they have training for their roles, implement, supervise and monitor the health and safety (labor) aspects of the EMP on a day-to-day basis reporting to the environment manager -- preparation of weekly H&S checklists to agreed formats, issuing stop notices for unsafe activities being undertaken, maintaining H&S statistics, and preparing the H&S section of the monthly progress reports;
- At least one dedicated labor officer with 5-6 years' relevant experience[67] to be based full-time on-site (at least five days per week) for the duration of works under the contract package, to prepare the labor management aspects, act as the GRM focal for labor, organizing and undertaking consultations with the labor, implement, supervise and monitor the labor aspects of the EMP on a day-to-day basis reporting to the environment manager -- preparation of weekly labor, sanitation and welfare checklists to agreed formats, audits of worker accommodation, code of conduct training for workers, checking all workers have valid identification documents/cards to access site, ensuring necessary labor paperwork, work permits and insurances are maintained, ensuring records of trainings, work permits, insurances, timesheets and pay slips are maintained, liaising with the H&S Supervisors and site staff to ensure timely corrective actions where needed, and preparing the labor section of the monthly progress reports; and
- At least one dedicated social and community liaison officer with 10-12 years' relevant experience to be based full-time on-site for the duration of works under the contract package, supporting completion of the site specific assessment and consultation proformas, to act as the GRM focal for the community and implement, organizing and undertaking information and formal consultations, supervise and monitor the social and community relations aspects of the EMP on a day-to-day basis reporting to the environment manager.

[64] Experience of at least five construction projects of a similar type, location, size and scale; experience of construction projects receiving IFI funding whilst being conversant with national laws and regulations and IFI environment safeguard policies and requirements

[65] On-site experience supervising at least five projects of similar type, location, scale and size electrical infrastructure with relevant degree; experience of construction projects receiving IFI funding whilst being conversant with national laws and regulations and IFI environment safeguard policies and requirements

[66] If the contractor works more than five days per week, or more than one shift, during days or hours off, an alternate suitably qualified staff having NEBOSH/IOSH certification will be required to stand in to the role.

[67] Labor management expertise including on construction sites with a degree in social science or related field. They will need experience of construction projects receiving IFI funding whilst being conversant with national laws and regulations and IFI environment safeguard policies and requirements

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310. Further, each active construction site is to have adequate environment, health and safety supervision, particularly to ensure the health and safety of all workers and local communities. Environment, health and safety supervisors are to be suitably qualified and experienced senior engineers having NEBOSH/IOSH certification or similar qualification who are based on-site full-time (at least five days per week)[68] and nominated to the role of EHS supervisor with responsibility for ensuring EMP implementation by the contractor, subcontractors and third parties, acting on the advice of, and reporting to the environment safeguards team. There will be at least one EHS Supervisor assigned for each active site – a supervisor will not supervise more than one site/distribution line or more than 50 workers at a time.

311. All subcontractors will be required to appoint an EHS representative to be available on each work site. Use of day labor is to be discouraged, if day labor is used the contractor will have to ensure increased supervision on-site from their side due to increased risks from lack of health and safety awareness etc.

312. Other safeguard experts such as field ecologists including taxonomists with expertise in Nepal, archaeologists or pollution control experts will also need to be employed on a part-time/intermittent basis by the contractor to meet the EMP requirements and depending on the outcome of the site-specific assessment and management requirements of each component.

313. The contractor's environment safeguards team will act as their GRM focals for each contract package to keep affected persons (community and labor) informed of works and be available to receive and deal with any grievances at the project site level. They will also be responsible for reporting EHS progress and performance at least monthly to NEA PMU and providing the necessary inputs to the quarterly progress reports and the semi-annual EMRs.

314. Construction contractors will have a corporate EHS policy and environmental management certifications such as ISO 14001 (or equivalent) and EHS certification such as ISO 45001 or equivalent.

315. **Project Management Consultants (PMC).** Capacity building and training will be required especially for NEA PMU, Karnali Provincial and District Electricity Offices, and contractors. The training and capacity building will not only be project and component specific but will also target the development of long term EHS capacity at NEA at corporate and Karnali Provincial and District Electrical Office level. For this NEA PMD and PMU will be assisted by environmental, health and safety specialists of the PMC. The PMC will also provide support to PMU by verifying (quality assurance) inputs/outputs, reviewing documents and reports regarding EHS aspects, developing the compliance monitoring systems, providing guidance and support on site-specific assessment and undertaking supervision and monitoring in relation to environment, ecology, labor, health and safety expertise, and providing monthly compliance and completion reports.[69] In particular, given ecological sensitivities in some project areas, a national ecologists specialized in Nepalese flora and fauna need to be

[68] If the contractor works more than five days per week, or more than one shift, during days or hours off, an alternate suitably qualified staff having NEBOSH/IOSH certification will be required to stand in to the role.

[69] For Output 2(iii) of the project PMC will provide PMU with the support of international environment consultant, international ecologist, national ecologist - flora, national ecologist – fauna, international H&S consultant, national labor consultant, and EHS field consultants (national) together with ad hoc inputs e.g., on pollution control. The EHS field consultants will be professionally qualified with at least 12-15 years of experience in EHS management in Nepal with exposure to GIIP and IFI lender projects; they will support trainings and undertake monthly site visits to a sample of active works in each of the six districts including construction camps and worker accommodation to ensure all aspects of the project comply with the EHS provisions of the contract, EMP/CEMP and relevant national laws and regulations.

included.

316. **Construction and O&M workers employed formally or informally by the NEA, contractors and their subcontractors**—these workers will need to abide, in their behavior and work, to directives issued by their employer with regards to environmental, health and safety management.

317. **Line agencies with regulatory responsibilities**– Other government agencies (refer Figure 8.2) are responsible for issuing and enforcing environment, forest clearances, other permits, and licenses that may be required for the the distribution component of project and must be sought by NEA or their contractor.

318. The proposed institutional arrangement relevant for EMP implementation is shown in Figure 8.2. The reporting, instructions, liaison/consultation, and advice/inspection channels are also shown.

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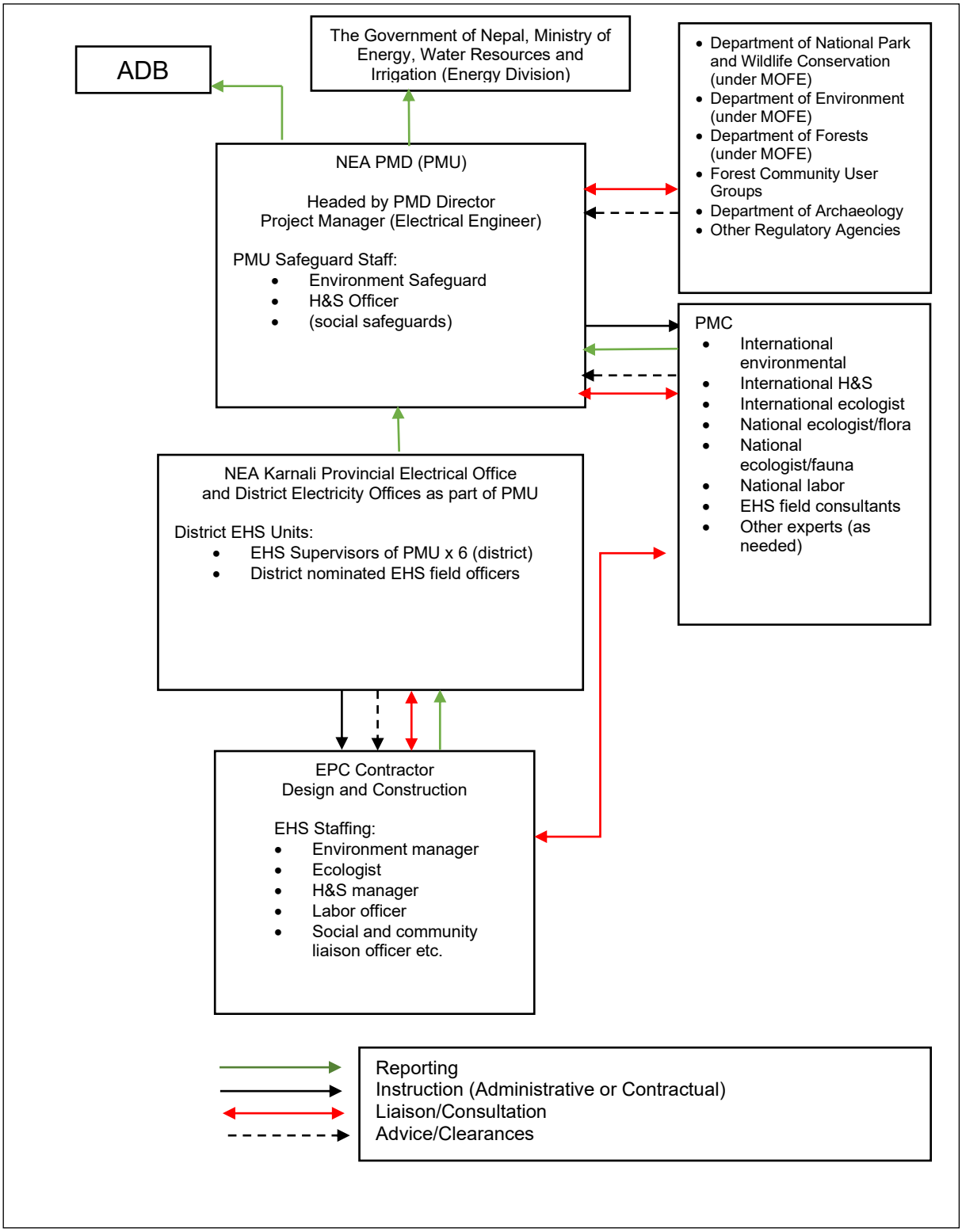
Figure 8.2 Environment Safeguards Implementation Arrangement



Source: ADB's TA Consultant

Roles and responsibilities of the Borrower. Detailed roles and responsibilities are as follows, not an exhaustive list:

1. **NEA PMD/PMU/Safeguard Staff**

- Ensuring adherence to all applicable national and state environment, health, safety, and labor laws and regulations in force at the time.
- Ensuring adherence to ADB's Safeguard Policy Statement (2009) and the related IFC Environment, Health, and Safety (EHS) general and power transmission and distribution guidelines (2007) and the International Labor Organization's Safety and Health in Construction and worker accommodation guidelines.
- Ensuring adequate management support, budget, staff, and other resources are allocated to satisfactorily implement, supervise, and monitor implementation of the EMP during all phases.
- Latest upon loan effectiveness appointing suitably qualified and experienced environment officer and health and safety officer under the PMU to support EMP implementation throughout all phases of the project component.
- Appointing suitably qualified and experienced staff in PMU at district level to support EMP implementation during construction and operation, as per the EMP implementation arrangements.
- Building up and sustaining institutional capacity in environmental management, health, safety and labor management.
- Ensuring all distribution lines/poles and DTRs comply with the criteria/principles set out in the IEE.
- Ensuring updating of the IEE and approval of sites/routes/designs in consultation with ADB. The IEE report will first need to be updated before the issue of bidding documents once NEA have prepared the individual distribution line lists and then again once the contractors are on board to cover environmental impacts and mitigation measures after the finalization of distribution line route alignments including the sites for the poles by EPC contractors. The updated IEE including the EMP shall be submitted by NEA to ADB for review and clearance before (i) issue of bidding documents and (ii) before approval of the contractor's detailed design and commencement of work on distribution lines.
- Preparing a detailed training plan, providing training venues, and providing with support of PMC a suite of training activities for NEA staff and contractors in relation awareness raising on EMP implementation.
- Ensuring that all PMD/PMU/O&M staff support and attend all capacity development and training activities provided for them.
- Adopting a zero-tolerance approach to OHS and enforcing all NEA staff to comply with OHS requirements of the EMP including wearing of appropriate PPE on site to set a good example to the contractor and their workers.
- Implementing the EMP throughout all phases or, if responsibilities are delegated, supervising, and monitoring implementation by the contractor.
- Incorporating the EMP into and reflecting experience, staffing, and bill of quantity requirements in the bidding and contract documents before issuing tenders and contract awards.
- Reviewing bids to ensure they are fully in accordance with the EMP requirements prior to contract award.
- Ensuring that all necessary clearances and no objections as applicable to the distribution lines (e.g., Department of Forests, Community Forest User Group, Local Authority, etc.) are secured before approving the works to start, particularly any works in the community forest land.
- If required, ensuring all tree cutting permissions and necessary compensation plantation (e.g., 1:10 and 1:25 for protected plant species with maintenance cost for

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up to 5 years) are secured for cutting of trees before the commencement of related work.

- To agree an memorandum of understanding (MOU) for monitoring of any required compensatory plantation as per the EMoP requirements if this will not be undertaken by NEA itself.
- Ensuring the contractor secures all necessary permissions, insurances, labor and other permissions before the commencement of related work, maintain records with copies of all the clearances, permits, licenses, and insurances obtained.
- Ensuring the contractor provides adequate training to their subcontractors and all workers including daily EHS toolbox talks and emergency response drills; suggesting topics for the training based on site observations.
- Ensuring the completion of site specific assessment forms and consultation proformas for each site/distribution line and undertaking site specific assessment and management planning based on the list of distribution lines developed by NEA and then the routes of the contractor. Updating the IEE/EMP as required in consultation with ADB prior to issue of bidding documents first, and then again prior to approval of the contractor's sites/route alignments, and then further if required with respect to any changes from the impacts/risks of sample, indicative sites/distribution line routes assessed in the IEE. Obtaining ADB's clearance for the IEE/EMP update prior to the issue of bid documents/commencement of work, including site establishment and vegetation clearance. Once cleared, ADB will disclose the updated IEE on its website whilst NEA will locally disclose it.
- Following site specific assessment, reviewing and approving the contractor's detailed designs, as well as their CEMP and sub-plans to ensure they incorporate and are in accordance with the EMP requirements including additional site-specific requirements.
- Preparing a stakeholder engagement plan to elaborate on ongoing consultation and information disclosure in relation to EMP implementation considering gender, vulnerable groups, and indigenous peoples; preparing consultation materials for distribution to affected communities.
- Undertaking awareness raising activities in respect of electrical safety for the communities.
- Locally disclosing the IEE and other environmental safeguards documents, including publication on NEA's website. Help with translation of the IEE into local languages or an explanation of its content will be extended free of charge to affected persons on request.
- Undertaking and documenting all ongoing consultation, details of consultations such as minutes of the meetings, photographs to be documented in the EMRs submitted to ADB.
- Establishing and operationalizing the GRM for affected persons (construction workers and local community members) in line with GRM Chapter in IEE report and provided at the end of this EMP, including appointing GRM Focals at PMU and district level and establishing the GRC, disseminating contacts, recording, and promptly resolving grievances received. All ongoing grievance-related information will be documented in the EMRs submitted to ADB.
- Once operational, any contractors hired for maintenance works will be supervised and monitored by O&M staff with roles and responsibilities the same as those of the contractor for construction.
- Developing and implementing a SOP for Karnali Province distribution lines component, to include operation and maintenance-related measures to be followed by NEA O&M team addressing the environment, health and safety impacts and risks of the distribution lines operation and maintenance works including recording of any occupational and community health and safety incidents. Development of this SOP will draw from, and be implemented as part of this EMP.

- Undertake periodic inspections and audits, supported by PMC, to ensure that environmental monitoring as set out in the EMoP is being undertaken during all applicable phases, with quantitative and qualitative monitoring results being appropriately logged, filed and documented. Quality assured, third-party laboratories is to conduct the instrumental quantitative monitoring and surveys.
- Undertaking with the support of PMC monthly EHS meetings including site walkover inspection to determine the status of EMP implementation by the contractor during construction as well as random "spot check" site visits to audit their EMP implementation. Minutes of meetings and findings of site walkover inspections will be attached to the EMRs to be submitted to ADB.
- Identifying areas for improvement, unsafe acts, and any non-compliances with the EMP by the contractor and/or PMU staff and instructing corrective actions to be taken by them to bring implementation back on track.
- Thoroughly investigating all unanticipated impacts, near-misses, accidents, and chance finds; preparing a detailed incident report where applicable, identifying and instructing on corrective actions particularly to avoid any repetition of near-misses and accidents.
- Monitoring and reporting on EMP implementation including reporting on EMP implementation in quarterly progress reports and preparing semi-annual EMRs for submission to ADB up until the ADB project completion report, or for longer period if it is required by the ADB PCR.
- Reporting any unanticipated impacts, major incidents (including fatalities), and chance finds to ADB within 48 hours of them occurring along with an incident report and corrective action plan (both a contractor's report and a PMU report with PMC input are to be provided).
- Reporting to ADB any grievances submitted to the third formal stage of the GRM upon receipt.
- Further updating the IEE/EMP as necessary and locally disclosing any updates if any unanticipated impacts (including project scope or design changes) occur during implementation; any such updates must be submitted to ADB for clearance and disclosure on the ADB website before any related works commence or are cleared by NEA PMD to continue.

2. **PMU District Level (in addition to PMD/PMU responsibilities (listed above) that cascade down)**

- Ensuring that prior to acceptance of the construction works from the contractor all pre-construction and construction EMP measures have been fully closed out, and the works as constructed will enable NEA to fully comply with all the operational EMP measures.
- Following the formal systems and templates developed for supervision and monitoring, undertake day-to-day supervision to ensure that contractors adhere to all the provisions in the EMP as well as their CEMP and sub-plans as approved by NEA PMU.
- Keep daily records and photo logs of site observations to inform preparation of the semiannual EMRs.
- O&M workers employed formally or informally by NEA will need to abide, in their behaviour and work, to directives issued by their employer with regards to environmental, health and safety management.

3. **Roles and responsibilities of the Contractor**

- Implementing all measures and responsibilities allocated to the contractor under the EMP for the full duration of the contractor's involvement.
- Ensuring adherence to all applicable national and state environment, health, safety, and labor laws and regulations in force at the time.

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- Ensuring adherence to ADB's Safeguard Policy Statement (2009) and the related IFC Environment, Health and Safety (EHS) general and power transmission and distribution guidelines (2007) and the International Labor Organization's Safety and Health in Construction and worker accommodation guidelines.
- Ensuring the detailed design reflects the EMP requirements including the criteria/principles set out in the IEE; seeking to ensure it has the same or no worse impact than the sample, indicative route alignments which were assessed in the IEE.
- Liaising with the Ministry of Forest and Environment of Nepal and the District Forest Offices for undertaking works in community forests and tree cutting which must be under their supervision.
- Undertaking ecological surveys using experienced field ecologists for all the distribution lines during route survey for fixing alignments with focus on critical habitat, globally threatened and endemic species flagged in the IEE as well as confirming the absence of sensitive receptors. In case of confirmed presence of any such species either directly observed by the ecologist or as confirmed from other sources the field ecologists will conduct a species-specific survey to inform the final route alignment and design.
- Ensuring all distribution lines and related facilities comply with the criteria/principles set out in the IEE.
- Ensuring the completion of site specific assessment forms and consultation proformas for each site/distribution line prior to route finalization. Supporting NEA PMU to update (as required) the IEE in respect of the detailed design by providing sufficient details to inform a revised project description and any subsequent reassessment of impacts and risks.
- Undertaking and documenting a facilitated health and safety (H&S) risk assessment considering for all phases.
- Preparing a Construction Environment Management Plan (CEMP) and sub-plans as specified in the EMP for review and approval by NEA prior to the commencement of works including site establishment.
- Ensuring adequate budget, staff and other resources are allocated to comply with and implement the contractor's responsibilities under the EMP and to supervise and monitor the active construction site to protect the environment and ensure the health and safety of all workers and affected communities.
- Ensuring suitably qualified and experienced environment safeguard team, as per the EMP requirements have been appointed to undertake regular on-site supervision and monitoring activities before the commencement of works.
- Adopting a zero-tolerance approach to OHS on the project, enforce all workers to comply with the OHS requirements of the EMP including the wearing of appropriate PPE on the construction site.
- Discouraging the use of work gangs and day labor by subcontractors and providing additional supervision where required.
- Obtaining all necessary permissions/no objections, permits, insurances, labor and other permissions before the commencement of related work, share copies of all clearances, permits, licenses, and insurances obtained.
- Providing – in part with the support from NEA – and ensuring attendance at EHS training courses for formal and informal construction workers and other personnel as required.
- Ensuring that all construction workers including all formal and informal employees and subcontractors understand their responsibilities to implement the EMP and mitigate environmental impacts and risks associated with pre-construction and construction activities.
- Supporting NEA in undertaking ongoing consultation and implementing the site-level GRM. In particular, the contractor's GRM Focal shall thoroughly document details of complaints (no matter how minor and quickly resolved) and make its best efforts to

resolve the complaints at project site level; all this information is to be included in the contractor's monthly reports to NEA.

- Undertaking environmental monitoring as set out in the EMoP (**Appendix 12)** during pre-construction and construction and documenting qualitative and quantitative monitoring results; for quantitative monitoring the contractor is to hire quality assured, third-party laboratories.
- Submitting monthly environmental management reports to NEA (monthly EMP reports will be stand-alone but included as part of the contractors' monthly progress reports) relating to the work undertaken over the reporting period including weekly checklists to an agreed format, and documenting the environmental measures including monitoring activities that have been carried out, problems encountered, record data including near misses and accidents, grievances received, and follow-up actions that were taken (or will be taken) to correct the problems.
- Informing NEA immediately in case of any approved detailed design changes or unanticipated environmental impacts occurring during implementation, and as required, provide any information needed to NEA to enable them to promptly update the IEE/EMP for clearance by ADB before any changes are implemented.
- Informing NEA and forest officials (district) of any wild animals found within the work area.
- Informing NEA within 24 hours in case of chance find or incident on site and providing within 48 hours an incident report with corrective action detailing how reoccurrence will be prevented.
- Informing NEA immediately in case of any non-compliance and help them to prepare as necessary a corrective action plan for clearance by ADB, the contractor is required to implement all necessary corrective action requested by NEA to ensure the project remains in compliance with national and state regulatory requirements, ADB's SPS 2009, the project's loan covenants and EMP requirements.
- Construction workers employed formally or informally by the contractors and their subcontractors will need to abide, in their behaviour and work, to directives issued by their employer with regards to environmental, health and safety management.

4. **Roles and responsibilities of the PMC**

- Support NEA PMD and the PMU safeguards staff and other officers with environmental responsibilities in ensuring compliance with loan covenants related to environmental safeguards as well as GoN and provincial/local environment laws and regulations;
- Support NEA to develop an environment, health and safety (labor) training plan and provide formal environmental management trainings for Output 2(iii) at the appropriate stage in project implementation as set out in the EMP (and agreed training plan) including preparation of all training materials in a format that can be used for future reference, document attendees for trainings through photographs and attendance list;
- Develop environment management checklists based on the EMP for use by PMU staff with environmental responsibilities who will be undertaking daily checks in undertaking their supervision and monitoring activities during detailed design and pre-construction, construction, operation and maintenance, same to be developed for PMC field level consultants;
- Support NEA and their contractors in understanding the national laws and regulations, international good practices for environmental management, and the mitigation and monitoring requirements set out in the IEE and EMP;
- Assist NEA to monitor and supervise implementation of the project EMP by themselves and their contractors;
- Help NEA to update the IEE to reflect their list of distribution lines to be included in the project, undertaking any site-specific assessment and identifying mitigation

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measures as required to demonstrate if criteria/principles are met, prior to issue of the bidding document;

- Review and confirm that necessary EMP provisions as well as a copy of the disclosed EMP (that may have been updated since project approval) are included in the bidding documents and contract documents for ensuring further implementation and compliance;
- Review and verify in the field the site specific assessment checklists and consultation proformas prepared by the contractors for all final alignments. Help NEA to update the IEE (e.g. prepare addendum to the IEE report) to reflect final alignments/siting of related equipment including undertaking any site-specific assessment and identifying additional site- specific construction mitigation measures required. Confirm that all final alignments/sites meet the criteria/principles particularly with respect to avoiding ecologically sensitive locations and complying with requirements for working in community forest or near nationally protected monuments. Identify if any environmental clearance (BES) or other permits are needed for works and thus if they are secured;
- Support NEA to review and confirm the detailed designs adequately incorporate all EMP measures and conform with the IFC EHS General and Transmission/Distribution Line Guidelines requirements prior to their approval;
- Support NEA to review and confirm that all pre-construction requirements and relevant clearances and permits have been obtained prior to commencement of works. Help PMU by developing a robust system they can use to maintain all records and copies of all clearances, permits, licenses and insurances obtained by NEA and contractors;
- Review consultation records of NEA and contractors, and confirm that meaningful consultations, including with women and vulnerable groups have been completed before commencement of works;
- Assist NEA in reviewing and approving the contractor's preconstruction documentation as required by the EMP (e.g. CEMP) and confirm they conform with EMP and IFC EHS General and Transmission/Distribution Line guidelines, ILO Safety and Health in Construction and worker accommodation guidelines, as well as national laws and regulations;
- Facilitate monthly EHS meetings/site walkovers ensuring PMC has undertaken at least monthly site visits to active project sites across all districts during the construction period to check PMU supervision and monitoring activities and adequate implementation of EMP measures and, advise NEA and their contractors if improvements are needed, document each site visit in field visit note including photographs;
- In addition to monthly site visits carry out at least quarterly in-depth environmental audits and random spot checks of all contractors to verify compliance to applicable requirements during construction.
- Review and verify ecology surveys of all sites pre-construction and provide ecologist to support PMU to supervise all vegetation clearance and all works located within 500m of areas of high biodiversity value (e.g., buffer zones) and traversing natural forest habitat or community forest, even if degraded and not controlled by the Ministry of Forest and Environment of Nepal.
- Assist NEA in undertaking quantitative monitoring required by the EMP and provide advise (e.g. templates) for adequate record keeping for environmental monitoring purposes.
- Prepare monthly/quarterly updates on task outcomes and assist NEA in preparing the semi-annual environmental monitoring reports in accordance with template agreed with ADB;
- Help NEA to update the IEE (additional assessment and consultations) and EMP in the event of unanticipated impact, including a change in scope or design, or the siting or routing of project components.

- Record and help NEA to develop and implement corrective action as necessary to address exceedance of performance standards or non- compliance issues;
- Assist NEA in investigating major incidents (including fatalities) and chance finds including reviewing the adequately of PMU and PMC supervision and monitoring as well as gaps of the contractor in preparing the PMU incident report and corrective action plan.
- Support NEA and contractors to locally disclose the IEE/EMP per the EMP requirements, prepare a stakeholder engagement (community liaison) plan, and continue to disclose information on and conduct meaningful consultations with the affected communities especially in relation to sites with adjacent properties and the distribution line routings.
- Support NEA to operationalize and effectively implement the grievance redress mechanism (GRM), including raising awareness of its existence with affected communities, resolving grievances related to environmental issues that have been submitted, and keeping adequate documentation.
- Support NEA to respond to any EHS related grievances.
- Prepare operational SOP for distribution lines in line with the requirements set out in the EMP to be adopted by NEA and providing them with training on their operationalization.
- Prepare a final environmental monitoring report setting out in detail how the project complied with all the EMP requirements to date and how NEA has been capacitated to continue to comply with the operational EMP requirements as part of the project completion report.

5. **Roles and responsibilities of ADB**

- Review, clear and disclose updated IEE/EMP on ADB's website as required on the identification of distribution lines by NEA and then on finalization of route alignments and in the event of any unanticipated impacts.
- Undertake supervision and monitoring of the EMP implementation by NEA in accordance with ADB's SPS, 2009.
- NEA and their contractors will provide ADB with access to the site and all requested information, their contractors will provide all ADB staff/consultants with a site health and safety induction and all the necessary personal protective equipment (PPE).

Supervision and reporting

319. NEA will carry out the following actions to supervise and monitor EMP implementation (not an exclusive list) and ensure intended environment safeguards outcomes are being achieved by the distribution component:

(i) Environment safeguard officer of PMU with support of Project Manager/PMC is to convene monthly EHS meetings attended by all safeguard staff at PMU/district level with contractor/O&M team including site walkover inspections to determine the status of EMP implementation and random "spot check" site visits to audit in more depth EMP implementation by the contractors and upon operation the District Electrical Office's O&M team.
(ii) Obtaining monthly reports from contractors and NEA O&M team and reviewing qualitative and quantitative monitoring results to identify any issues of concern.
(iii) Identifying areas for improvement, unsafe acts, and any non-compliances with the EMP and instructing corrective action to be taken by them to bring implementation back on track.
(iv) Keeping records of all monthly reports, meetings, inspections, and audits and timebound corrective actions instructed.

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(v) Supervising and monitoring the implementation of any corrective actions alongside EMP implementation to ensure they are implemented in a timely manner.

320. In addition to standard contract monitoring systems established by the PMD for the preconstruction and construction stages, the environment safeguard officer and H&S officer of PMU with the support of PMC will introduce formal systems and templates for monitoring and reporting on EMP implementation, with the following reporting lines. The reporting frequency of submission are provided in Table 8.1 and the initial list of the different reporting formats is provided in Table 8.2. Those responsible shall ensure monitoring is well documented and the timely submissions of monitoring reports with an acceptable level of detail:

(i) Contractors will establish their own internal systems for monitoring and reporting their EMP implementation.
(ii) Contractors as the main executors of the EMP will formally submit monthly and quarterly summary environmental management reports per an agreed template to the PMU project manager who will share the report with the environment safeguard officer of the PMU team.
(iii) Once works commence on site, the EHS supervisors (PMU) and EHS field officers (districts) under the direction of the environment safeguard officer and health and safety officer of PMU will keep daily records and photo logs of site observations reporting their findings in at least monthly reports to them with written quarterly summaries of progress submitted – their quarterly summary reports will be attached to the EMRs submitted to ADB.
(iv) Complete photographic records will be kept by both the contractor and EHS field officers (districts) covering all activities on site as well as key locations such as the construction site, receptors adjacent to poles/DTRs, and ROWs of distribution lines, off-site access roads, stores, sanitation and welfare facilities, temporary worker camps or overnight accommodation etc. Photographs of key areas will be taken prior to construction activities begin, to provide the environmental baseline. Copies of all geo-referenced photographs will be submitted to the PMU environment safeguard officer along with the contractor's monthly report and the district EHS supervisors (PMU) written monthly summaries.
(v) PMU environment safeguards officer with safeguard team to convene monthly EHS meetings to be attended by project manager, district electrical engineers, EHS supervisors and EHS field officers, PMC safeguards consultants, and contractor's management and environment safeguard team to discuss progress; initially progress will be discussed in relation to detailed design actions and as the project progresses will move onto pre-construction and contraction actions.
(vi) During the monthly EHS meetings areas for improvement, unsafe acts, and any non-compliances, time-bound corrective actions, and responsibilities to address them will be discussed, agreed, and documented – minutes of monthly EHS meetings will be attached to EMRs submitted to ADB.
(vii) PMU environment safeguards officer and H&S officer will be able to instruct the district staff and be given delegated authority to instruct the contractor to take corrective actions at any time in relation to EMP implementation.
(viii) PMU environment safeguards officer together with the safeguard team will maintain the time-bound corrective action plan, monitoring and reporting of corrective actions will be undertaken alongside monitoring and reporting of EMP implementation.

321. For the operational stages, NEA will establish an internal system for the districts to monitor and report on EMP implementation along the same lines as that established for construction. NEA will be responsible for obtaining and maintaining documentation and ensuring document control with access by and distribution to relevant personnel. Documentation and records to be kept by all parties in hard copy as well as electronic format

for access at the project sites and to be made available for inspection at any time are as follows (not an exclusive list):

(i) Bid and contract documents (copy submitted to ADB)
(ii) Definitive IEE and EMP (as disclosed on the ADB website)
(iii) Legal register (of all applicable legislation)
(iv) Environment clearances (if applicable) and written no objections
(v) Vehicle emission test, etc.
(vi) Training plan and training records
(vii) Community liaison plan and records of all consultations undertaken
(viii) Records of emergency preparedness and response drills
(ix) Document review and approval records
(x) Contractor's CEMP and sub-plans and copies of approval records
(xi) H&S risk assessments
(xii) Contracts, timesheets and payroll records
(xiii) Contractor's certifications and insurances
(xiv) Completed site checklists and photographic records
(xv) Corrective action instructions
(xvi) Contractor's and operational accident record and incident reports
(xvii) GRM register
(xviii) Copies of correspondence related to EHS issues
(xix) Material inventories and consumption records
(xx) Waste management records
(xxi) Construction camp site/overnight accommodation reports
(xxii) Monitoring results
(xxiii) Chance find records (if any)
(xxiv) Property surveys
(xxv) Habitat surveys
(xxvi) Tree inventory

322. NEA will facilitate ADB to carry out the following monitoring actions to supervise project implementation:

(i) Conduct periodic site visits during the project implementation to confirm compliance with the EMP, loan covenants, ADB's SPS, 2009 and IFC EHS General and Transmission and Distribution Guidelines.
(ii) If required, conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants.
(iii) Review and comment on the semi-annual EMRs submitted by NEA to ensure that adverse impacts and risks are mitigated as was planned and agreed with ADB, that any corrective actions have been duly implemented, and that the GRM is fully functional.
(iv) Work with NEA to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the loan agreement, and exercise remedies to re-establish compliance as appropriate.
(v) Prepare a project completion report that assesses whether the objective and desired outcomes of the EMP have been achieved, considering the baseline conditions, and monitoring results.

323. For this purpose, NEA and their contractors will provide ADB with access to the site and all requested information on the project. For any ADB supervision missions to ongoing construction works, NEA and their contractors will provide all ADB staff with a project site health and safety induction and adequate PPE in accordance with Table 2.7.1 of the IFC ES General Guidelines - Occupational Health and Safety section.

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Table 8.1 Minimum Reporting Frequencies

Contractor	EHS Supervisor(s) at District		PMU Safeguard Team within PMD	
Reporting to PIU	**Supervision**	**Reporting to Safeguard Unit of PMD**	**Supervision**	**Report to ADB**
Pre-Construction and Construction Stage				
Monthly Report Quarterly Summary Report	Day to Day	Monthly Report Quarterly Summary Report, Incidents to be reported in 24 hours	Monthly	Semi-annual EMR from loan effectiveness to completion of construction, and incidents to be reported in 48 hours
Operation Stage				
n/a	Day to Day	Quarterly Report, Semi Annual Summary Report, Incidents to be reported in 24 hours	Quarterly	Semi-annual EMR until issuance of ADB's PCR, and incidents to be reported in 48 hours

Source: ADB's TA Consultant

Table 8.2 Summary Details of Reporting Formats

Format No.	Item	Stage	Contractor	PMU with support from PISC	
			Reporting to PMU	**Supervision**	**Review and Reporting**
RF 1	Site-Specific Checklist and Consultation Proforma to inform IEE update by NEA	Pre-Construction	One Time	-	One Time
RF 2	Approval of Detailed Design / CEMP including H&S risk assessment /permits etc.	Pre-Construction	One Time pre-construction (then update through construction as needed)	-	One Time (then as updated)
RF 3	Ecology Survey and Tree Inventory	Pre-Construction	One Time	-	One Time
RF 4	Environmental Quality Monitoring	Pre-Construction	One Time	-	One Time
		Construction	Per EMoP Requirement	Day to Day	Monthly
		Commissioning	One Time	-	One Time
RF 5	Deviations and Corrective Action Plans	Construction	In case of non-compliance or unanticipated impact until closed out	Day to Day	Monthly

Format No.	Item	Stage	Contractor	PMU with support from PISC	
			Reporting to PMU	Supervision	Review and Reporting
RF 6	Vehicles Used and Pollution Control	Construction	Monthly	Day to Day	Monthly
RF 7	Pollution Incident Reporting	Construction	Monthly (Immediate for major incident)	Day to Day	Monthly (Immediate for major incident)
RF 8	Work Force Management (Labor)	Construction	Monthly	Day to Day	Monthly
RF 9	Details of PPE Stocks	Construction	Monthly	Day to Day	Monthly
RF 10	Occupational and Community Safety Measures	Construction	Monthly	Day to Day	Monthly
RF 11	H&S Incident Reporting	Construction	Monthly (Immediate for LTI and Fatalities)	Day to Day	Monthly (Immediate for LTI and Fatalities)
RF 12	Consultation Activities	Construction	Monthly	Day to Day	Monthly
RF 13	GRM during Construction	Construction	Monthly	Day to Day	Monthly
RF 14	Training Records	Construction	Monthly	Day to Day	Monthly

Source: ADB's TA Consultant

Environmental management implementation schedule

324. Strictly no contracts will be awarded before the EMP has been incorporated into the contract documentation. Further, no site establishment or construction activity is to take place before PMD has received and approved the contractor's EMP (CEMP), including all sub-plans. Tentative implementation schedule of the project is listed in the Table 8.3. The contractor(s) will submit a detailed implementation schedule for the detailed design, pre-construction, and construction once the contract has been awarded.

Table 8.3 Key EMP Milestones in Implementation Schedule

	Milestone	Indicative Time Frame
1	**Project Implementation**	
A	Bidding Documents	2 months before procurement
B	Procurement	2-3 months before construction commences
C	Second IEE update finalisation	Prior to commencing construction
D	Construction commencement	4-5 months after bidding commences
E	Construction Completion	36 months of contractual works from construction commencement)
F	Defects Liability Period (DLP)	12 months after construction completion
2	**Pre-Construction Phase**	
A	Implementation of mitigation measures and conduct environmental monitoring for which PMD is responsible	Immediate implementation, noting EMP requirements must be reflected in contract for which bidding documents may be issued prior to ADB project approval
B	Establishment of GRM	Immediate implementation, latest within one month

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	Milestone	Indicative Time Frame
		of loan effectiveness
C	Appointment of PMU safeguards officers	Latest within one month of loan effectiveness for the PMU safeguard support.
D	Appointment of PMC	PMC must be appointed within three months of loan effectiveness and prior to the approval of bidding documents, detailed design, CEMP approval, site establishment, site preparation, etc.
E	Identification of lines and first update of IEE and obtaining ADB clearance of update	Before issue of bidding documents
F	Implementation of mitigation measures and conduct environmental monitoring for which contractor is responsible	Upon award of the contract
G	Completion of environmental assessment forms and consultation proformas for siting and route alignments. Updating the IEE/EMP to reflect final route alignments and obtaining ADB clearance of update	Prior to approval of the detailed design, and before any works commence on site for the route alignments in question
H	Submission and approval of the Construction Environmental Management Plan (CEMP)	One month before the start of works including any site establishment, site preparation, demolition, and earthworks
3	**Construction Phase**	
A	Implementation of mitigation measures and conduct of environmental effects monitoring following the EMP.	After award of the contract
B	Monthly EMR for Project's Monthly Progress Report	5th day after effective month (covering the month prior)
C	Semi-Annual EMR during construction for submission to ADB	15th day after effective 6-months; the last construction EMR will be submitted after the commissioning and DLP of all works by the implementing agency documenting in depth how all pre-construction and construction activities were complied with
D	Restoration of construction sites	Before demobilization of contractor
4	**Operation Phase**	
A	Implementation of mitigation measures and monitoring activities for operational period	Upon commissioning
B	Semi-Annual EMR during construction for submission to ADB	15th day after effective 6-months; the first operational EMR will be submitted 6 months after the last construction EMR was submitted up until the ADB Project Completion Report is issued

Source: ADB's TA Consultant

D. Capacity Building

325. In addition to the appointment of safeguard staff as part of the PMU and nomination of EHS supervision at district level, capacity building and training will be required as existing setup and safeguard capacity of NEA is inadequate to implement the IEE/EMP. To build capacity in the PMU/Districts and reinforce capacity of contractors for implementation of the EMP and other safeguard requirements, a training programme will be delivered. The training programme will be implemented as per training modules provided in Table 8.4, training needs

will be further determined by the NEA and elaborated in a training plan.

326. Training modules can be changed during construction phase based on requirements of PMU and contractors. The basic objective of providing training to the different stakeholders is to enhance their capabilities for implementation of the EMP and EMoP during construction and operation. Delivery of the training program is part of the ADB project cost that includes institutional strengthening, capacity building and training whilst NEA attendance will be from counterpart support, and the contractor will factor in their attendance within the contract amount. Trainings to be given:

(i) Upon the award of contracts to the contractor
(ii) Before the start of construction work
(iii) Refresher during construction
(iv) Before demobilization of contractor and commencement of O&M

Table 8.4 Training Requirement

Training Session/ Project Stage	Required Attendees	Delivery Mode	Delivered by	Estimated Total Amount ($)[70]	External Trainers Budget Source
Pre-construction					
Introduction to ADB's Safeguard Policy Statement (2009), IFC EHS and ILO Guidelines, Government of Nepal requirements, and Project EMP including EMoP	PMD, PMU, Contractors' Management and Environment Safeguards Teams*	Lecture session, presentation, and discussion. In Person/ 1 day	PMU safeguards team of NEA/ Environmental specialist, H&S and labor experts of PMC		PMC Budget
EMP implementation for detailed design	PMD, PMU Contractors' Design Teams and Environment Safeguards Teams*	Lecture session, presentation, and discussion. In Person/ 1 day	PMU safeguards team of NEA / Environment specialist and H&S Experts of PMC		PMC Budget
EMP criteria and principles and specific location wise requirements	PMD, PMU Contractors' Design Teams and Environment Safeguards Teams*	Lecture session, presentation, and discussion. Online/ 0.5 day	Environment officers of NEA PMU / Environment specialist and ecologist of PMC with support of Ministry of Forest & Environment of Nepal/Department of National Park & Wildlife Conservation officials		PMC Budget
Determination of natural and critical habitat, critical habitat qualifying species, threatened and Nepal National Protected Species and ecological survey requirements	PMD, PMU Contractors' Design Teams and Environment Safeguards Teams*	Lecture session, presentation, and discussion. Online/ 0.5 day	Environment officers of NEA PMU / Environment specialist and ecologist of PMC supported by PMC expert input on natural and critical habitat assessment		PMC Budget

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Training Session/ Project Stage	Required Attendees	Delivery Mode	Delivered by	Estimated Total Amount ($)[70]	External Trainers Budget Source
Bird/wildlife sensitive design for distribution lines (detailed design)	PMD, PMU Contractors' Design Teams and Environment Safeguards Teams*	Lecture session, presentation, and discussion. Online/ 0.5 day	Environment officers of NEA PMU / Environment specialist and ecologist of PMC supported by PMC expert input on bird/wildlife sensitive design		PMC Budget
Polychlorinated Biphenyls (PCB) awareness raising and environmentally safe and sound transformer design	PMD, PMU, Contractors' Management, Design Teams and Environment Safeguards Teams*	Lecture session, presentation, and discussion. Online/ 0.5 day	Environment officers of NEA of PMU/ Environmental specialist of PMC supported by PMC expert input on pollution control and PCB management		PMC Budget
Facilitated H&S workshop (detailed design)	PMD, PMU, Contractors Management, Detailed Design, and Environment Safeguards Teams*	Facilitated workshop In Person/ 1 day	PMU safeguards team of NEA/H&S Expert of PMC		PMC Budget
GRM operation (initial run at start of project, and then again, on handover to operational staff)	All GRM levels- GRM Focal Points, GRC, PMD, PMU, Contractors Management, Environment Safeguards Team, Local Government/ Ward Members/ Representatives* GRM Focal Points of Contractors*	Lecture session, presentation, and discussion. In Person/ 1 day	PMU safeguards team of NEA/ Environmental specialist of PMC		PMC Budget
EMP implementation for pre-construction and construction, including workshop on CEMP preparation	PMD, PMU Contractors' Construction Teams and Environment Safeguards Teams*	Lecture session, presentation, and discussion. In Person/ 1 day	PMU safeguards team of NEA/ Environmental specialist and H&S Experts of PMC		PMC Budget
Facilitated H&S workshop (construction stage)	PMD, PMU, Contractors Management, Construction, and Environment Safeguards Staff	Facilitated workshop In Person/ 1 day	H&S Officer of NEA PMU/H&S Expert of PMC		PMC Budget
National labor laws and ILO guidelines	PMD, PMU, Contractors	Facilitated workshop	PMU safeguards team of NEA/Labor Expert of PMC		PMC Budget

Training Session/ Project Stage	Required Attendees	Delivery Mode	Delivered by	Estimated Total Amount ($)[70]	External Trainers Budget Source
on worker accommodation	Management, Construction and Environment Safeguards Teams*	In Person/ 0.5 day			
Environmental quality monitoring requirements; site supervision and monitoring including use of detailed monitoring framework (checklists) and preparing period Environmental Monitoring Reports	PMD, PMU, Contractors Management and Environment Safeguards Teams*	Lecture session, presentation, and discussion. In Person/ 2 days	PMU safeguards team of NEA / Environmental specialist and H&S Experts of PMC		PMC Budget
Site restoration	PMD, PMU, Contractors Management, Construction, and Environment Safeguards Staff	Lecture session, presentation, and discussion. Online/ 0.5 day	PMU safeguards team of NEA / Environmental specialist of PMC		PMC Budget
EMP implementation for O&M, including, workshop on SOP preparation	PMD, PMU	Lecture session, presentation, and discussion. In Person/ 1 day	PMU safeguards team of NEA/ Environmental specialist and H&S Experts of PMC		PMC Budget
Facilitated H&S Workshop (Operation Stage)	PMD, PMU	Facilitated workshop In Person/ 1 day	H&S Officer of NEA PMU/H&S Expert of PMC		PMC Budget
			Sub-Total Training Budget		

*Cost of contractors' staff attendance at all formal trainings and capacity development activities will be included in contract price.
Source: ADB's TA Consultant

327. Costs will be associated with implementation of the mitigation plan, EMoP and capacity building. Necessary budgetary provisions must be planned and allocated by NEA for implementing the environmental measures as part of the EMP. The main EMP budget items have been identified for implementing the environmental management and monitoring and capacity building activities required, and an indicative budget allocated for each. The budget in Table 8.5 will be refined during project implementation but enables preparedness for financial requirements. For contract related costs, these are only an estimate based on an estimate of the construction and installation cost, since the contracts are subject to competitive bidding, it will be for the contractor/consultants to reflect in their Bill of Quantities (BOQ) and ensure adequate budget is provided in their bids for the EMP implementation. The construction EMoP will be part of the Contractor's contract. The indicative EMoP budget provided in Table 8.5 below.

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328. If the construction period extends beyond 36 months, then the budget will need to be increased on a prorata basis. Operational costs are an annual cost and will be incurred annually for each year the distribution components are in operation.

Table 8.5 Indicative EMP budget

Item	Quantity	Estimated Rate ($)	Estimated Total Amount ($)	Budget Source
PRE-CONSTRUCTION AND CONSTRUCTION				
NEA Safeguard Staffing and incidentals				
Environment Safeguard Officer x 1	60 person months full time	1000 pm		NEA Counterpart Cost
Health and Safety Officer x 1	60 person months full time	1000 pm		NEA Counterpart Cost
EHS Supervisors x 6	36 person months full time	800 pm		NEA Counterpart Cost
Training and capacity building	Ref. Table 8.4	Lump sum estimate		NEA Counterpart Cost
Ongoing Consultation, GRM Implementation, for Consultation or GRC Meetings to cover ad hoc cost of printing leaflets, hire of venue or food purchase etc.	60 months	1200 pm		NEA Counterpart Cost
		Sub-total		
PMC Safeguard Specialists				
Environmental Specialist x 1	18 person months over 60-month period (including logistics during site visits)	15,000 pm		PMC Contract
Ecologist x 1	6 person months over 60-month period (including logistics during site visits)	15,000 pm		PMC Contract
Field Ecologist x 2	18 person months over 60-month period (including logistics during site visits)	2,000 pm		PMC Contract
Health and Safety Specialist x 1	12 person months over 60-month period (including logistics during site visits)	15,000 pm		PMC Contract
Labor Expert x 1	12 person months over 60-month period (including logistics during site visits)	15,000 pm		PMC Contract
EHS field consultant x 6	18 person months over 36-month period (including logistics during site visits)	2,000 pm		PMC Contract
		Sub-total		

Item	Quantity	Estimated Rate ($)	Estimated Total Amount ($)	Budget Source
Construction environmental quality monitoring	Ref. Table 8.6	Lump sum estimate		Construction Contract/BOQ
		Sub-total		
Construction Sub-Total				
OPERATION				
Safeguard staff during operation	12 person months full-time x 2 staff (annual cost repeats)			
Training and capacity building	Ref. Table 8.4	Lump sum estimate		
Ongoing Consultation, GRM Implementation, for Consultation or GRC Meetings to cover ad hoc cost of printing leaflets, hire of venue or food purchase etc.	12 months			
Operation Sub-Total				

* Tentative 1 package for distribution line component; ** total project cost = $ 23 million;
*** per NEA about 25 poles per km
Source: ADB's TA Consultant

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Table 8.6 Environmental quality monitoring budget

Item	Sites	Quantity	Estimated Rate ($)	No.	Estimated Total Amount ($)
Pre-Construction (Contractor)					
Property surveys	Along distribution lines/pole	1,221.57 km (sites tbc)	1,000 for equipment Time and travel included in contractor's staff cost	1	
Ecological/tree/ habitat surveys	Along distribution lines/pole	1,221.57 km (sites tbc)	1,000 for equipment Time and travel included in contractor's ecologist cost	1	
Polychlorinated biphenyl	Existing DTR on distribution network	50 (tbc)	100	1	
Construction (Contractor)					
Drinking water source for potability	Construction sites (worker supply)	6 (transient sites tbc)	54	12	

Source: ADB's TA Consultant

IX. CONCLUSION AND RECOMMENDATIONS

329. The Output 2(iii) distribution component is unlikely to cause significant adverse irreversible, diverse or unprecedented environmental impacts and thus this IEE has been prepared. Also, no major, large-scale civil or structural works will be involved (civil works will only include new pole foundation/erection), with most works consisting of electrical and mechanical works. Potential environmental impacts were identified in relation to the design, location, construction, operation and maintenance of the Output 2(iii) distribution infrastructure and mitigation measures have been developed in respect of all temporary and permanent environment impacts identified. Potential impacts and risks are expected to be easily mitigated through the adoption of international good practices for environmental management as set out in the International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) Guidelines, including the General Guidelines, and those on Electric Power Transmission and Distribution, as well as wildlife sensitive design features e.g., avoiding the use of bare conductors and adequate spacing and insulation of conductors and equipment at the distribution poles in order to prevent electrocution.

330. The selection and design of new equipment will comply with national requirements as well as considering international good practice as per IFC EHS Guidelines, particularly with respect to avoiding the use of polychlorinated biphenyl (PCB) oil in the purchase of new DTRs and the use of all asbestos-containing materials in the project.

331. The detailed route alignments of the various distribution lines will be determined by the contractors upon mobilization, but in principle, NEA and their contractors will adopt the criteria/principles (para 77 of this IEE) to ensure significant adverse irreversible, diverse or unprecedented environmental impacts are avoided, and fully implement the EMP and ensure works in ecologically sensitive areas is avoided as far as possible and wherever necessary, all required permits are obtained prior to commencing works in such areas of ecological importance.

332. Screening has confirmed that the indicative new and existing 11 kV route alignments comply with the criteria related to the national parks, their buffers, Ramsar sites, KBA/IBA, conservation forest, national protected monuments and religious forests. Since they have not been mapped yet, most LT lines cannot be screened yet, but NEA will ensure they and any 11 kV lines are taken out of the subproject scope if any are found to be in, or passing through, these areas once routes are selected. Some 11 kV and LT lines, however, are likely to pass through community forests and natural habitat and here existing power line RoWs will be followed, new lines and any minor deviations of existing lines must remain within existing road RoWs.

333. Once the distribution lines have been mapped by the contractors, those not meeting the criterion and principles (para 77 of this IEE) will be immediately dropped. Distribution lines and their related equipment in natural habitat will only be installed where significant conversion or degradation of natural habitat can be avoided. All storage areas and any labor camps will be located inside the nearest existing substation or on modified habitat at least 500 m outside of the high biodiversity value areas.

334. Since the distribution routes assessed are only indicative and will not be finalized until NEA have prepared the individual distribution lines list and the contractors are on board, during project implementation site-specific assessment checklist and consultation proformas will be completed by NEA and updated by the contractors. Based on the checklists this IEE and EMP will need to be updated and cleared by ADB with any government clearances or permissions obtained firstly before issue of bid documents and secondly before routings are approved by NEA and works commence.

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335. Potential construction impacts relate to disturbance of land in the ROWs of new and existing distribution lines (especially for new lines and those requiring new access tracks) as well as adjacent communities, with pollution, health and safety risks to workers and the community if the construction activities are not well managed by NEA and their contractors. The most significant impacts include traffic congestion on narrow, damaged roads in highly complex terrain, dust (already a major issue in most rural areas due to unsurfaced roads), noise in semi-rural/dense settlement areas, and community health and safety risk. Pollution, health and safety risks to workers, notably health and safety risks due to working at height and with electricity, and the community will remain during operation and maintenance works especially as maintenance of distribution lines by NEA is an issue with many existing poles were also observed to be broken/leaning and non-compliant to safety clearances with lines sagging/low hanging in dense settlement areas, exposing the locals particularly if the person, tree, or structure is near a live line where the safe horizontal or vertical ground clearances are compromised.

336. An EMP has been prepared for the project, which includes (i) Mitigation measures for managing the environmental impacts of DTR installation; (ii) Mitigation measures for managing the environmental impacts during distribution line implementation; (iii) Environmental monitoring program, including monitoring of health and safety incidents; (iv) Institutional arrangements, including capacity building; and (v) EMP budget required during implementation of the Output 2(iii) distribution components.

337. The responsible entity for mitigation, monitoring, and reporting is NEA. Mitigation measures will be assured by a program of environmental supervision and monitoring to be conducted during the construction and operation stages. Any unanticipated impacts or requirements for corrective action during implementation of the Output 2(iii) distribution component will be reported by the NEA to ADB.

Initial Environmental Examination

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Nepal: South Asia Subregional Economic Cooperation Electricity Transmission and Distribution Strengthening Project

Output 2(iii): Expansion and Augmentation of the Distribution Network in Karnali Province

Volume 2: Appendices

Prepared by Nepal Electrical Authority, Government of Nepal, for the Asian Development Bank

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CURRENCY EQUIVALENTS

(as of 15 February 2026)

Currency Unit	–	Nepalese rupee (NPR)
NPR 1.00	=	$ 0.0066
$1.00	=	NPR 152.18

ABBREVIATIONS

ABC	aerial bundled cable
ADB	Asian Development Bank
CC	covered conductor
DFO	district forest officer
DoA	Department of Archeology, Nepal
DTR	distribution transformer
EHS	environmental, health and safety
EHSG	environmental, health and safety guidelines
EMF	electromagnetic field
EMoP	environmental monitoring plan
EMP	environmental management plan
EPC	engineering, procurement and construction
GRC	grievance redressal committee
GoN	Government of Nepal
GRM	grievance redress mechanism
IBA	important bird area
IBAT	integrated biodiversity assessment tool
ICNIRP	International Commission for Non-Ionizing Radiation Protection
IEE	initial environmental examination
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	key biodiversity area
MOFE	Ministry of Forest and Environment, Nepal
NEA	Nepal Electrical Authority
NP	national park
OHL	overhead line
PA	protected area
PAI	project area of influence
PCB	polychlorinated biphenyl
PCR	physical cultural resources
PIU	project implementation unit
PMD	project management directorate
POP	persistent organic pollutant
PPE	personal protective equipment
PMC	project management consultant
ROW	right of way
SSEMD	Social Safeguard and Environment Management Department of NEA
WHO	World Health Organization

WEIGHTS AND MEASURES

dB(A)	-	A-weighted decibel
amp	-	ampere
ckm	-	circuit km
km	-	kilometer (1000 meters)
kV	-	kilo volt
kVA	-	kilo volt ampere (1000 volt ampere)
kWh	-	kilowatt-hour (1000 watts)
kWp	-	kilowatt peak
LV	-	low voltage
m	-	meter
sqm	-	square meter
MVA	-	mega volt ampere (1000 kVA)
MW	-	megawatt (1000 kilowatts)

NOTES

In this report, "$" refers to US dollars unless otherwise stated.

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APPENDIX 1: SUMMARY PROJECT SCOPE

District	Municipality	Ward No	11kV (Km)	0.400/0.230 kV (Km)	DTR Nos
Salyan (line km with 3 wires)	Sharada Municipality	1 to 15	20.81	41.04	15
	Bagchaur Municipality		8.6	30.48	20
	Chhatreshwori	**1 to 7**	**8.15**	**18.46**	**9**
	Tribeni	**1 to 9**	**8.79**	**13.96**	**9**
	Kapurkot	1 to 9	6.46	20.97	9
	Siddhakumakh		8.69	15.57	9
	Kamukh		20.92	55.26	15
	Darma		10.1	83.58	10
	Bangad Kupinde Municipality	1	54.07	177.4	18
Jajarkot	Bheri Municipality	1	3000	10000	11/0.4kV 25 kVA 5 numbers 50kVA 1 number
	Bheri Municipality	2	4800	12500	
	Bheri Municipality	3	0	500	
	Bheri Municipality	4	0	2000	
	Bheri Municipality	5	0	12500	
	Bheri Municipality	6	3000	17500	
	Bheri Municipality	7	0	10000	
	Bheri Municipality	8	0	2500	
	Bheri Municipality	9	0	2250	
	Bheri Municipality	10	0	7500	
	Bheri Municipality	11	0	500	
	Bheri Municipality	12	0	750	
	Bheri Municipality	13	0	250	
	Nalgad Municipality	1	0	4000	11/0.4 kV 25 kVA 10 numbers and 50 kVA 12 numbers
	Nalgad Municipality	2	0	2500	
	Nalgad Municipality	3	0	3500	
	Nalgad Municipality	4	0	1500	
	Nalgad Municipality	5	0	3250	
	Nalgad Municipality	6	0	2250	
	Nalgad Municipality	7	0	2750	
	Nalgad Municipality	8	3000	2750	
	Nalgad Municipality	9	3000	4000	
	Nalgad Municipality	10	6000	3500	
	Nalgad Municipality	11	2700	3750	
	Nalgad Municipality	12	0	2500	
	Nalgad Municipality	13	3300	3000	
	Chhedagad Municipality	1	6000	30000	11/0.4 kV 25 kVA 10 numbers and 50 kVA 16 numbers
	Chhedagad Municipality	2	6300	20000	
	Chhedagad Municipality	3	2100	35000	
	Chhedagad Municipality	4	0	21500	
	Chhedagad Municipality	5	0	2500	

District	Municipality	Ward No	11kV (Km)	0.400/0.230 kV (Km)	DTR Nos
	Chhedagad Municipality	6	0	4000	
	Chhedagad Municipality	7	3600	35000	
	Chhedagad Municipality	8	2400	40000	
	Chhedagad Municipality	9	12000	44500	
	Chhedagad Municipality	10	3000	36750	
	Chhedagad Municipality	11	3600	15000	
	Chhedagad Municipality	12	4200	12500	
	Chhedagad Municipality	13	4800	10000	
	Shiwalaya	1	0	10000	11/0.4 kV 25 kVA 3 numbers and 50 kVA 7 numbers
	Shiwalaya	2	3000	7500	
	Shiwalaya	3	0	3000	
	Shiwalaya	4	0	7500	
	Shiwalaya	5	0	5000	
	Shiwalaya	6	0	12500	
	Shiwalaya	7	0	7500	
	Shiwalaya	8	4200	10000	
	Shiwalaya	9	0	7500	
	Kuse	1	4200	12500	11/0.4 kV 25 kVA 12 numbers and 50 kVA 18 numbers
	Kuse	2	3000	7500	
	Kuse	3	2400	12500	
	Kuse	4	3000	10000	
	Kuse	5	0	17500	
	Kuse	6	6000	12500	
	Kuse	7	6000	9500	
	Kuse	8	4800	10000	
	Kuse	9	6000	10000	
	Barekot	1	30000	60000	11/0.4 kV 25 kVA 13 numbers and 50 kVA 18 numbers
	Barekot	2	12000	30000	
	Barekot	3	10800	7500	
	Barekot	4	4800	10000	
	Barekot	5	9000	5000	
	Barekot	6	8400	15000	
	Barekot	7	21000	10000	
	Barekot	8	6000	7500	
	Barekot	9	33000	35000	
	Junichande	1	0	10000	11/0.4 kV 25 kVA 13 numbers and 50 kVA 18 numbers
	Junichande	2	4200	7500	
	Junichande	3	4800	5000	
	Junichande	4	4800	12500	
	Junichande	5	0	10000	

District	Municipality	Ward No	11kV (Km)	0.400/0.230 kV (Km)	DTR Nos
	Junichande	6	0	15000	
	Junichande	7	6000	5000	
	Junichande	8	6000	10000	
	Junichande	9	4800	12500	
	Junichande	10	6000	10000	
	Junichande	11	4200	5000	
Jumla	Patrasi	1	44	48	25/50/100 kVA, 11/0.4 kVA 14 numbers
	Patrasi	2			
	Patrasi	3			
	Patrasi	4			
	Patrasi	5			
	Patrasi	6			
	Patrasi	7			

	230/400V, 11kV and Transformers		11m Pole (Nos)	55sqmm ABC Cable (4C) km	8/9 M Poles (Nos.)	50 Sq m ABC Cable (4C) km	25 Sq m ABC Cable (2C) km	Transformers (Nos)
Rukum West	Aathbiskot Municipality	1	80	12.5	552	6	35	7
	Aathbiskot Municipality	2						
	Aathbiskot Municipality	3						
	Aathbiskot Municipality	4						
	Aathbiskot Municipality	5						
	Aathbiskot Municipality	6						
	Aathbiskot Municipality	7						
	Aathbiskot Municipality	8						
	Aathbiskot Municipality	9						
	Aathbiskot Municipality	10						
	Aathbiskot Municipality	11						
	Aathbiskot Municipality	12						
	Aathbiskot Municipality	13						
	Aathbiskot Municipality	14						
	Chaurjahari Municipality	1	61	9	505	4	27	9
	Chaurjahari Municipality	2						
	Chaurjahari Municipality	3						
	Chaurjahari Municipality	4						
	Chaurjahari Municipality	5						
	Chaurjahari Municipality	6						
	Chaurjahari Municipality	7						
	Chaurjahari Municipality	8						
	Chaurjahari Municipality	9						

	230/400V, 11kV and Transformers		11m Pole (Nos)	55sqmm ABC Cable (4C) km	8/9 M Poles (Nos.)	50 Sq m ABC Cable (4C) km	25 Sq m ABC Cable (2C) km	Transformers (Nos)
	Chaurjahari Municipality	10						
	Chaurjahari Municipality	11						
	Chaurjahari Municipality	12						
	Chaurjahari Municipality	13						
	Chaurjahari Municipality	14						
	Musikot Municipality	1	40	6.3	160	2	6	5
	Musikot Municipality	2						
	Musikot Municipality	3						
	Musikot Municipality	4						
	Musikot Municipality	5						
	Musikot Municipality	6						
	Musikot Municipality	7						
	Musikot Municipality	8						
	Musikot Municipality	9						
	Musikot Municipality	10						
	Musikot Municipality	11						
	Musikot Municipality	12						
	Musikot Municipality	13						
	Musikot Municipality	14						
	Sani Bheri	1	210	33	937	12	36	7
	Sani Bheri	2						
	Sani Bheri	3						
	Sani Bheri	4						
	Sani Bheri	5						
	Sani Bheri	6						
	Sani Bheri	7						
	Sani Bheri	8						
	Sani Bheri	9						
	Sani Bheri	10						
	Sani Bheri	11						
	Tribeni	1	41	6	173	5	4	6

Source: NEA

APPENDIX 2: NATIONAL AND INTERNATIONAL ENVIRONMENTAL QUALITY STANDARDS AND GUIDELINES

NATIONAL ENVIRONMENTAL QUALITY STANDARDS

AIR QUALITY STANDARDS

National AmbientAir Quality Standards, 2082

Parameters	Averaging Time	Ambient Concentration (maximum) ug/m3	Test Methods
Total Suspended Particulates	Annual	-	
	24-hours[a]	**230**	High Volume Sampling and Gravimetric Analysis
	Annual	**25**	High Volume Sampling and Gravimetric analysis, TOEM or Beta Attenuation
PM2.5	24-hours[a]	40	
	Annual	**70**	High Volume Sampling Gravimetric Analysis, TOEM, Beta Attenuation
PM10	24-hours[a]	120	High Volume Sampling Gravimetric Analysis, TOEM, Beta Attenuation
Sulphur Dioxide	Annual[b]	50	Ultraviolet Fluorescence, west and Gaeke Method
	24-hours[a]	70	
Nitrogen Dioxide	Annual	40	Chemiluminescence
	24-hours[a]	80	Same as Annual
Carbon Monoxide	8 hours[a]	10,000	Non Dispersive Infrared Spectrophotometer (NDIR)
Lead	Annual[b]	0.5	High Volume Sampling, followed by Atomic absorption spectrometry
Benzene	Annual[b]	5	Gas Chromatographic Technique
Ozone	8 hours[a]	157	UV spectrophotometer

Notes:

[a] **24 hourly values shall be met 95% of the time in a year. 18 days per calendar year the standard may be exceeded but not on two consecutive days**

[b] **In any specified place twice in one week continuously for 24 hours and with the weekly data taken for a minimum of 104 times; yearly average is considered.**

Operational Diesel Generator Emission Standards1

Category (KW)	CO	HC+NOx	PM
KW<8	8	7.5	0.8
8≤KW<	6.6	7.5	0.8
19≤KW<	5.50	7.50	0.60
37≤KW<	5.00	4.70	0.40
75≤KW<	5.00	4.00	0.30

[1] Source: Emission Standard for Deisel Generator 2069

130≤KW<	3.5	4	0.2

Imported Diesel Generator Emission Standards

Category (kW)	CO	HC+NOx	PM
kW<8	8	7.5	0.8
8<19	6.6	7.5	0.8
19<37	5.5	7.5	0.6
37<75	5	4.7	0.4
75<130	5	4	0.3
130<560	3.5	4	0.2

Light and Over 2.5 Ton Commercial Vehicle Emission Standards

Limit Values, Grams per Kilometer			
Type of Vehicle	Mass of CO	Mass of HC	Mass of NOx
L CV (RM=<1305 Kg)	2.3	0.2	0.15
L CV (1305>RM< or =1760 Kg)	4.17	0.25	0.18
L CV (RM > 1760 Kg)	5.22	0.29	0.21

NOISE STANDARDS

Noise Standards

Area	**Day**	**Night**	**Remarks a**
Industrial	75	**70**	Passenger car at 65 miles per hour at 25 feet registers 77 dB
Commercial	**65**	**55**	50 dB(A) is typical of conversation in a restaurant or office
Urban Residential	55	50	50 dB(A) is typical of conversation at home, large electrical transformers at 100 feet
Rural Residential Area	**45**	**40**	
Mixed Residential Area	63	55	
Peaceful Area	**50**	**40**	
Water Pump			Max: 65 dB
Diesel Generator			Max: 90 dB
Entertainment Means			Max: 70 dB

Note a: http://www.industrialnoisecontrol.com/comparative-noise-examples.htm

NATIONAL WATER QUALITY STANDARDS

Generic Standard: Tolerance Limit for Industrial (Wastewater) Effluents Discharged into Inland Surface Waters and Public Sewers

SN	Parameters	Industrial waste into Inland Surface Waters	Wastewater into inland Surface Waters from CWTP*	Industrial Effluents into Public Sewers*
1	TSS, mg/l	30-200	50	600
2	Particle size of TSS	Shall pass 850-micron Sieve	Shall pass 850-micron Sieve	
3	pH Value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
4	Temperature ^{o}C[1]	<40	<40	45
5	TDS, mg/L, max			2100
6	Color and Odor			
7	BOD for 5 days at 20 degree C, mg/L Max	30-100	50	400
8	Oils and grease, mg/L, Max, Max	10	10	50
9	Phenolic compounds, mg/	m1	1	10
10	Cyanides (as CN), mg/L, Max	0.2	0.2	2
11	Sulfides (as S), mg/L, Max	2	2	2
	Sulphates (SO_4), mg/L, Max			500
12	Radioactive materials: a. Alpha emitters, c/ml, Max	10^{-7}	10^{-7}	
	b. Beta emitters, c/ml, Max	10^{-8}	10^{-8}	
13	Insecticides	Absent	Absent	Absent
14	Total residual chlorine, mg/L	1	1	1000 as chlorides
15	Fluorides (as F), mg/L, Max	2	2	10
16	Arsenic (as AS), mg/L, Max	0.2	0.2	1
17	Cadmium (as, Cd), mg/L, Max	2	2	2
18	Hexavalent chromium (as Cr), mg/L, Max	0.1	0.1	2
19	Copper (as Cu), mg/L, Max	3	3	3
20	Lead (as Pb), mg/L, Max	0.1	0.1	0.1
21	Mercury (as Hg), mg/L, Max	0.01	0.01	0.01
22	Nickel (as Ni), mg/L, Max	3	3	3
23	Selenium (as Se), mg/L, Max	0.05	0.05	0.05

SN	Parameters	Industrial waste into Inland Surface Waters	Wastewater into inland Surface Waters from CWTP*	Industrial Effluents into Public Sewers*
24	Zinc (as Zn), mg/L, Max	5	5	5
25	Sodium, %, max			
26	Ammoniacal nitrogen, mg/L, Max	50	50	50
27	COD, mg/L, Max	250	250	1000
28	Silver, mg/L, Max	0.1	0.1	0.1
29	Mineral Oils, mg/L, Max			10
30	Inhibition of nitrification test at 200ml/l			<50%

Source: MOEN, 2010.

Notes: CWTP= Combined Waste Water Treatment Plant; Under enforcement since BS 2058/1/17 (30 April 2001); *Under enforcement since BS 2060/3/9 (23 June 2003); [1] Shall not exceed 40°C in any section within 15 m downstream from the effluent outlet.

National Drinking Water Quality Standards

Group	National Drinking Water Quality Standards, 2022			Remarks
	Parameter	Unit	Max. Concentration Limits	
Compulsory Parameters				
Physical Parameters	Turbidity	NTU	5	NHBGV
	pH		6.5 – 8.5	NHBGV
	Color	TCU	5	NHBGV
	Taste and Odor		Should not be offensive	NHBGV
	Electrical Conductivity	µS/cm	1500	NHBGV
Chemical Parameters	Iron	mg/l	0.3 (3)	NHBGV
	Manganese	mg/l	0.2	NHBGV
	Arsenic	mg/l	0.05	NHBGV
	Fluoride	mg/l	0.5-1.5 (min-max)	HBGV
	Ammonia	mg/l	1.5	NHBGV
	Chloride	mg/l	250	NHBGV
	Sulphate	mg/l	250	NHBGV
	Nitrate	mg/l	50	NHBGV
	Copper	mg/l	1	NHBGV
	Zinc	mg/l	3	NHBGV
	Aluminnium	mg/l	0.2	NHBGV
	Total Hardness	mg/l	500	NHBGV
	Residual Chlorine	mg/l	0.1 - 0.5	HBGV (for system with chlorination only)
Microbial Parameter	E-coli	CFU/100ml	0	HBGV
Further testing based on risk and relevance				
Physical	Total Dissolved	mg/l	1,000	NHBGV

Group	National Drinking Water Quality Standards, 2022			Remarks
	Parameter	Unit	Max. Concentration Limits	
Parameter	Solids			
Chemical Parameter	Calcium	mg/l	200	NHBGV
	Lead	mg/l	0.01	HBGV
	Cadmium	mg/l	0.003	HBGV
	Chromium	mg/l	0.05	HBGV
	Cyanide	mg/l	0.07	HBGV
	Mercury	mg/l	0.001	HBGV
	Nitrites	mg/l	3	HBGV
Microbial Parameter	Total Coliform	CFU/100ml	0 (95% samples)	HBGV

Surface Water Quality (Aquatic Ecosystems)

	Parameter name	Target Water Quality Range	Chronic Effect Value	Acute Effect Value
1.	Aluminium (mg/l)	At pH <6.5: 5	10	100
		At pH >6.5:10	20	150
2.	Ammonia (µg/L)	< 7	< 15	< 100
3.	Arsenic (µg/L)	< 10	< 20	< 130
4.	Atrazine (µg/L)	< 10	< 19	< 100
5.	Cadmium			
	Soft water (60 mg/l CaCO3)	< 0.15	0.3	3
	Medium water (60 – 119 mg/l)	< 0.25	0.5	6
	Hard water (120 – 180 mg/l)	< 0.35	0.7	10
	Very Hard (> 180 mg/l)	< 0.40	0.8	13
6.	Chlorine (Residual) µg/L	< 0.2	0.35	5
7.	Chromium (VI) µg/L	7	10	200
8.	Chromium (III) µg/L	< 12	24	340
9.	Copper µg/L			
	Soft water (60 mg/l CaCO3)	< 0.3	0.53	1.6
	Medium water(60 – 119 mg/l)	< 0.8	1.5	4.6
	Hard water (120 – 180 mg/l)	< 1.2	2.4	7.5
	Very Hard (> 180 mg/l)	< 1.40	2.8	12
10.	Cyanide µg/L	1	4	110
11.	Dissolved Oxygen (% saturation)	80 – 120	> 60	> 40
12.	Endosulphan (µg/L)	< 0.01	0.02	0.2
13.	Fluoride (µg/L)	< 750	1500	2540
14.	Iron	The iron concentration should not be allowed to vary by more than 10% of the background dissolved iron concentration for a particular site or case, at a specific time.		
15.	Lead µg/L			
	Soft water (60 mg/l CaCO3)	< 0.2	0.5	4
	Medium water(60 – 119 mg/l)	< 0.5	1.0	7
	Hard water (120 – 180 mg/l)	< 1.0	2.0	13
	Very Hard (> 180 mg/l)	< 1.2	2.4	16
16.	Manganese (µg/l)	< 180	370	1300

	Parameter name	Target Water Quality Range	Chronic Effect Value	Acute Effect Value
17.	Mercury (µg/l)	< 0.04	0.08	1.7
18.	Nitrogen (inorganic)	Inorganic nitrogen concentrations should not be changed by more than 15% from that of the water body under local unimpacted conditions at any time of the year; The trophic status of the water body should not increase above its present level, though a decrease in trophic status is permissible; The amplitude and frequency of natural cycles in inorganic nitrogen concentrations should not be changed.		
19.	pH			
	All aquatic ecosystems	pH values should not be allowed to vary from the range of the background pH values for a specific site and time of day, by > 0.5 of a pH unit, orby > 5%, and should be assessed by whichever estimate is more conservative.		
20.	Phenols (µg/l)	<30	60	500
21.	Phosphorus (inorganic)	All surface waters Inorganic phosphorus concentrations should not be changed by > 15 % from that of the water body under local, unimpacted conditions at any time of the year; The trophic status of the water body should not increase above its present level, though a decrease in trophic status is permissible (see Effects); The amplitude and frequency of natural cycles in inorganic phosphorus concentrations should not be changed.		
22.	Selenium (µg/l)	< 2	5	30
23.	Temperature (All aquatic ecosystems)	Water temperature should not be allowed to vary from the background average daily water temperature considered to be normal for that specific site and time of day, by > 2°C, or by > 10%, whichever estimate is the more conservative.		
24.	Total Dissolved Solids (All inland waters)	-TDS concentrations should not be changed by > 15% from the normal cycles of the water body under un impacted conditions at any time of the year; -The amplitude and frequency of natural cycles in TDS concentrations should not be changed.		
25.	Total Suspended Solids (All inland waters)	Any increase in TSS concentrations must be limited to < 10% of the background TSS concentrations at a specific site and time.		
26.	Zinc (µg/l)	< 2	3.6	36

Source: Department of Irrigation, Ground Water Project (Nepal Gazette (Number 10, 16 June 2008)

ELECTRICAL SAFETY (ELECTRICITY RULES, 2050 (1993))

CHAPTER – 5[2]

SAFETY MEASURES REGARDING ELECTRIC DEVICES

48. Minimum Distance from Ground to the Electric Wire:

– (1) Distance between the electric wire of different volts of the distribution and transmission system and the ground shall not be less than as prescribed in Schedule-12.

(2) In case where electric line is to be installed by the side of the road or along it, it shall be done by

[2] https://lawcommission.gov.np/en/?p=5065

adopting appropriate technological measures.
(3) If it is necessary to install electric line of more than 33,000 volts, it shall have to be done by adding 0.305 meter for each 33,000 volts on the distance as prescribed for 33,000 volts in Schedule-12.

49. Regarding the Installation of Electric Line Across the Road:-
While installing electric line of more than 11,000 volt across the road in a densely populated area, the double insulator system shall have to be used.

50. Distance to be Maintained on either side of the Electric Line:-
(1) While installing electric line of distribution and transmission system, it shall not be installed in a distance lower than the distance as prescribed in Schedule- 13 from the house or tree.
(2) If it is necessary to install electric line of more than 33,000 volt, it shall have to be done by adding 0.305 meter for each 33,000 volts on the distance as prescribed for 33,000 volts in Schedule-13.

51. Distance to be Maintained in between the Poles:-
While determining the distance in between the electric poles, it shall be maintained with taking consideration upon last tensile strength factor of safety and distance between ground and wire.

52. No Electric Lines should be carried out from above a House:-
No electric lines of any kind shall be carried out from above a house. Provided that the lines of upto 400/230 volt may be carried out from above a garage, cottage (Tahara), or fence and such electric lines shall be installed at a height which shall not be less than three meter from the highest point of such garage, cottage or fence.

53. In Relation to Installation of the Lines of Different voltages in a Single Pole:-
(1) While installing electric lines of different voltages on a single pole, the line of higher voltages shall be installed above and the line of low voltage below.
(2) While installing lines in a manner as mentioned in sub-rule (I), care has to be taken that no leakage or danger of any kind or charge shall exist from high voltage line to low voltage line.
(3) It is necessary that a distance required from the technical point of view should be maintained between the lines of high voltage and low voltage.

54. In Relation to electric Lines to be Installed around Airport:-
While installing electric lines around the airport, it shall be done according to a decision arrived at by the discussion with the chief of airport concerned.

55. In Relation to Installation of Electric Lines and Telephone Lines:-
While installing electric line near to the telephone lines or vice versa, the licensee and the concerned office of telecommunication shall hold discussions between them and it shall be installed in such a way that no obstacle or
charge shall be made to the telephone line from the technical point of view.

56. Safety from Lightning:-
The licensee, shall, for the purpose of safety from any harm from lightning or to ensure non-fluctuations of electric energy, provide protection equipment against lightning or any appropriate device and a system for earthing of lightning from those devices shall also be provided.

57. Change-over-switch to be Maintained:-
Each person, who install a standby generating set for standby use, shall, in consultation with the licensee in that
area, have to install a change-over-switch.

58. Earthing to be Done:-
(1) All kinds of metallic supports under high voltage system shall be permanently and effectively earthen by using perpetual earth wire.
(2) Insulators shall have to be installed at not less than three meters from the ground in the stay-wires used in supports of transmission and distribution system.

59. Cutout to be Installed:-
(1) The licensee shall have to install cutout or circuit breaker on the energy meter with seal for the purpose of safety and load limit of the energy meter installed in the house or premises of the consumer.
(2) The consumer shall have to install an isolating switch nearby the energy meter.

60. Earthing of Electric Devices to be used at the places of the Consumer:-
(1) If electric appliances like water-heater, air-conditioner are installed in the house of the consumer, provision of earthing shall have to be made for such appliances by supplying electricity through separate appropriate electric
circuit.
(2) If electric appliances of different metals is to be used in the house or premises of the consumer, three-pin plug socket shall have to be installed and such plug socket shall have to be connected with the earthing
system.
(3) The earthing system installed in the house or premises of the consumer shall have to be in accordance with the technically proper system.

61. Safety of Internal Wiring:-
Wiring method and the electric devices installed for the safety of internal wiring of the consumer's house shall ha ve
to be in accordance with the prevailing technical standard.

62. Insulated Wire to be Used:-
Insulated wire shall have to be used when joining electric line to the consumer's house.

63. Electric Line to be Provided through Pole:-
(1) While installing a electric line to the consumer's house, it shall be done only through pole.
(2) Notwithstanding anything written in sub-rule (1), while installing electric line to the consumer's house, it shall be done only after making provision of safety in accordance with the prevailing technical standard.

64. Danger of Leakage at 230/400 Volt:-
The insulation resistance of electric system of 230/400 volts and wiring shall be at least 5 megaohm.

65. Danger of Leakage at High Voltage:-
(1) The insulation resistance of 3,300 volt electric system shall be at least 20 megaohm.
(2) While calculating the insulation resistance of more than 3,300 volt electric system, it shall be

done by adding 1 megaohm for each 1,000 volt on 20 megaohm.
(3) The operation of electric system without the insulation resistance as mentioned in sub-rule (1) and (2) shall not be allowed.

66. Utilization of House and Land around the construction Site Relating to Production, Transmission and Distribution of Electricity may be Prohibited:-
(1) If any construction work has been carried on relating to production, transmission and distribution of electricity for the purpose of Sub-section (3) of Section 33 of the Act, Government of Nepal may, by publishing a notification in the Nepal Gazette from time to time, prohibit in the utilization of the house and land at the place of construction or at the place falling within the specified distance around the construction site for any specified purpose.
(2) No one should plant tree or construct house underneath the electric line installed for the purpose of transmission or distribution of electricity or on either side of such line within the distance as prescribed in Schedule-12 and 13.

67. Standard of Electrical Devices and Method of Use:-
The licensee, shall have to abide by the following matters from the point of view of standard and safety of the electrical devices to be used in the works of production, transmission and distribution of the electricity:-
(a) Materials and devices of high standards should be used,
(b) when bringing into operation the new plant or after repairing the old one, it should be operated after conducting all tests from the technical point of view and be proved proper,
(c) The electric wires to be used for any purpose should be of adequate capacity required for that work,
(d) While joining the electric wires, it should be joined in accordance with the recognized technical standard in such a way that a danger might not arise,
(e) The joint boxes of underground wire, metallic conduct joint and joint of metallic sheets of the wire shall have to be installed on such places that those joints could be easily accessible for inspection.
(f) Fuses, circuit breaker or any appropriate device shall have to be installed in such a way that if more current than the specified current flow in the electric circuit or sub-circuit, they might resist the flow of current and there would not arise any danger. These devices, while in operation, should be such that extra heat would not be produced, non-sparking and would of no danger at the time of changing.
(g) Single phase switch is not allowed to be installed in the neutral wire except on live wire.

Right of Way (ROW) and Safety Clearances as per NEA Electricity Rules

Parameter	33 kV line	66 kV Line	132 kV Line	220 kV Line
Right of Way (ROW)	7m (3.5m either side)	12m (6m either side)	18m (9m either side)	30m (15 m either side)
Ground Clearances	Minimum 6.1m at the maximum sag condition. • Road - 7m • Power cable with voltage - 3.5m • Communication line crossing - 3.5m • Residential area - 7m • Power line above/ below - 3.5m • Phase to phase - 3.75 m			
Horizontal Clearance	Minimum distance from a tree or a house. • For 230/400 to 11,000 V - 1.25 m • For 11,000 to 33,000 V - 2 m • For >more than 33,000 V - add 0.305m for each 33,000V on the above distance			

Source: Nepal Electricity Rules, 2050.

SCHEDULE- 12 (ELECTRICITY RULES, 2050 (1993))

(Relating to Rule 48)

Distance which ought to be from wire to the ground				
S. No.	Standard of voltage of electricity	While crossing the road (meter)	On the side of the road (meter)	In other places (meter)
1.	In between 230/400 and 11,000	5.8	5.5	4.6
2.	In between 11,000 and 33,000	6.1	5.8	5.2

SCHEDULE -13 (ELECTRICITY RULES, 2050 (1993))

(Relating to Rule 50)

MINIMUM DISTANCE WHICH OUGHT TO BE FROM THE WIRE TO THE HOUSE OR TREE

S. No.	Standard of Voltage of Electricity	Minimum Distance to be from house or tree
1.	Standard 230/400 to 11,000	1.25 meter
2.	From 11,000 to 33,000	2.00 meter

Note:- While determining the minimum distance as above, maximum deflection of wire arising due to air pressure shall also have to be considered.

SCHEDULE-14 (ELECTRICITY RULES, 2050 (1993))

(Relating to Rule 74)

FORMAT OF THE INFORMATION OF ACCIDENT CAUSED DUE TO ELECTRIC CURRENT

1. Time and date of accident:
2. Place, district and zone of accident
3. Electricity supply voltage and system
4. Name of the person killed or injured due to accident (if animal is affected, mention it):
5. Name of the licensee of the area of accident:
6. Occupation of the person sustaining accident (work relating to electricity or other work) to be mentioned clearly:
7. (a) If accident was occurred due to work relating to electricity, particulars of the same:
   (b) If accident was occurred due to other work, how it occurred, particulars of the same:
8. If accident was occurred due to work relating to electricity, the name and designation of the person on whose order the victim was working and the statement of the person giving order:
9. Detailed description of accident:-
10. Description of the work done after accident:
11. Details of the measures take or to be taken by the licensee in order to remove the possibility of such accident in future:

Licensee's
Signature:-
Name:-
Designation :-
Date:-

INTERNATIONAL (WB/IFC-EHS GUIDELINE) ENVIRONMENTAL QUALITY STANDARDS[3]

AIR QUALITY

WHO Ambient Air Quality Guidelines of 2021 in Comparison to 2005 Guidelines

Pollutant	Averaging time	WHO 2021 air quality guideline	WHO 2005 air quality guideline	Change
SO_2 (µg/m^3)	24-hour	**40**	20	+100%
	10-minute	**500**	500	Unchanged
NO_2 (µg/m^3)	Annual	**10**	40	-75%
	24-hour	**25**	N/A	Newly introduced
	1-hour	**200**	200	Unchanged
PM_{10} (µg/m^3)	Annual	**15**	20	-25%
	24-hour	**45**	50	-10%
$PM_{2.5}$ (µg/m^3)	Annual	**5**	10	-50%
	24-hour	**15**	25	-40%
O_3 (µg/m^3)	Peak season	**60**	N/A	Newly introduced
	8-hour	**100**	100	Unchanged
CO (mg/m^3)	24-hour	**4**	4	Unchanged
	8-hour	10	10	Unchanged
	1-hour	**35**	35	Unchanged
	15-minute	**100**	100	Unchanged

Note: those in bold are more stringent than Nepali regulations and will be used for the purpose of monitoring any short-term impacts on air quality
Source: ADB TA Consultant

NOISE

Ambient Noise Level Guidelines

Receptor	One Hour L_{Aeq} (dBA)	
	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational[4]	**55**	**45**
Industrial; commercial	**70**	70

Note: a combination of Nepali and WHO will need to be applied as the most stringent noise levels based on the area and individual receptor in question. For commercial area, rural residential area and peaceful aera the Nepali standards shall be complied. For industrial area the WHO guidelines shall be complied. In an urban residential area or mixed residential area, the WHO guidelines shall be complied, and at any individual residential receptor in an industrial or commercial zone the WHO guidelines will be applied. If the applicable noise levels are already exceeded by background the maximum increase in background level at the receptor is 3dBA.
Source: Guidelines for Community Noise, World Health Organization (WHO), 1999.

Noise Limits for Various Working Environments

Location / activity	Equivalent level LA_{eq},8h	Maximum LA_{max}, fast
Heavy Industry (no demand for oral communication)	85 dB(A)	110 dB(A)
Light industry (decreasing demand for oral communication)	50-65 dB(A)	110 dB(A)
Open offices, control rooms, service counters or similar	45-50 dB(A)	-

[3] https://www.ifc.org/en/insights-reports/2000/general-environmental-health-and-safety-guidelines

[4] For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).

Location / activity	Equivalent level LA_{eq},8h	Maximum LA_{max}, fast
Individual offices (no disturbing noise)	40-45 dB(A)	-
Classrooms, lecture halls	35-40 dB(A)	-
Hospitals	30-35 dB(A)	40 dB(A)

Source: *Guidelines for Community Noise, World Health Organization (WHO), 1999*

Control room noise should follow best practice guidelines as set out in the IFC EHS guidelines on OHS where the average noise level within the control room shall not exceed 40-50dBA during the length of the 8-hour working day.

VIBRATION

International Guidelines – some of the most recognizable standards for structural vibration measurements are ISO 4866, British BS 7385-2, and German DIN 4150-3. The German DIN 4150-3 – Vibration in Buildings – Part 3: Effects on structures Standard provides short term and long-term limits 5 for vibration at the foundation for various structures. It is useful as it provides short term values corresponding to construction impacts. Since the international standard focuses more on measurement of vibration this is considered as the international best practice to be followed by the Project, it has been used in various other recent ADB environmental assessments.[6]

Guideline Values for Vibration Velocity to be Used When Evaluating the Effects of Short-term and Long-term Vibration on Structures

Group	Type of structure	Guideline Values for Velocity (mm/s)				
		Short-term				Long-term
		At foundation			Uppermost Floor	Uppermost Floor
		Less than 10 Hz	10 Hz to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	10
2	Residential dwellings and buildings of similar design and/or use	5 (105 dB)	5 to 15	15 to 20	15	5 (105 dB)
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3 (100.5 dB)	2 to 8	8 to 10	8	2.5 (99.0 dB)

Source: DIN 4150-3, Structural Vibration, Part 3: Effect of vibration on structures

DIN 4150-3 notes that "experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur. If damage nevertheless occurs, it is to be assumed that other causes are responsible. Exceeding the value in the table does not necessarily lead to damage".

[5] short-term vibrations are defined as those that do not occur often enough to cause structural fatigue and do not produce resonance in the structure being evaluated and long-term vibrations are all the other types of vibration.

[6] For example, https://www.adb.org/projects/documents/geo-51257-001-eia-0

WATER QUALITY

Indicative Values for Treated Sanitary Sewage Discharges to Surface Water

Pollutants	Units	Guideline Value
pH	pH	6 – 9
BOD mg/l 30	mg/l	30
COD mg/l 125	mg/l	125
Total nitrogen mg/l 10	mg/l	10
Total phosphorus mg/l 2	mg/l	2
Oil and grease	mg/l	10
Total suspended solids	mg/l	50
Total coliform bacteria	MPN / 100 ml	400

MPN = Most Probable Number
Source: https://www.ifc.org/wps/wcm/connect/3d9a54ae-c44c-488d-9851-afeb368cb9f9/1-3+wastewater+and+ambient+water+quality.pdf?MOD=AJPERES&CVID=ls4Xbfn

ELECTRICAL SAFETY

ICNIRP Limit Values Concerning Electric and Magnetic Fields (50 Hz) for the Public and at Working Places

Source	**Electric Field Strength [kV/m]**	**Magnetic Flux Density [μT]**
Occupational exposure	10	500
General public exposure	5	100

Source: ICNIRP. Guidelines for limiting exposure to electromagnetic fields (up to 300 GHz). 2020

Minimum Working Distance for Trained Employees to AC

Voltage range phase to phase (kV)	Minimum working and clear hot stick distances (m)
2.1 to 15	0.6
15.1 to 35	0.71

Source: https://www.ifc.org/content/dam/ifc/doc/2000/2007-electric-transmission-distribution-ehs-guidelines-en.pdf

LIGHTING

(Source: https://www.ifc.org/content/dam/ifc/doc/2000/2007-general-ehs-guidelines-occupational-health-and-safety-en.pdf)

Workplaces should, to the degree feasible, receive natural light and be supplemented with sufficient artificial illumination to promote workers' safety and health, and enable safe equipment operation. Supplemental 'task lighting' may be required where specific visual acuity requirements should be met.

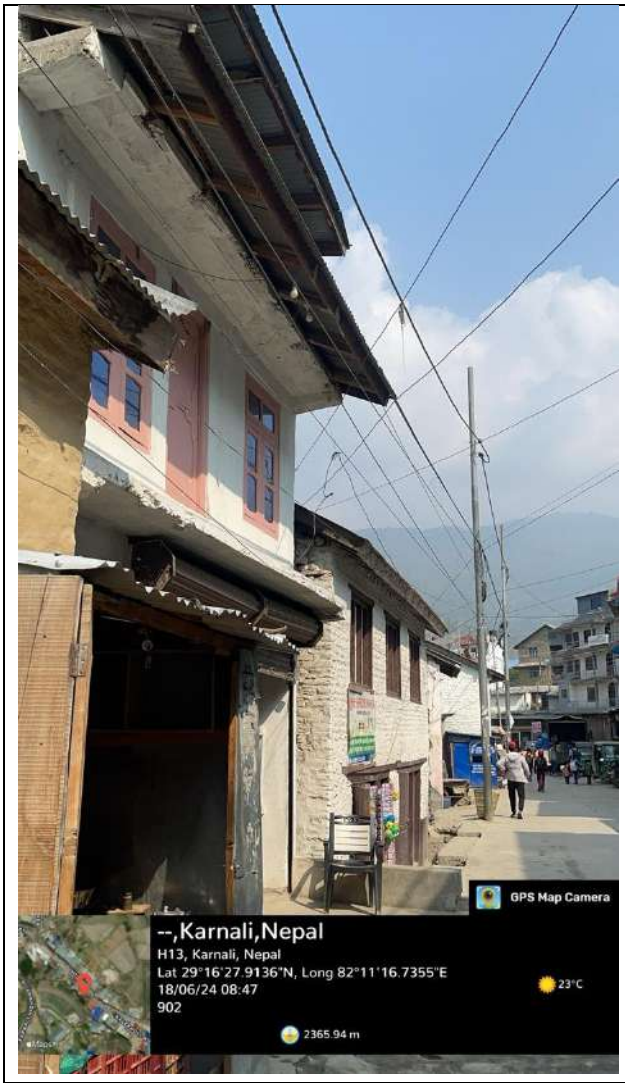
Emergency lighting of adequate intensity should be installed and automatically activated upon failure of the principal artificial light source to ensure safe shut-down, evacuation, etc.

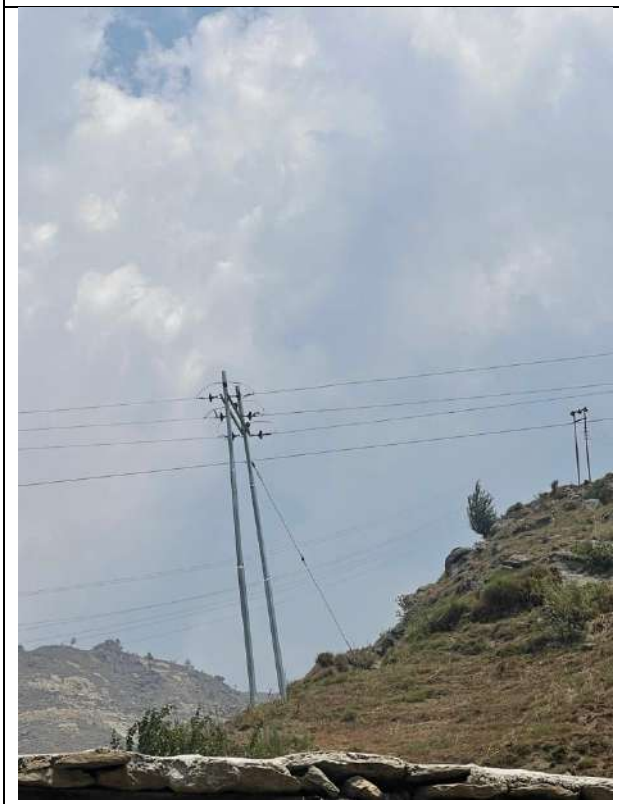
Minimum Lighting Levels for Workplace Safety

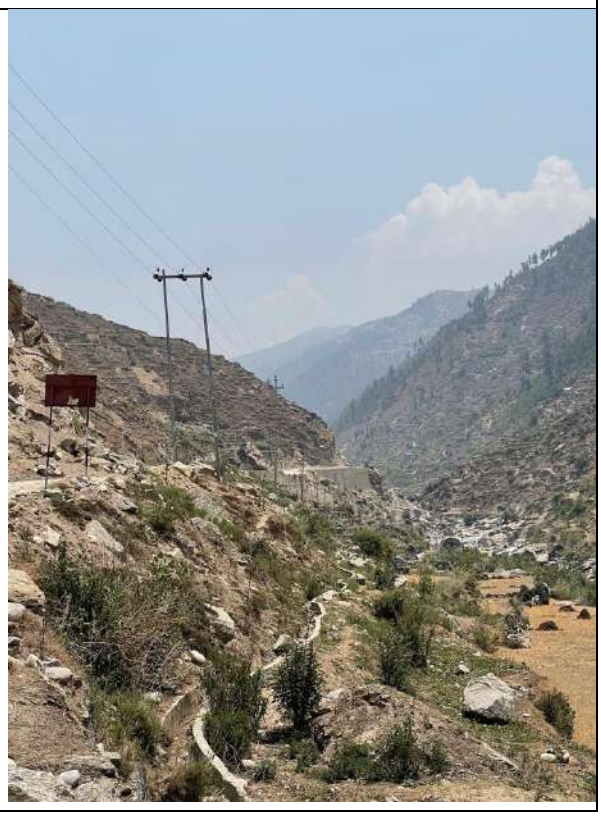
APPENDIX 3: PHOTOGRAPHS OF GENERAL ARRANGEMENTS AND EXISTING LINES VISITED

General Arrangement of 11 kV and LT Structure (bare and covered)

GPS Map Camera
--,Karnali,Nepal
Karnali Highway, Karnali, Nepal
Lat 29°16'7.3565"N, Long 82°9'32.3370"E
17/06/24 18:01
895
24°C
2314.62 m

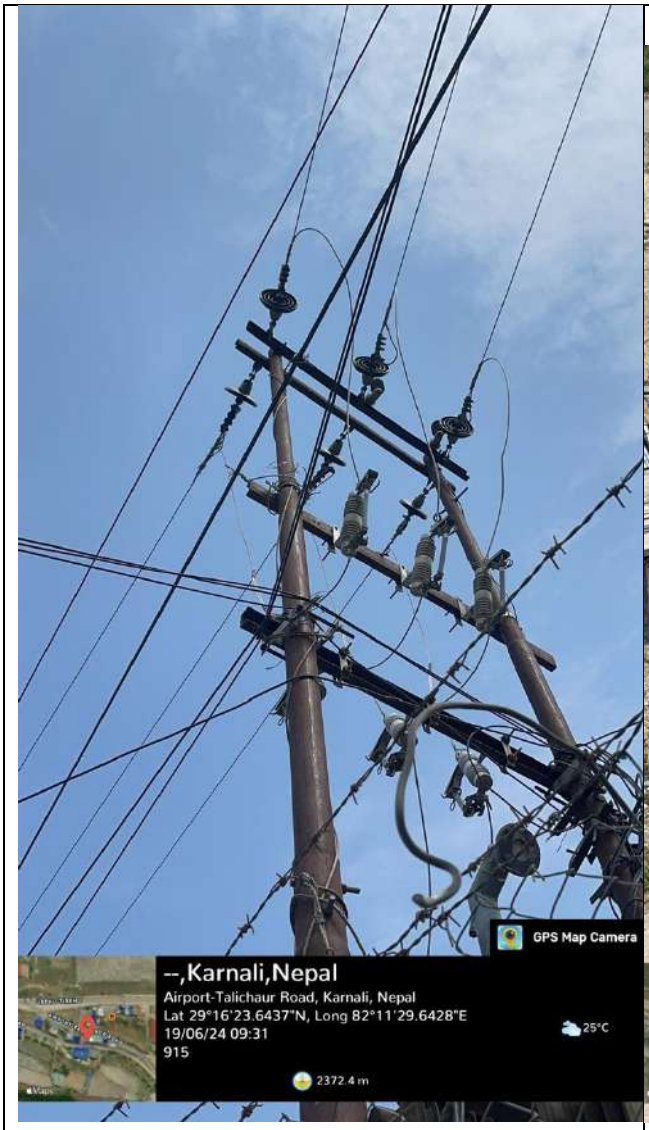

GPS Map Camera
--,Karnali,Nepal
H13, Karnali, Nepal
Lat 29°16'27.9136"N, Long 82°11'16.7355"E
18/06/24 08:47
902
23°C
2365.94 m



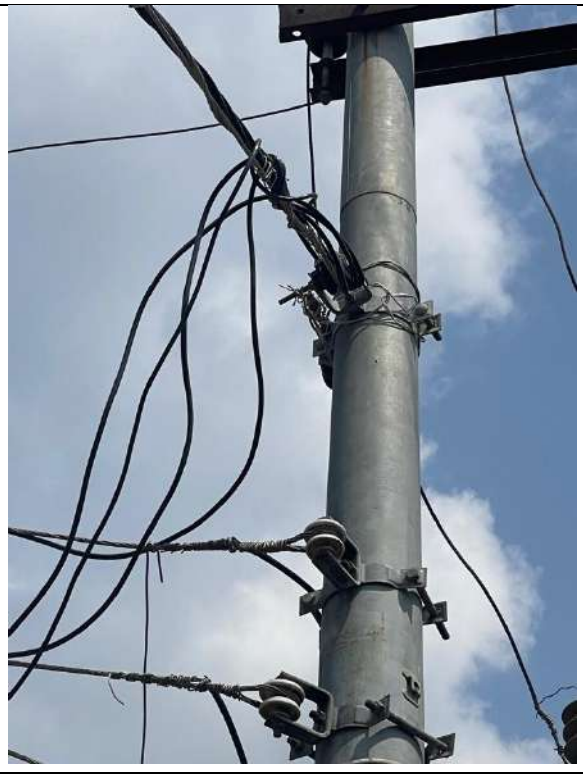


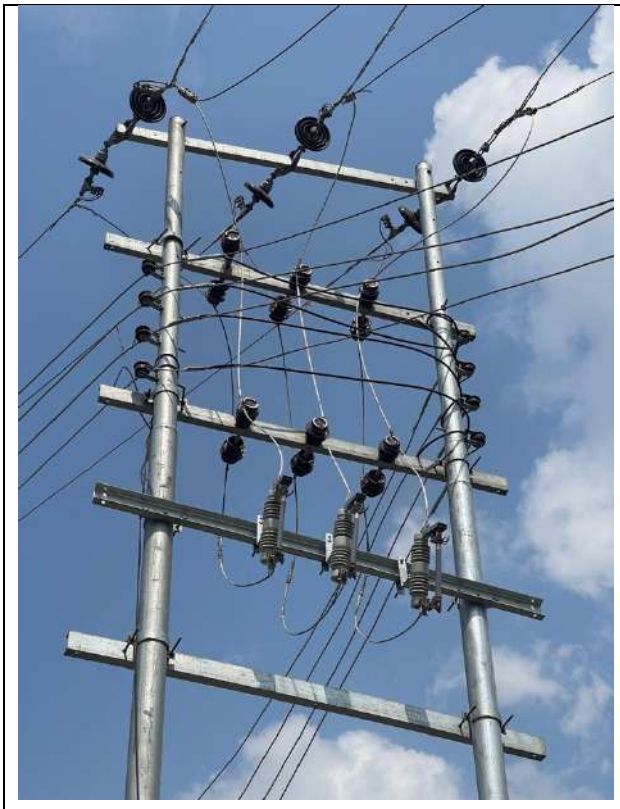
GPS Map Camera
--,Karnali,Nepal
Airport-Talichaur Road, Karnali, Nepal
Lat 29°16'21.6136"N, Long 82°11'33.3582"E
19/06/24 09:28
909
25°C
2370.75 m

GPS Map Camera
--,Karnali,Nepal
Airport-Talichaur Road, Karnali, Nepal
Lat 29°16'23.3038"N, Long 82°11'30.6599"E
19/06/24 09:30
912
25°C
2369.68 m


GPS Map Camera
--,Karnali,Nepal
Airport-Talichaur Road, Karnali, Nepal
Lat 29°16'23.6437"N, Long 82°11'29.6428"E
19/06/24 09:31
915
25°C
2372.4 m

GPS Map Camera
--,Karnali,Nepal
H13, Karnali, Nepal
Lat 29°16'25.1945"N, Long 82°11'22.8619"E
19/06/24 09:36
922
25°C
2371.67 m





GPS Map Camera
--,Karnali,Nepal
NH61, Karnali, Nepal
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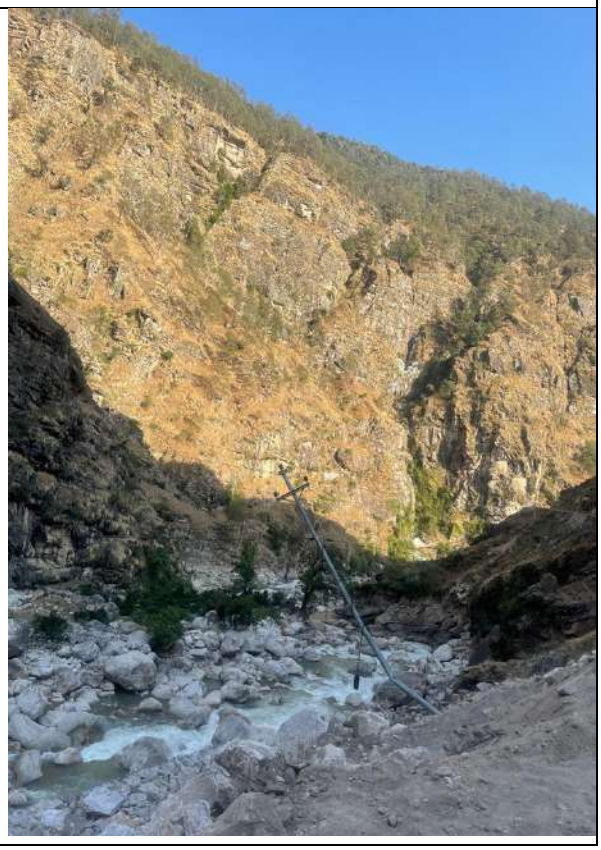
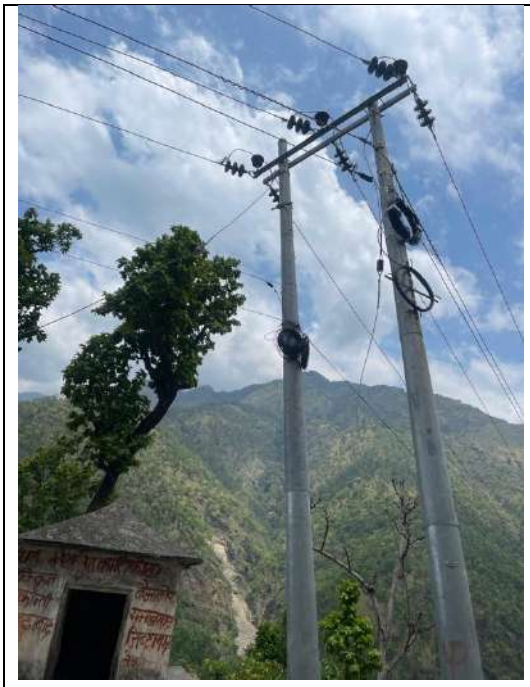
19/06/24 10:33
945
25°C
2339.66 m



--,Kamali,Nepal



Source: ADB's TA Consultant

APPENDIX 4: DETAILS OF SAMPLE 11kV AND LT LINES VISITED

TABLE A4-A: 11kV and LT LINES

Distribution Line and area name	Land Uses	Habitat Types	Topography and Ground Conditions	Settlements	Properties and sensitivities	Road	Surface Water	Groundwater	Vegetation Types	Trees, Forest and Sensitivities	Physical Cultural resources	General Environment Conditions	Land for Temporary Facilities	Design Considerations
LT new ABC in Ward 02 to Ward 03 Bheri, Rakam Kanali to Chandannath	Mix of New and Existing ROW along road, residential, arable and fallow cropland, grazing lands, scrubland Community forest land: (subject to confirmation during IEE finalisation)	Mix of modified and some natural habitat	Complex terrain, steep slope	Bheri, Rakam Kanali, Chandannath	Rural, remote village, scattered houses, line mostly passing crop lands	7 crossing -rural roads	None	None	Crop and natural vegetation	Some trees –Neem, Pine, Sal, etc; Tree felling envisaged, trimming required; alignment does not pass or close any to PA, Buffer Zone, etc.	National protected PCR – None (subject to confirmation during IEE finalisation) Local – None	Low noise levels, moderate to low level of visual dust	Limited as ROW passing though settlement/cropland areas and in complex terrain and rural footpath type road	Community forest, ecological and PCR screening during site specific assessment and EMP to be followed Consultations with locals/farmers before selection of line and work commences
11kV New CC and LT new ABC in Mofla Area – 11kV new CC and LT New ABC Mofla to Mofla, 11kV new CC and LT new ABC Mofla to Jogibada and Rema	Mostly New (in non-electrified village) along roads, arable and fallow cropland, grazing lands, scrubland, residential areas Community forest land: (subject to confirmation during IEE finalisation)	Modified and Natural habitat	Complex terrain; Steep slopes	Mofla, Badki	Rural, remote area, some isolated villages/scattered house, line mostly passing rural footpath/road and croplands	3-5 main road crossing	Hima River along crossing	None	Crop and few natural vegetation	Some trees –Pine, etc; Tree felling not envisaged, trimming may be required; alignment does not pass or close any to PA, Buffer Zone, etc.	National protected PCR – None (subject to confirmation during IEE finalisation) Local – Small local temples inside villages	Low noise levels, high level of visual dust	Limited in some sections as ROW passing though cropland areas and in complex terrain and rural roads	None Community forest, ecological and PCR screening during site specific assessment and EMP to be followed Consultations with locals before selection of line and work commences
Bangadkupinde-8 11kV 2.91km, 400 or 230 V 0.45km, and 3 trasnformers	New ROW in non-electrified village; along village roads/footp	Modified and Natural habitat	Complex terrain	Simleni, Mandanda, Lamdanda,	Rural, remote area, some isolated villages/scattered house, line mostly passing esrthern fair	1 main road crossing	None	None	Crop and few trees fodder trees and community forest	Some trees –Pinus roxburghii, Pinus wallichiana, Shorea robusta, etc; Tree felling not envisaged, trimming may be required (at	National protected PCR – None (Local – None	Low noise levels, low to moderate level of visual dust	Limited. ROW passing though cropland areas and in complex terrain and rural roads	None Community forest, ecological and PCR screening during site specific assessment and EMP to be followed

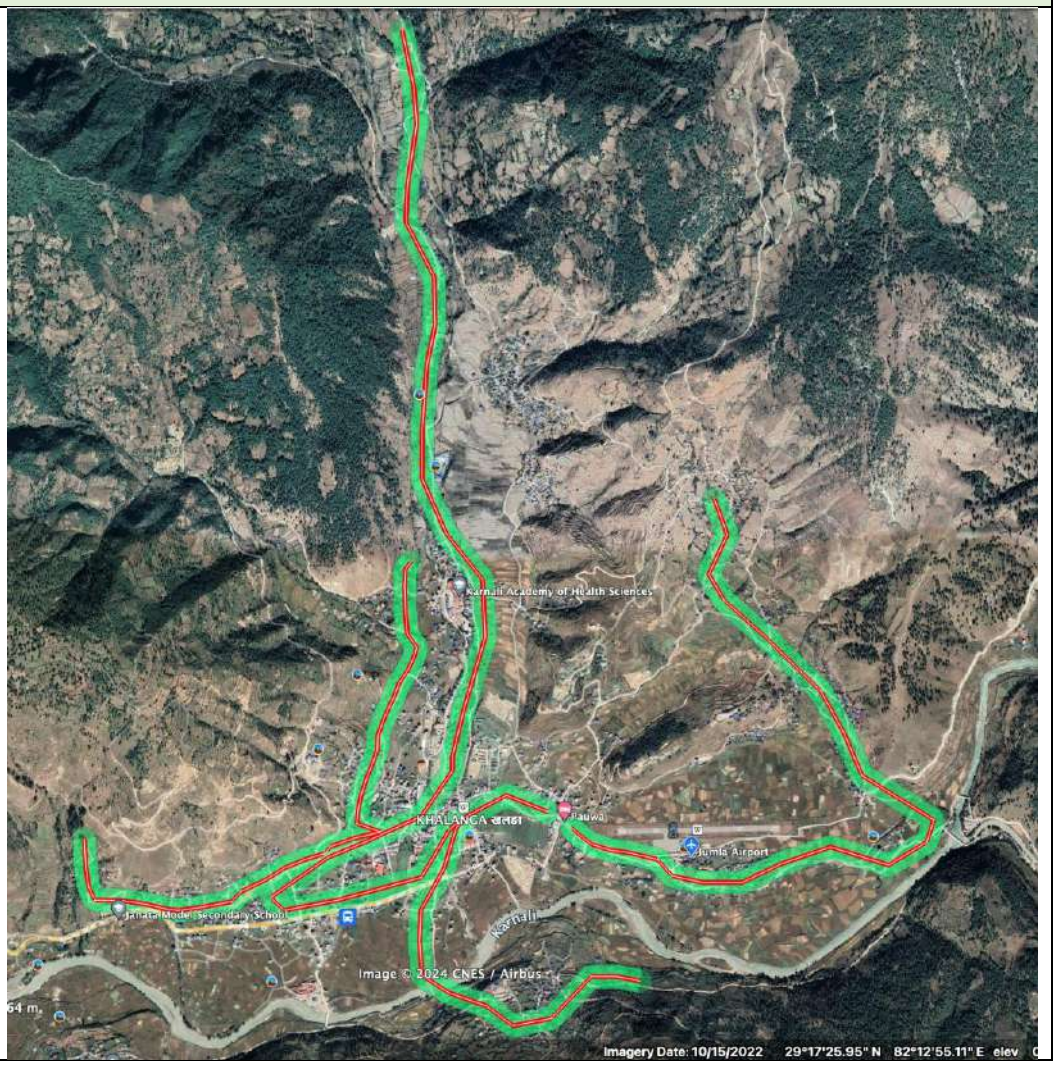
Distribution Line and area name	Land Uses	Habitat Types	Topography and Ground Conditions	Settlements	Properties and sensitivities	Road	Surface Water	Groundwater	Vegetation Types	Trees, Forest and Sensitivities	Physical Cultural resources	General Environment Conditions	Land for Temporary Facilities	Design Considerations
	aths, arable and fallow cropland, grazing lands, residential areas Community forest land near Mandanda:				weather roads, rural road and croplands					few locations); alignment does not pass or close any to PA, Buffer Zone, etc.				Consultations with locals before selection of line and work commences
11kV CC and LT ABC Rehabilitated/reconductoring Line in Jumla Town/Bazar area	Existing ROW along town roads, cropland, residential, commercial, education/ health facility Community forest land: (subject to confirmation during IEE finalisation)	Modified Habitat	Complex terrain	Jumla Town, Jumla Bazar, Jugada, Shantinagar	Town area, scattered house, line mostly passing settlement, congested/bust market areas town road. Jumla Airport - 10m; JR Karnali Boarding School – 10m; Shree Karnali Secondary School-50m; Karnali Academy of health Science-50m; Jehovah Sammah Prayer House-30m; District Health Office- 25m; Shree Chandannath Higher Secondary School -40m; Asia International Model School – 25m; Ratna Chudeshwor Secondary school- 50m	Multiple main road crossing	Jugada River crossing; Karnali River crossing	None in ROW. Borewells present in settlement areas	Crops, fruits in orchard, shrubland and private trees in some section of the PAI	Oak, Rhododendron, guava are dominant species. Tree cutting not envisaged, although trimming envisaged. Alignment does not pass or close any to PA, Buffer Zone, etc.	National protected PCR – None (subject to confirmation during IEE finalisation) Local – Jumla Church-5m; Buddhamasta Temple/Monastery; Thinke Temple -49m, Chandannath Temple-52m	Low to moderate noise levels, high level in market areas, moderate level of visual dust; solid waste dumps in ROW along busy areas, drains clogged	High constraint in busy town area. Some section of ROW passing though narrow steep roads in complex terrain	Community forest, ecological and PCR screening during site specific assessment and EMP to be followed Consultations with locals/farmers before selection of line and work commences. Adjust school timings and adequate community H&S measures as per EMP. Traffic management along alignment during conductoring; Care to be taken not to impact other overhead utilities present.
11kV bare to CC and rehabilitate and LT line bare to ABC LT and rehabilitate - Chandannath to Ward-6	Existing ROW along town roads, residential, commercial Community forest land:	Modified Habitat	Complex terrain	Chandannath, Bijaynagar, Chinna	Mostly rural area, scattered house, ROW mostly passing settlement, areas town along road.	8 main road crossing	Canal crossing and adjacent to ROW	None	Crops, shrubs, trees	Guava, Neem, Oak, Pine, Sal trees. Trimming envisaged but not felling. Alignment does not pass or close any to PA, Buffer Zone, etc.	National protected PCR – None (subject to confirmation during IEE finalisation)	Low to moderate noise levels, moderate level of visual dust; solid waste dumps along road	High constraint in busy town area. Some section of ROW passing though narrow steep roads in complex terrain	Community forest, ecological and PCR screening during site specific assessment and EMP to be followed Consultations with locals/farmers before selection of line and work commences. Adequate community H&S

Distribution Line and area name	Land Uses	Habitat Types	Topography and Ground Conditions	Settlements	Properties and sensitivities	Road	Surface Water	Groundwater	Vegetation Types	Trees, Forest and Sensitivities	Physical Cultural resources	General Environment Conditions	Land for Temporary Facilities	Design Considerations
	(subject to confirmation during IEE finalisation)										Local – None			measures as per EMP. Traffic management along alignment during conductoring; Care to be taken not to impact other overhead utilities present.

Source: ADB's TA Consultant

APPENDIX 5: MAPS OF INDICATIVE ROUTES

11kV and LT Lines = Red Polyline
PAI (50m buffer each side of distribution line) = Green Overlay
PAI Buffer Overlay created using University of New Hampshire 'KML Tools'
(https://ceinfo.unh.edu/kmltools/index.cfm)

Distribution line surveyed	Indicative Alignment Map
11kV CC and LT ABC Rehabilitated/reconductoring Line in Jumla Town/Bazar area	

Distribution line surveyed	Indicative Alignment Map
11kV bare to CC and rehabilitate and LT line bare to ABC LT and rehabilitate - Chandannath to Ward-6	

Distribution line surveyed	Indicative Alignment Map
LT ABC new and rehabilitation Khadachakra , Ward 4 area	 NL Map Source: https://www.protectedplanet.net/555569933, Analysis using QGIS

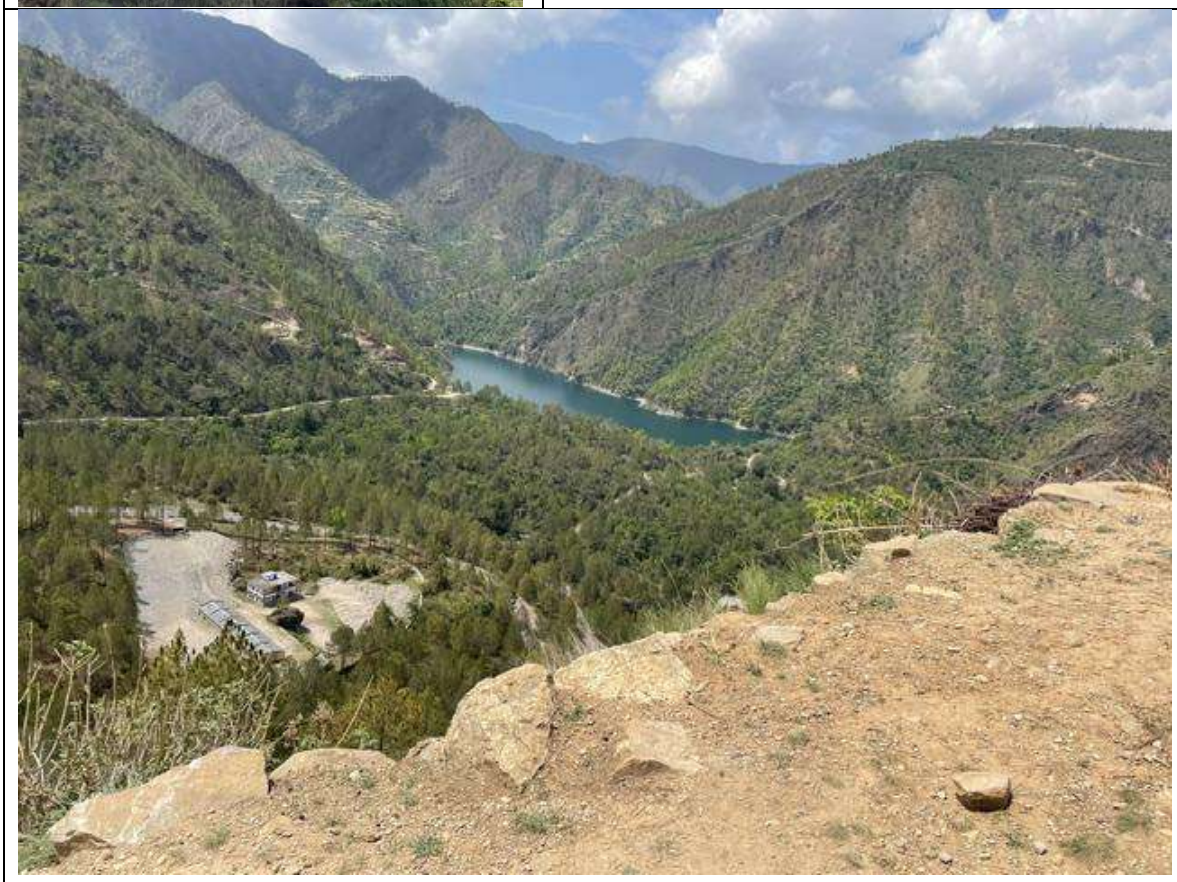
Source: ADB's TA Consultant

APPENDIX 6: FLORA AND FAUNA PHOTOLOG

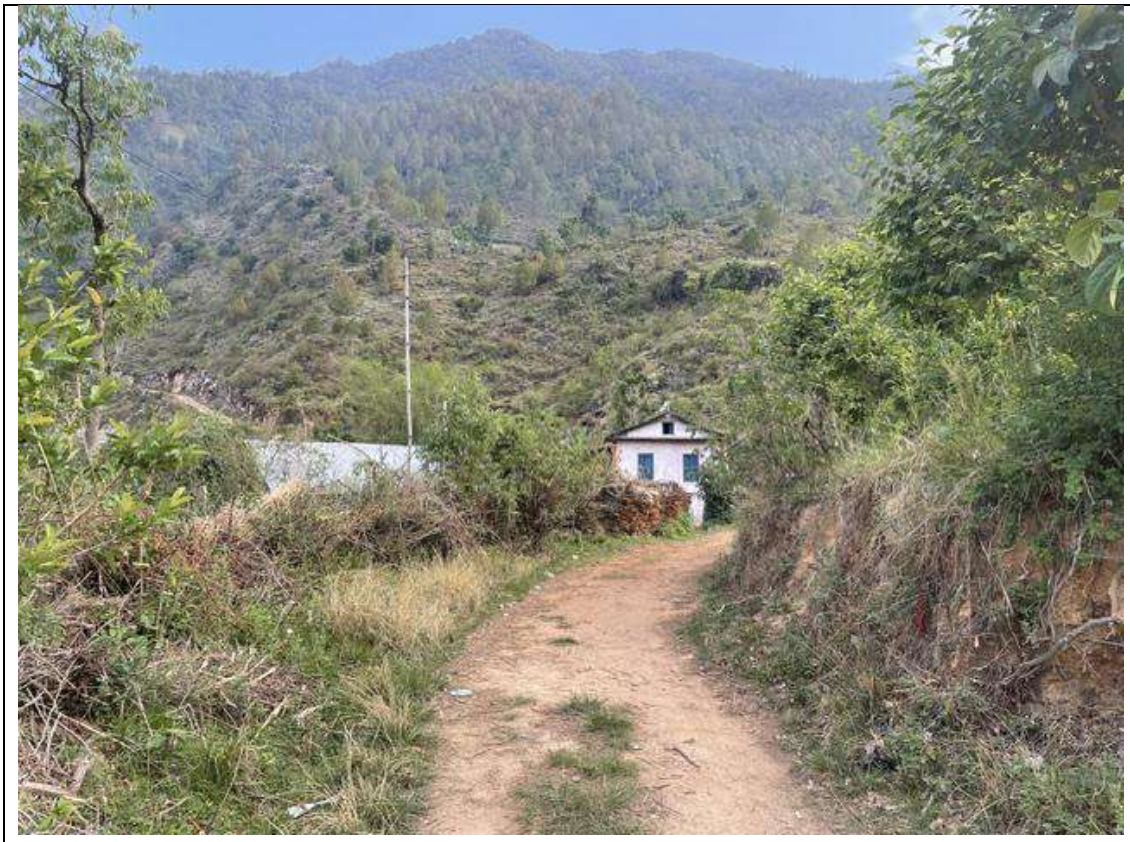
Photographs of vegetation of Nepal/Karnali observed during site visits

Vegetation in Forested Land in Jumla DL RoW

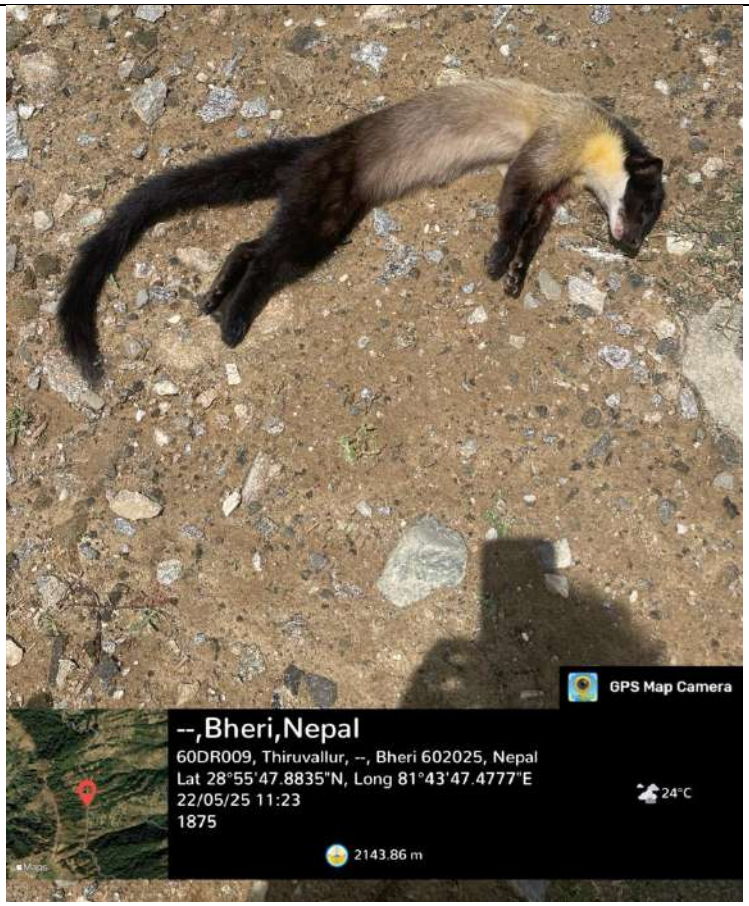
RoW in Jumla in non Forested Land



Vegetation and landscape along ROW of Kupinde Daha, Bangaadkupinde Salyan



Vegetation, crops and Access Road in new 11kV and LT line in Sharda, Salyan Area



Yellow-Throated Matrin (*Martes flavigula) (IUCN LC), carcass (likely roadkill, but with small puncture marks in throat),* Observed in Bheri

Barking deer, or Northern Red Muntjac (*Muntiacus vaginalis*), (IUCN -LC) observed in DFO office in Jumla (was taken away by villager and kept as pet, rescued)

Cubs of Common leopard (*Panthera pardus*) (IUCN-VU), - Female Leopard poisoned by Villagers in Jumla. Cubs rescued and kept in DFO office.

Source: ADB's TA Consultant

APPENDIX 7: CONSULTATION RECORDS

(REFER TABLE 6.2 OF IEE)

PARTICIPANT DETAILS
Date: 17.06.2024
Components In Area: 11kV and LT lines) - bare to CC /ABC rehabilitation, alignment
Municipality / Rural Municipality of Respondent's Residence: Gora, Sinja Line, Jumla, Kalikot, along road - passes settlement, hills/valleys, some house and shop entry inside ROW
No. of Participants: 10
Gender of Respondent: Female 0 Male 10
Age of Respondent: 23-52
Main Livelihood (Occupation): Agriculture
Secondary Livelihoods: Shop
Number of family members living under the same roof (as a single household): average 4-5 per family
Do you or any of your family members fall into any of the following vulnerable groups?: All having children and senior citizens

Does your or any of your family members livelihood depend on the forest? No.

How is Your and Your Family Members Underlying Health? Good

Awareness of the Project Prior to this Consultation:
Not At All Aware: 100% Slightly Aware Very Aware

LAND USE, LIVELIHOODS, AND SENSITIVE COMMUNITY RECEPTORS
Where is your residence and/or land located in relation to the following project locations:

	Residence/ Shop	Land	Remarks
In the vicinity of the 11kV/LT line ROW	Yes	None	Lines passing along houses, cropland
In vicinity of new SS	None	None	None

Are you Concerned about Land Use being Adversely Impacted By The Project?
Yes: No 100% Don't Know:
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider to Mitigate Impacts, noting that compensation will be paid for land acquisition and resettlement:[7] None

Other than in relation to land acquisition and resettlement, are you concerned that the project would cause: None

Are you aware of any sensitive community receptors that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Receptor	Remarks Potential Impact/Suggested Mitigation
Community Farmland	Yes line over cropland
Community Forest	None
Nursery or School	None
Clinic, Health Center, or Hospital	None
Religious Building (temple, shrine, etc.)	None
Footpath or track	Yes
Others	None

BIODIVERSITY

[7] Under Land Use Consider Damage to Crops, Structures, Trees etc. but also Landscape/Visual Impacts

Are you aware of any legally protected areas or other sensitive ecological habitat that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Legally Protected Area or Sensitive Ecological Habitat	Location	Remarks Potential Impact/ Suggested Mitigation
None identified to be nearby	None	None

Is any biodiversity supported by the local area of social, economic, or cultural importance to your local community (e.g. fisheries, forests)?
Yes -fishery and forest

Does you livelihood depend on wild animals within the construction and reservoir area, whether used for personal consumption or commercial purposes?
No

Does you livelihood depend on harvest of wild (not cultivated) plants including trees/timber, whether for personal consumption (heating, cooking, food, medicinal, religious) or commercial purposes, directly from the construction and reservoir area? Yes
Yes- medicinal plans, fodder, fuel wood, house building materials

With reference to the photo guide provided, are you aware of any of these threated wild animal or plant species being present in the construction and reservoir area? None
If yes, please elaborate on location: None

Are you Concerned about Wild Animals and Plants being Adversely Impacted By The Project? No.

PHYSICAL CULTURAL RESOURCES

Are you Concerned about Physical Cultural Resources being Adversely Impacted By The Project?
No

Are you aware of any Physical Cultural Resources of either national or local importance (e.g. temples, shrines, religious forests, sacred groves or trees, heritage trees, cremation places etc.) that may be directly or indirectly adversely impacted by the Project, please identify their location on map provided whenever possible?

Name of Physical Cultural Resource	Location	Remarks Potential Impact/ Suggested Mitigation
None		

HUMAN ENVIRONMENT

Are you aware of any of the following having occurred in the local area?
Earthquakes Yes Landslides Yes Storms Yes
Flooding Yes Drought No (but scarcity present) Forest Fire Yes

Are you aware that, if not well managed, there may be safety risks associated with civil construction of the project?
Yes No Don't Know 100%
Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider Increasing Awareness: None

Are you aware that, if not well managed, there may be safety risks associated with operation of the project/electrical infrastructure?
Yes 0% No 100% Don't Know 0%

Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider Increasing Awareness: None

Are you Concerned about the Overall Community Health and Safety Impacts of the Project?:
Yes No 100% Don't Know 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider Mitigating Impacts:
None

Do You Believe that Once NEA have met National Regulations the following Impacts and Risks from the Project during Construction Are?
Influx of construction workers from outside the local area and/or Nepal during the construction period:
Intolerable Tolerable Don't Know 100%
Accommodation of construction workers in local communities:
Intolerable 0% Tolerable Don't Know 100%
Interaction of community members with construction workers:
Intolerable 0% Tolerable 0% Don't Know 100%
Interaction of community members with construction traffic:
Intolerable 0% Tolerable 0% Don't Know 100%
If intolerable to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts/Make a Risk More Acceptable: None

Do You Believe that Once NEA have met National Regulations the Impacts and Risks from the Project during Operation Are?
How would you qualify:
The existing noise level in the area?
Very Quiet 0% Quiet 100% Noisy 0% Very Noisy 0%
The existing air quality (dust levels) in the area?
Very Dirty 50% Dirty 50% Clean 0% Very Clean 0%
The availability of water resources for drinking, washing etc.
Very Poor 0% Poor 90% Good 10% Very Good 0%
The existing surface water quality in the area?
Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%
The existing ground water quality in the area?
Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%
Solid and hazardous waste management in the area is?
Very Poor 0% Poor 0% Good 100% Very Good 0%
The existing road traffic in the area?
Very Busy 0% Busy 0% Quiet 0% Very Quiet 100%

What are the main sources of existing pollution in the local area?
None

Do you think the project could, either temporarily during construction or permanently during operation:
Increase existing noise levels in the area?
Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%
Decrease existing air quality (dust) in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase pressure on availability water resources for drinking, washing etc.
Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%
Decrease existing surface water quality in the area?

Yes: Intolerable 0% Yes: Tolerable 0% No 100% Don't Know 0%

Decrease existing ground water quality in the area?
Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%
Increase solid and hazardous waste in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%
Increase existing road traffic in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

If yes to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider Mitigating These Impacts: None

Do you and your family have:

Socioeconomic Condition	Remarks
Access to electricity from national grid	No
Access to electricity from an off-grid system (solar panel, etc.)	Yes. Individual solar panel
Access to drinking water from home tap	30%
Access to drinking water from public well	0%
Access to drinking water from waterbody	100%
Access to clean sanitation facilities (toilet)	100%
Connection to sewerage system	0%
Access to health care close to home	100% to primary health care
Access to public transportation system close to home (e.g. bus route)	20%
Access to private transportation system (motorbike, car, etc.)	0%

How Do You Believe Socioeconomic Conditions Will Be Impacted By The Project?
Positively 100% Negatively 0% Don't know 0%

Elaborate on Potential Socioeconomic Impacts and Detail Measures the Project Can Consider to Mitigating Any Negative Impacts: None

Do You Believe the Project would Impact Transport Connectivity in Your Area, including transport by foot or by vehicle?
Positively 0% Negatively 0% Don't know 100%
Elaborate on Potential Impacts on Transport Connectivity and Detail Measures the Project Can Consider to Mitigate Any Negative Impacts: None

GENERAL

General Support for the Project:
Not Supportive 0% Neutral 0%
Slightly Supportive 0% Very Supportive 100%

Further Suggestions to Project on Environment, Health and Safety Impacts to be Considered Further and Measures that Could be Incorporated to Mitigate Them.

- Some electrocution reported in villages
- Happy to support the project
- Road needs to be improved

PARTICIPANT DETAILS
Date: 18.06.2024
Components In Area: 11kV and LT lines) – new and bare to CC /ABC rehabilitation
Municipality / Rural Municipality of Respondent's Residence: Rural; Mofla, Jumla area, along road -passes settlement, hills/valleys, some house and shop entry inside ROW
No. of Participants: 03
Gender of Respondent: Female 0 Male 03
Age of Respondent: 31-55
Main Livelihood (Occupation): Agriculture
Secondary Livelihoods: None
Ethnicity: all tribal
Number of family members living under the same roof (as a single household): average 3-4 per family
Do you or any of your family members fall into any of the following vulnerable groups?: with children and parents

Does your or any of your family members livelihood depend on the forest? No.

How is Your and Your Family Members Underlying Health? Good

Awareness of the Project Prior to this Consultation:
Not At All Aware: 100% Slightly Aware Very Aware

LAND USE, LIVELIHOODS, AND SENSITIVE COMMUNITY RECEPTORS
Where is your residence and/or land located in relation to the following project locations:

	Residence/ Shop	Land	Remarks
In the vicinity of the 11kV/LT line ROW	Yes	None	Lines passing along houses, cropland
In vicinity of new SS	None	None	None

Are you Concerned about Land Use being Adversely Impacted By The Project?
Yes:0% No 0% Don't Know: 100%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider to Mitigate Impacts, noting that compensation will be paid for land acquisition and resettlement:[8] None

- No issues with poles in cropland

Other than in relation to land acquisition and resettlement, are you concerned that the project would cause: None

Are you aware of any sensitive community receptors that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Receptor	Remarks Potential Impact/Suggested Mitigation
Community Farmland	Yes line over cropland
Community Forest	None
Nursery or School	None
Clinic, Health Center, or Hospital	None
Religious Building (temple, shrine, etc.)	None
Footpath or track	Yes
Others	None

BIODIVERSITY

[8] Under Land Use Consider Damage to Crops, Structures, Trees etc. but also Landscape/Visual Impacts

Are you aware of any legally protected areas or other sensitive ecological habitat that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible: No

Legally Protected Area or Sensitive Ecological Habitat	Location	Remarks Potential Impact/ Suggested Mitigation
Ghotiputal Community Forest	Adjacent to Village	None

Is any biodiversity supported by the local area of social, economic, or cultural importance to your local community (e.g. fisheries, forests)?
Yes -fishery and forest

Does you livelihood depend on wild animals within the construction and reservoir area, whether used for personal consumption or commercial purposes? No

Does you livelihood depend on harvest of wild (not cultivated) plants including trees/timber, whether for personal consumption (heating, cooking, food, medicinal, religious) or commercial purposes, directly from the construction and reservoir area? Yes

- Forest use- Cooking fuel, house construction, fodder, medicinal plants

With reference to the photo guide provided, are you aware of any of these threated wild animal or plant species being present in the construction and reservoir area?

- Bear, Fox, Small and large sized monkeys, wild boar. Monkey, Bears and wild boar incidents are during crop ripening season

If yes, please elaborate on location: in and around forest, cropland

Are you Concerned about Wild Animals and Plants being Adversely Impacted By The Project? No.

PHYSICAL CULTURAL RESOURCES

Are you Concerned about Physical Cultural Resources being Adversely Impacted By The Project? No

Are you aware of any Physical Cultural Resources of either national or local importance (e.g. temples, shrines, religious forests, sacred groves or trees, heritage trees, cremation places etc.) that may be directly or indirectly adversely impacted by the Project, please identify their location on map provided whenever possible?

Name of Physical Cultural Resource	Location	Remarks Potential Impact/ Suggested Mitigation
None		

HUMAN ENVIRONMENT

Are you aware of any of the following having occurred in the local area?

Earthquakes	Yes	Landslides	Yes	Storms	No
Flooding	Yes	Drought	Yes	Forest Fire	Yes

Are you aware that, if not well managed, there may be safety risks associated with civil construction of the project?
Yes No Don't Know 100%
Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider Increasing Awareness: None

Are you aware that, if not well managed, there may be safety risks associated with operation of the project/electrical infrastructure?
Yes 0% No 100% Don't Know 0%

Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider Increasing Awareness: None

Are you Concerned about the Overall Community Health and Safety Impacts of the Project?:
Yes No 100% Don't Know 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider Mitigating Impacts:
None

Do You Believe that Once NEA have met National Regulations the following Impacts and Risks from the Project during Construction Are?
Influx of construction workers from outside the local area and/or Nepal during the construction period:
Intolerable Tolerable 100% Don't Know 0%
Accommodation of construction workers in local communities:
Intolerable 0% Tolerable 100% Don't Know 0%
Interaction of community members with construction workers:
Intolerable 0% Tolerable 0% Don't Know 100%
Interaction of community members with construction traffic:
Intolerable 0% Tolerable 0% Don't Know 100%
If intolerable to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts/Make a Risk More Acceptable: None

Do You Believe that Once NEA have met National Regulations the Impacts and Risks from the Project during Operation Are?
How would you qualify:
The existing noise level in the area?
Very Quiet 0% Quiet 100% Noisy 0% Very Noisy 0%
The existing air quality (dust levels) in the area?
Very Dirty 50% Dirty 50% Clean 0% Very Clean 0%
The availability of water resources for drinking, washing etc.
Very Poor 0% Poor 90% Good 10% Very Good 0%
The existing surface water quality in the area?
Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%
The existing ground water quality in the area?
Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%
Solid and hazardous waste management in the area is?
Very Poor 0% Poor 0% Good 100% Very Good 0%
The existing road traffic in the area?
Very Busy 0% Busy 0% Quiet 0% Very Quiet 100%

What are the main sources of existing pollution in the local area?
Dusty roads

Do you think the project could, either temporarily during construction or permanently during operation:
Increase existing noise levels in the area?
Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%
Decrease existing air quality (dust) in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase pressure on availability water resources for drinking, washing etc.
Yes: Intolerable 60% Yes: Tolerable 0% No 0% Don't Know 40%
Decrease existing surface water quality in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Decrease existing ground water quality in the area?

Yes: Intolerable 60% Yes: Tolerable 0% No 0% Don't Know 40%

Increase solid and hazardous waste in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase existing road traffic in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

If yes to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider Mitigating These Impacts: None

Do you and your family have:

Socioeconomic Condition	Remarks
Access to electricity from national grid	Yes
Access to electricity from an off-grid system (solar panel, etc.)	No
Access to drinking water from home tap	100%
Access to drinking water from public well	0%
Access to drinking water from waterbody	100%
Access to clean sanitation facilities (toilet)	100%
Connection to sewerage system	0%
Access to health care close to home	100% to primary health care
Access to public transportation system close to home (e.g. bus route)	100%
Access to private transportation system (motorbike, car, etc.)	10%

How Do You Believe Socioeconomic Conditions Will Be Impacted By The Project?

Positively 100% Negatively 0% Don't know 0%

Elaborate on Potential Socioeconomic Impacts and Detail Measures the Project Can Consider to Mitigating Any Negative Impacts: None

Do You Believe the Project would Impact Transport Connectivity in Your Area, including transport by foot or by vehicle?

Positively 100% Negatively 0% Don't know 0%

Elaborate on Potential Impacts on Transport Connectivity and Detail Measures the Project Can Consider to Mitigate Any Negative Impacts: None

GENERAL

General Support for the Project:

Not Supportive 0% Neutral 0%

Slightly Supportive 0% Very Supportive 100%

Further Suggestions to Project on Environment, Health and Safety Impacts to be Considered Further and Measures that Could be Incorporated to Mitigate Them.

- No issues with poles in cropland
- GRM and consultations are most welcome and will be utilized if required
- Water scarcity in the area; and has to be fetched from far away – provide taps
- Forest use- Cooking fuel, house construction, fodder, medicinal plants – improved electricity will reduce burden on forest
- Monkey, Bears and wild boar incidents/damage are during crop ripening season

PARTICIPANT DETAILS
Date: 18.06.2024
Components In Area: 11kV and LT lines) – new and bare to CC /ABC rehabilitation
Municipality / Rural Municipality of Respondent's Residence: Rural, Bagbajar, Jumla area, along road -passes settlement, hills/valleys, some house and shop entry inside ROW.
No. of Participants: 07
Gender of Respondent: Female 03 Male 04
Age of Respondent: 24-65
Main Livelihood (Occupation): Agriculture
Secondary Livelihoods: None
Ethnicity: Tribal mix
Number of family members living under the same roof (as a single household): average 4-5 per family
Do you or any of your family members fall into any of the following vulnerable groups?: Children and Senior Citizens

Does your or any of your family members livelihood depend on the forest? No.

How is Your and Your Family Members Underlying Health? Good

Awareness of the Project Prior to this Consultation:
Not At All Aware: 100% Slightly Aware Very Aware

LAND USE, LIVELIHOODS, AND SENSITIVE COMMUNITY RECEPTORS
Where is your residence and/or land located in relation to the following project locations:

	Residence/ Shop	Land	Remarks
In the vicinity of the 11kV/LT line ROW	Yes	None	Lines passing along houses, cropland
In vicinity of new SS	None	None	None

Are you Concerned about Land Use being Adversely Impacted By The Project?
Yes:0% No 0% Don't Know: 100%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider to Mitigate Impacts, noting that compensation will be paid for land acquisition and resettlement:[9] None

Other than in relation to land acquisition and resettlement, are you concerned that the project would cause: None

Are you aware of any sensitive community receptors that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Receptor	Remarks Potential Impact/Suggested Mitigation
Community Farmland	Yes line over cropland
Community Forest	None
Nursery or School	None
Clinic, Health Center, or Hospital	None
Religious Building (temple, shrine, etc.)	None
Footpath or track	Yes
Others	None

BIODIVERSITY

[9] Under Land Use Consider Damage to Crops, Structures, Trees etc. but also Landscape/Visual Impacts

Are you aware of any legally protected areas or other sensitive ecological habitat that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible: No

Legally Protected Area or Sensitive Ecological Habitat	Location	Remarks Potential Impact/ Suggested Mitigation
None in area		None

Is any biodiversity supported by the local area of social, economic, or cultural importance to your local community (e.g. fisheries, forests)?
Yes -fishery and forest

Does you livelihood depend on wild animals within the construction and reservoir area, whether used for personal consumption or commercial purposes? No

Does you livelihood depend on harvest of wild (not cultivated) plants including trees/timber, whether for personal consumption (heating, cooking, food, medicinal, religious) or commercial purposes, directly from the construction and reservoir area? Yes; Forest use- Cooking fuel, house construction, fodder, medicinal plants

With reference to the photo guide provided, are you aware of any of these threated wild animal or plant species being present in the construction and reservoir area? - Vultures

If yes, please elaborate on location: in and around village

Are you Concerned about Wild Animals and Plants being Adversely Impacted By The Project? No.

PHYSICAL CULTURAL RESOURCES

Are you Concerned about Physical Cultural Resources being Adversely Impacted By The Project? No

Are you aware of any Physical Cultural Resources of either national or local importance (e.g. temples, shrines, religious forests, sacred groves or trees, heritage trees, cremation places etc.) that may be directly or indirectly adversely impacted by the Project, please identify their location on map provided whenever possible?

Name of Physical Cultural Resource	Location	Remarks Potential Impact/ Suggested Mitigation
None		

HUMAN ENVIRONMENT

Are you aware of any of the following having occurred in the local area?

Earthquakes	No	Landslides	yes	Storms	No
Flooding	No	Drought	No	Forest Fire	Yes

Are you aware that, if not well managed, there may be safety risks associated with civil construction of the project?
Yes No Don't Know 100%
Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider Increasing Awareness: None

Are you aware that, if not well managed, there may be safety risks associated with operation of the project/electrical infrastructure?
Yes 0% No 100% Don't Know 0%
Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider Increasing Awareness: None

Are you Concerned about the Overall Community Health and Safety Impacts of the Project?:
Yes No 100% Don't Know 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider Mitigating Impacts:
None

Do You Believe that Once NEA have met National Regulations the following Impacts and Risks from the Project during Construction Are?
Influx of construction workers from outside the local area and/or Nepal during the construction period:
Intolerable Tolerable 100% Don't Know 0%
Accommodation of construction workers in local communities:
Intolerable 0% Tolerable 0% Don't Know 100%
Interaction of community members with construction workers:
Intolerable 0% Tolerable 100% Don't Know 0%
Interaction of community members with construction traffic:
Intolerable 0% Tolerable 100% Don't Know 0%
If intolerable to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts/Make a Risk More Acceptable: None

Do You Believe that Once NEA have met National Regulations the Impacts and Risks from the Project during Operation Are?
How would you qualify:
The existing noise level in the area?
Very Quiet 0% Quiet 100% Noisy 0% Very Noisy 0%
The existing air quality (dust levels) in the area?
Very Dirty 0% Dirty 50% Clean 50% Very Clean 0%
The availability of water resources for drinking, washing etc.
Very Poor 0% Poor 100% Good 0% Very Good 0%
The existing surface water quality in the area?
Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%
The existing ground water quality in the area?
Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%
Solid and hazardous waste management in the area is?
Very Poor 0% Poor 0% Good 100% Very Good 0%
The existing road traffic in the area?
Very Busy 0% Busy 0%Quiet 0% Very Quiet 100%

What are the main sources of existing pollution in the local area?
None

Do you think the project could, either temporarily during construction or permanently during operation:
Increase existing noise levels in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%
Decrease existing air quality (dust) in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase pressure on availability water resources for drinking, washing etc.
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%
Decrease existing surface water quality in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%
Decrease existing ground water quality in the area?
Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%
Increase solid and hazardous waste in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase existing road traffic in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

If yes to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider Mitigating These Impacts: None

Do you and your family have:

Socioeconomic Condition	Remarks
Access to electricity from national grid	No
Access to electricity from an off-grid system (solar panel, etc.)	No (limited solar)
Access to drinking water from home tap	0%
Access to drinking water from public well	100%
Access to drinking water from waterbody	100%
Access to clean sanitation facilities (toilet)	0%
Connection to sewerage system	0%
Access to health care close to home	100% to basic primary health care
Access to public transportation system close to home (e.g. bus route)	0%
Access to private transportation system (motorbike, car, etc.)	0%

How Do You Believe Socioeconomic Conditions Will Be Impacted By The Project?

Positively 100% Negatively 0% Don't know 0%

Elaborate on Potential Socioeconomic Impacts and Detail Measures the Project Can Consider to Mitigating Any Negative Impacts: None

Do You Believe the Project would Impact Transport Connectivity in Your Area, including transport by foot or by vehicle?

Positively 100% Negatively 0% Don't know 0%

Elaborate on Potential Impacts on Transport Connectivity and Detail Measures the Project Can Consider to Mitigate Any Negative Impacts: None

GENERAL

General Support for the Project:

Not Supportive 0% Neutral 0%

Slightly Supportive 0% Very Supportive 100%

Further Suggestions to Project on Environment, Health and Safety Impacts to be Considered Further and Measures that Could be Incorporated to Mitigate Them.

- Power failure is hampering cooking (unable to use mixers, hot plates, etc.). Impacting business like saw mills -main livelihood of the area
- Child education using solar is not adequate
- Construct a motorable road connecting to the village (presently through narrow suspended bridge) to improve business. Footpaths are also broken, and bridges get damaged during rainy seasons.
- Major power failure with voltage drop during the evening in the villages of the area. Cooking and eating is mostly in the dark and very difficult
- Women have to walk 2-3 hours to the forest areas to collect firewood. If village is electrified, then this time will be saved and more time to do household works. Can use heaters/induction cookers if electrified
- Happy to hear about GRM and will use if required

PARTICIPANT DETAILS
Date: 18.06.2024
Components In Area: 11kV and LT lines) – new and bare to CC /ABC rehabilitation
Municipality / Rural Municipality of Respondent's Residence: Rural, Rugagaon, Bhadgaon, non-electrified village, along road -passes isolated settlement, croplands, some house inside ROW
No. of Participants: 05
Gender of Respondent: Female 00 Male 05
Age of Respondent: 30-65
Main Livelihood (Occupation): Agriculture
Secondary Livelihoods: None
Ethnicity: Tribal
Number of family members living under the same roof (as a single household): average 5-6 per family
Do you or any of your family members fall into any of the following vulnerable groups?: Senior citizen in family

Does your or any of your family members livelihood depend on the forest? No.

How is Your and Your Family Members Underlying Health? Good

Awareness of the Project Prior to this Consultation:
Not At All Aware: 0% Slightly Aware 100% Very Aware

LAND USE, LIVELIHOODS, AND SENSITIVE COMMUNITY RECEPTORS
Where is your residence and/or land located in relation to the following project locations:

	Residence/ Shop	Land	Remarks
In the vicinity of the 11kV/LT line ROW	Yes	None	Lines passing along cropland
In vicinity of new SS	None	None	None

Are you Concerned about Land Use being Adversely Impacted By The Project?
Yes:0% No 100% Don't Know: 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider to Mitigate Impacts, noting that compensation will be paid for land acquisition and resettlement:[10] None

Other than in relation to land acquisition and resettlement, are you concerned that the project would cause: None

Are you aware of any sensitive community receptors that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Receptor	Remarks Potential Impact/Suggested Mitigation
Community Farmland	Yes line over cropland
Community Forest	None
Nursery or School	None
Clinic, Health Center, or Hospital	None
Religious Building (temple, shrine, etc.)	None
Footpath or track	Yes
Others	None

BIODIVERSITY

Are you aware of any legally protected areas or other sensitive ecological habitat that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible: No

[10] Under Land Use Consider Damage to Crops, Structures, Trees etc. but also Landscape/Visual Impacts

Legally Protected Area or Sensitive Ecological Habitat	Location	Remarks Potential Impact/ Suggested Mitigation
None in area	None	None

Is any biodiversity supported by the local area of social, economic, or cultural importance to your local community (e.g. fisheries, forests)?
Yes -fishery and forest

Does you livelihood depend on wild animals within the construction and reservoir area, whether used for personal consumption or commercial purposes? No

Does you livelihood depend on harvest of wild (not cultivated) plants including trees/timber, whether for personal consumption (heating, cooking, food, medicinal, religious) or commercial purposes, directly from the construction and reservoir area? Yes

- Forest use- Cooking fuel, house construction, fodder, medicinal plants

With reference to the photo guide provided, are you aware of any of these threated wild animal or plant species being present in the construction and reservoir area? None

If yes, please elaborate on location: in and around forest

Are you Concerned about Wild Animals and Plants being Adversely Impacted By The Project? No.

PHYSICAL CULTURAL RESOURCES

Are you Concerned about Physical Cultural Resources being Adversely Impacted By The Project? No

Are you aware of any Physical Cultural Resources of either national or local importance (e.g. temples, shrines, religious forests, sacred groves or trees, heritage trees, cremation places etc.) that may be directly or indirectly adversely impacted by the Project, please identify their location on map provided whenever possible?

Name of Physical Cultural Resource	Location	Remarks Potential Impact/ Suggested Mitigation
None		

HUMAN ENVIRONMENT

Are you aware of any of the following having occurred in the local area?

Earthquakes	No	Landslides	Yes	Storms	No
Flooding	No	Drought	Yes	Forest Fire	Yes

Are you aware that, if not well managed, there may be safety risks associated with civil construction of the project?
Yes No Don't Know 100%
Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider Increasing Awareness: None

Are you aware that, if not well managed, there may be safety risks associated with operation of the project/electrical infrastructure?
Yes 0% No 100% Don't Know 0%
Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider Increasing Awareness: None

Are you Concerned about the Overall Community Health and Safety Impacts of the Project?:
Yes No 100% Don't Know 0%

If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider Mitigating Impacts:
None

Do You Believe that Once NEA have met National Regulations the following Impacts and Risks from the Project during Construction Are?
Influx of construction workers from outside the local area and/or Nepal during the construction period:
Intolerable Tolerable 0% Don't Know 100%
Accommodation of construction workers in local communities:
Intolerable 0% Tolerable 100% Don't Know 0%
Interaction of community members with construction workers:
Intolerable 0% Tolerable 0% Don't Know 100%
Interaction of community members with construction traffic:
Intolerable 0% Tolerable 100% Don't Know 0%
If intolerable to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts/Make a Risk More Acceptable: None

Do You Believe that Once NEA have met National Regulations the Impacts and Risks from the Project during Operation Are?
How would you qualify:
The existing noise level in the area?
Very Quiet 0% Quiet 100% Noisy 0% Very Noisy 0%
The existing air quality (dust levels) in the area?
Very Dirty 0% Dirty 100% Clean 0% Very Clean 0%
The availability of water resources for drinking, washing etc.
Very Poor 0% Poor 100% Good 0% Very Good 0%
The existing surface water quality in the area?
Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%
The existing ground water quality in the area?
Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%
Solid and hazardous waste management in the area is?
Very Poor 0% Poor 0% Good 100% Very Good 0%
The existing road traffic in the area?
Very Busy 0% Busy 0%Quiet 100% Very Quiet 0%

What are the main sources of existing pollution in the local area?
None

Do you think the project could, either temporarily during construction or permanently during operation:
Increase existing noise levels in the area?
Yes: Intolerable 0% Yes: Tolerable 0% No 100% Don't Know 0%

Decrease existing air quality (dust) in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase pressure on availability water resources for drinking, washing etc.
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%
Decrease existing surface water quality in the area?
Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%
Decrease existing ground water quality in the area?
Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%
Increase solid and hazardous waste in the area?
Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%

Increase existing road traffic in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

If yes to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider Mitigating These Impacts: None

Do you and your family have:

Socioeconomic Condition	Remarks
Access to electricity from national grid	No
Access to electricity from an off-grid system (solar panel, etc.)	No (limited solar)
Access to drinking water from home tap	0%
Access to drinking water from public well	0%
Access to drinking water from waterbody	100%
Access to clean sanitation facilities (toilet)	0%
Connection to sewerage system	0%
Access to health care close to home	100% to basic primary health care
Access to public transportation system close to home (e.g. bus route)	0%
Access to private transportation system (motorbike, car, etc.)	0%

How Do You Believe Socioeconomic Conditions Will Be Impacted By The Project?

Positively 100% Negatively 0% Don't know 0%

Elaborate on Potential Socioeconomic Impacts and Detail Measures the Project Can Consider to Mitigating Any Negative Impacts: None

Do You Believe the Project would Impact Transport Connectivity in Your Area, including transport by foot or by vehicle?

Positively 0% Negatively 0% Don't know 100%

Elaborate on Potential Impacts on Transport Connectivity and Detail Measures the Project Can Consider to Mitigate Any Negative Impacts: None

GENERAL

General Support for the Project:

Not Supportive 0% Neutral 0%

Slightly Supportive 0% Very Supportive 100%

Further Suggestions to Project on Environment, Health and Safety Impacts to be Considered Further and Measures that Could be Incorporated to Mitigate Them.

- Flour mills needs electricity, presently using manual methods or inadequate power- hampers business
- Schools need power to operate computers and internet
- Drinking water lifting is manually presently, electric pump is needs to meet demands
- Irrigation is hampered and water extraction using pumps is needed. Presently monsoon dependent cropping as water scarcity during other seasons.

PARTICIPANT DETAILS
Date: 19.06.2024
Components In Area: 11kV and LT lines) – new and bare to CC /ABC rehabilitation
Municipality / Rural Municipality of Respondent's Residence: Rural, Jumla bazar area, along road -passes settlement, croplands, some house/shops inside ROW
No. of Participants: 03
Gender of Respondent: Female 00 Male 03
Age of Respondent: 40-60
Main Livelihood (Occupation): Agriculture
Secondary Livelihoods: None
Ethnicity: Tribal
Number of family members living under the same roof (as a single household): average 4-6 per family
Do you or any of your family members fall into any of the following vulnerable groups?: Children and Parents

Does your or any of your family members livelihood depend on the forest? None
How is Your and Your Family Members Underlying Health? Good
Awareness of the Project Prior to this Consultation:
Not At All Aware: 0% Slightly Aware 0% Very Aware 100%

LAND USE, LIVELIHOODS, AND SENSITIVE COMMUNITY RECEPTORS
Where is your residence and/or land located in relation to the following project locations:

	Residence	Land	Remarks
In the vicinity of the 11kV/LT line ROW	100%	0%	Lines passing along/over hous/shops
In vicinity of proposed SS	0%	0%	None

Are you Concerned about Land Use being Adversely Impacted By The Project?
Yes: 100% No 0% Don't Know 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider to Mitigate Impacts, noting that compensation will be paid for land acquisition and resettlement:[11]
None

Are you aware of any sensitive community receptors that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Receptor	Remarks Potential Impact/ Suggested Mitigation
Community Farmland	Yes
Community Forest	None
Nursery or School	Yes
Clinic, Health Center, or Hospital	None
Religious Building (temple, shrine, heritage trees, etc.)	Yes
Footpath or track	Yes
Other … …	None

BIODIVERSITY

Are you aware of any legally protected areas or other sensitive ecological habitat that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Legally Protected Area or Sensitive Ecological Habitat	Location	Remarks Potential Impact/ Suggested Mitigation
None identified to be nearby	None	None

Is any biodiversity supported by the local area of social, economic, or cultural importance to your local community (e.g. fisheries, forests)?
None

[11] Under Land Use Consider Damage to Crops, Structures, Trees etc. but also Landscape/Visual Impacts

Does you livelihood depend on wild animals within the construction area, whether used for personal consumption or commercial purposes?
No

Does you livelihood depend on harvest of wild (not cultivated) plants including trees/timber, whether for personal consumption (heating, cooking, food, medicinal, religious) or commercial purposes, directly from the construction area? Forest use- Cooking fuel, house construction, fodder, medicinal plants

With reference to the photo guide provided, are you aware of any of these threated wild animal or plant species being present in the construction and area?
None
If yes, please elaborate on location:

Are you Concerned about Wild Animals and Plants being Adversely Impacted By The Project?
No

PHYSICAL CULTURAL RESOURCES
Are you Concerned about Physical Cultural Resources being Adversely Impacted By The Project?
No

Are you aware of any Physical Cultural Resources of either national or local importance (e.g. temples, shrines, religious forests, sacred groves or trees, heritage trees, cremation places etc.) that may be directly or indirectly adversely impacted by the Project, please identify their location on map provided whenever possible?

Name of Physical Cultural Resource	Location	Remarks Potential Impact/ Suggested Mitigation
Hindu Temple	Jumla bazar- beside RoW	Dust on temple

HUMAN ENVIRONMENT
Are you aware of any of the following having occurred in the local area?
Earthquakes Yes Landslides Yes Storms Yes
Flooding No Drought No

Are you aware that, if not well managed, there may be safety risks associated with civil construction of the project?
Yes 0% No 0% Don't Know 100%
Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider to Increase Awareness:
None

Are you aware that, if not well managed, there may be safety risks associated with operation of the project/electrical infrastructure?
Yes 100% No 0% Don't Know 0%
Please elaborate on Concerns and, if no, suggest any Measures the Project Can Consider to Increase Awareness:
- Works are requested to be extra careful or not done during 7am -10am as local children goes to school and 3pm-5pm return back. But they can take an alternate road if this blocked due to powerline installation
- Inform locals before work starts
- GRM is most welcome
- Sparks from DTR is observed occasionally and need

Are you Concerned about the Overall Community Health and Safety Impacts of the Project?:
Yes 100% No 0% Don't Know 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider Mitigating Impacts:
None

Do You Believe that Once NEA have met National Regulations the following Impacts and Risks from the Project during Construction Are?
Influx of construction workers from outside the local area and/or Nepal during the construction period:
Intolerable 0% Tolerable 100% Don't Know 0%
Accommodation of construction workers in local communities:
Intolerable 0% Tolerable 100% Don't Know 0%

Interaction of community members with construction workers:

Intolerable 0% Tolerable 100% Don't Know 0%

Interaction of community members with construction traffic:

Intolerable 0% Tolerable 100% Don't Know 0%

If intolerable to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts/Make a Risk More Acceptable:

Do You Believe that Once NEA have met National Regulations the Impacts and Risks from the Project during Operation Are?

How would you qualify:

The existing noise level in the area?

Very Quiet 0% Quiet 0% Noisy 100% Very Noisy 0%

The existing air quality (dust levels) in the area?

Very Dirty 0% Dirty 0% Clean 100% Very Clean 0%

The availability of water resources for drinking, washing etc.

Very Poor 0% Poor 100% Good 0% Very Good 0%

The existing surface water quality in the area?

Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%

The existing ground water quality in the area?

Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%

Solid and hazardous waste management in the area is?

Very Poor 0% Poor 100% Good 0% Very Good 0%

The existing road traffic in the area?

Very Busy 0% Busy 100% Quiet 0% Very Quiet 0%

What are the main sources of existing pollution in the local area?

Do you think the project could, either temporarily during construction or permanently during operation:

Increase existing noise levels in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Decrease existing air quality (dust) in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase pressure on availability water resources for drinking, washing etc.

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Decrease existing surface water quality in the area?

Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%

Decrease existing ground water quality in the area?

Yes: Intolerable 0% Yes: Tolerable 0% No 100% Don't Know 0%

Increase solid and hazardous waste in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase existing road traffic in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

If yes to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts:

Do you and your family have:

Socioeconomic Condition	Remarks
Access to electricity from national grid	100%
Access to electricity from an off-grid system (solar panel, etc.)	0%
Access to drinking water from home tap	100%
Access to drinking water from public well	0%
Access to drinking water from waterbody	0%
Access to clean sanitation facilities (toilet)	100%

Socioeconomic Condition	Remarks
Connection to sewerage system	100%
Access to health care close to home	100%
Access to public transportation system close to home (e.g. bus route)	100%
Access to private transportation system (motorbike, car, etc.)	0 %

How Do You Believe Socioeconomic Conditions Will Be Impacted By The Project?

Positively 100% Negatively 0% Don't know 0%

Elaborate on Potential Socioeconomic Impacts and Detail Measures the Project Can Consider to Mitigate Any Negative Impacts:
None

GENERAL

General Support for the Project:
Not Supportive 0% Neutral 0%
Slightly Supportive 0% Very Supportive 100%

Further Suggestions to Project on Environment, Health and Safety Impacts to be Considered Further and Measures that Could be Incorporated to Mitigate Them.

- Works are requested to be extra careful or not done during 7am -10am as local children goes to school and 3pm-5pm return back. But they can take an alternate road if this blocked due to powerline installation
- Inform locals before work starts
- GRM is most welcome
- Sparks from DTR is observed occasionally and need to be repaired or prevented

PARTICIPANT DETAILS
Date: 19.06.2024
Components In Area: 11kV and LT lines) – new and bare to CC /ABC rehabilitation
Municipality / Rural Municipality of Respondent's Residence: Rural, Jumla bazar area, along road -passes settlement, croplands, some house/shops inside ROW
No. of Participants: 03
Gender of Respondent: Female 03 Male 00
Age of Respondent: 30-65
Main Livelihood (Occupation): Shop
Secondary Livelihoods: None
Ethnicity: General
Number of family members living under the same roof (as a single household): average 3-4 per family
Do you or any of your family members fall into any of the following vulnerable groups?: Parents

Does your or any of your family members livelihood depend on the forest? None
How is Your and Your Family Members Underlying Health? Good
Awareness of the Project Prior to this Consultation:
Not At All Aware: 100% Slightly Aware 0% Very Aware 0%

LAND USE, LIVELIHOODS, AND SENSITIVE COMMUNITY RECEPTORS
Where is your residence and/or land located in relation to the following project locations:

	Residence	Land	Remarks
In the vicinity of the 11kV/LT line ROW	100%	0%	Lines passing along/over house/shops
In vicinity of proposed SS	0%	0%	None

Are you Concerned about Land Use being Adversely Impacted By The Project?
Yes: 100% No 0% Don't Know 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider to Mitigate Impacts, noting that compensation will be paid for land acquisition and resettlement:[12]

- Remove the power lines and poles from house compound
- Replace the damaged poles and lines in the area. DTR and pole sparks need to be prevented as some are close to houses
- Don't install poles in front of houses and shops
- Lines above the houses are not safe
- Cables are low hanging and need to high clearance for safety

Are you aware of any sensitive community receptors that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Receptor	Remarks Potential Impact/ Suggested Mitigation
Community Farmland	Yes
Community Forest	None
Nursery or School	Yes
Clinic, Health Center, or Hospital	None
Religious Building (temple, shrine, heritage trees, etc.)	None
Footpath or track	Yes
Other … …	None

BIODIVERSITY

Are you aware of any legally protected areas or other sensitive ecological habitat that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Legally Protected Area or Sensitive Ecological Habitat	Location	Remarks Potential Impact/ Suggested Mitigation
None identified to be nearby	None	None

[12] Under Land Use Consider Damage to Crops, Structures, Trees etc. but also Landscape/Visual Impacts

Is any biodiversity supported by the local area of social, economic, or cultural importance to your local community (e.g. fisheries, forests)?
None

Does you livelihood depend on wild animals within the construction area, whether used for personal consumption or commercial purposes?
No

Does you livelihood depend on harvest of wild (not cultivated) plants including trees/timber, whether for personal consumption (heating, cooking, food, medicinal, religious) or commercial purposes, directly from the construction area? Forest use- Cooking fuel, house construction, fodder, medicinal plants

With reference to the photo guide provided, are you aware of any of these threated wild animal or plant species being present in the construction and area?
None
If yes, please elaborate on location:

Are you Concerned about Wild Animals and Plants being Adversely Impacted By The Project?
No

PHYSICAL CULTURAL RESOURCES
Are you Concerned about Physical Cultural Resources being Adversely Impacted By The Project?
No

Are you aware of any Physical Cultural Resources of either national or local importance (e.g. temples, shrines, religious forests, sacred groves or trees, heritage trees, cremation places etc.) that may be directly or indirectly adversely impacted by the Project, please identify their location on map provided whenever possible?

Name of Physical Cultural Resource	Location	Remarks Potential Impact/ Suggested Mitigation
None	None	None

HUMAN ENVIRONMENT
Are you aware of any of the following having occurred in the local area?
Earthquakes No Landslides Yes Storms No
Flooding No Drought No

Are you aware that, if not well managed, there may be safety risks associated with civil construction of the project?

Yes 0% No 0% Don't Know 100%

Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider to Increase Awareness:
None

Are you aware that, if not well managed, there may be safety risks associated with operation of the project/electrical infrastructure?

Yes 100% No 0% Don't Know 0%

Please elaborate on Concerns and, if no, suggest any Measures the Project Can Consider to Increase Awareness:

- Remove the power lines and poles from house compound
- Replace the damaged poles and lines in the area. DTR and pole sparks need to be prevented as some are close to houses
- Don't install poles in front of houses and shops
- Lines above the houses are not safe
- Cables are low hanging and need to high clearance for safety

Are you Concerned about the Overall Community Health and Safety Impacts of the Project?:
Yes 100% No 0% Don't Know 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider Mitigating Impacts:

- Don't install poles in front of houses and shops
- Lines above the houses are not safe
- Cables are low hanging and need to high clearance for safety

Do You Believe that Once NEA have met National Regulations the following Impacts and Risks from the Project during Construction Are?
Influx of construction workers from outside the local area and/or Nepal during the construction period:
Intolerable 0% Tolerable 100% Don't Know 0%
Accommodation of construction workers in local communities:
Intolerable 0% Tolerable 100% Don't Know 0%
Interaction of community members with construction workers:
Intolerable 0% Tolerable 100% Don't Know 0%
Interaction of community members with construction traffic:
Intolerable 0% Tolerable 100% Don't Know 0%
If intolerable to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts/Make a Risk More Acceptable:

Do You Believe that Once NEA have met National Regulations the Impacts and Risks from the Project during Operation Are?
How would you qualify:
The existing noise level in the area?
Very Quiet 0% Quiet 100% Noisy 0% Very Noisy 0%
The existing air quality (dust levels) in the area?
Very Dirty 0% Dirty 0% Clean 100% Very Clean 0%
The availability of water resources for drinking, washing etc.
Very Poor 0% Poor 100% Good 0% Very Good 0%
The existing surface water quality in the area?
Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%
The existing ground water quality in the area?
Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%
Solid and hazardous waste management in the area is?
Very Poor 0% Poor 0% Good 100% Very Good 0%
The existing road traffic in the area?
Very Busy 0% Busy 100% Quiet 0% Very Quiet 0%

What are the main sources of existing pollution in the local area?

Do you think the project could, either temporarily during construction or permanently during operation:

Increase existing noise levels in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%
Decrease existing air quality (dust) in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%
Increase pressure on availability water resources for drinking, washing etc.
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%
Decrease existing surface water quality in the area?
Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%
Decrease existing ground water quality in the area?
Yes: Intolerable 0% Yes: Tolerable 0% No 100% Don't Know 0%

Increase solid and hazardous waste in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%
Increase existing road traffic in the area?
Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

If yes to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts:

Do you and your family have:

Socioeconomic Condition	Remarks
Access to electricity from national grid	100%

Socioeconomic Condition	Remarks
Access to electricity from an off-grid system (solar panel, etc.)	0% (in some houses)
Access to drinking water from home tap	100%
Access to drinking water from public well	0%
Access to drinking water from waterbody	0%
Access to clean sanitation facilities (toilet)	100%
Connection to sewerage system	100%
Access to health care close to home	100%
Access to public transportation system close to home (e.g. bus route)	100%
Access to private transportation system (motorbike, car, etc.)	100 %

How Do You Believe Socioeconomic Conditions Will Be Impacted By The Project?

Positively 100% Negatively 0% Don't know 0%

Elaborate on Potential Socioeconomic Impacts and Detail Measures the Project Can Consider to Mitigate Any Negative Impacts:
None

GENERAL

General Support for the Project:
Not Supportive 0% Neutral 0%
Slightly Supportive 0% Very Supportive 100%

Further Suggestions to Project on Environment, Health and Safety Impacts to be Considered Further and Measures that Could be Incorporated to Mitigate Them.

- from house compound
- Replace the damaged poles and lines in the area. DTR and pole sparks need to be prevented as some are close to houses
- Don't install poles in front of houses and shops
- Lines above the houses are not safe
- Cables are low hanging and need to high clearance for safety

PARTICIPANT DETAILS
Date: 19.06.2024
Components In Area: 11kV and LT lines) – new and bare to CC /ABC rehabilitation
Municipality / Rural Municipality of Respondent's Residence: Rural, Chandannath Ward 2, along road -passes settlement, croplands, some house/shops inside ROW
No. of Participants: 08
Gender of Respondent: Female 03 Male 05
Age of Respondent: 30-65
Main Livelihood (Occupation): Shop, Agriculture, Unemployed
Secondary Livelihoods: Govt. Job.
Ethnicity: General
Number of family members living under the same roof (as a single household): average 4-7 per family
Do you or any of your family members fall into any of the following vulnerable groups?: Parents

Does your or any of your family members livelihood depend on the forest? None

How is Your and Your Family Members Underlying Health? Good
Awareness of the Project Prior to this Consultation:
Not At All Aware: 100% Slightly Aware 0% Very Aware 0%

LAND USE, LIVELIHOODS, AND SENSITIVE COMMUNITY RECEPTORS
Where is your residence and/or land located in relation to the following project locations:

	Residence	Land	Remarks
In the vicinity of the 11kV/LT line ROW	100%	0%	Lines passing along/over house/shops
In vicinity of proposed SS	0%	0%	None

Are you Concerned about Land Use being Adversely Impacted By The Project?
Yes: 0% No 100% Don't Know 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider to Mitigate Impacts, noting that compensation will be paid for land acquisition and resettlement:[13]
None

Are you aware of any sensitive community receptors that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Receptor	Remarks Potential Impact/ Suggested Mitigation
Community Farmland	Yes
Community Forest	None
Nursery or School	Yes
Clinic, Health Center, or Hospital	None
Religious Building (temple, shrine, heritage trees, etc.)	None
Footpath or track	Yes
Other … …	None

BIODIVERSITY

Are you aware of any legally protected areas or other sensitive ecological habitat that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Legally Protected Area or Sensitive Ecological Habitat	Location	Remarks Potential Impact/ Suggested Mitigation
None identified to be nearby	None	None

Is any biodiversity supported by the local area of social, economic, or cultural importance to your local community (e.g. fisheries, forests)?
None

[13] Under Land Use Consider Damage to Crops, Structures, Trees etc. but also Landscape/Visual Impacts

Does you livelihood depend on wild animals within the construction area, whether used for personal consumption or commercial purposes?
No

Does you livelihood depend on harvest of wild (not cultivated) plants including trees/timber, whether for personal consumption (heating, cooking, food, medicinal, religious) or commercial purposes, directly from the construction area? Forest use- Cooking fuel, house construction, fodder, medicinal plants

With reference to the photo guide provided, are you aware of any of these threated wild animal or plant species being present in the construction and area?
None
If yes, please elaborate on location:

Are you Concerned about Wild Animals and Plants being Adversely Impacted By The Project?
No

PHYSICAL CULTURAL RESOURCES
Are you Concerned about Physical Cultural Resources being Adversely Impacted By The Project?
No

Are you aware of any Physical Cultural Resources of either national or local importance (e.g. temples, shrines, religious forests, sacred groves or trees, heritage trees, cremation places etc.) that may be directly or indirectly adversely impacted by the Project, please identify their location on map provided whenever possible?

Name of Physical Cultural Resource	Location	Remarks Potential Impact/ Suggested Mitigation
None	None	None

HUMAN ENVIRONMENT
Are you aware of any of the following having occurred in the local area?
Earthquakes No Landslides Yes Storms No
Flooding No Drought No

Are you aware that, if not well managed, there may be safety risks associated with civil construction of the project?
Yes 100% No 0% Don't Know 0%
Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider to Increase Awareness:
Live power lines can cause accidents

Are you aware that, if not well managed, there may be safety risks associated with operation of the project/electrical infrastructure?
Yes 100% No 0% Don't Know 0%
Please elaborate on Concerns and, if no, suggest any Measures the Project Can Consider to Increase Awareness:

- Major short circuits during monsoons, Sparks are observed
- ROWs must not be over houses
- NEA worker electrocuted 2 years back due to miscommunication during repair as power was turned on (communication signal issue and no voice clarity)
- Locals were also electrocuted in some cases due to cable brakes on roads

Are you Concerned about the Overall Community Health and Safety Impacts of the Project?:
Yes 100% No 0% Don't Know 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider Mitigating Impacts:
Same as above

Do You Believe that Once NEA have met National Regulations the following Impacts and Risks from the Project during Construction Are?
Influx of construction workers from outside the local area and/or Nepal during the construction period:
Intolerable 0% Tolerable 100% Don't Know 0%
Accommodation of construction workers in local communities:
Intolerable 0% Tolerable 100% Don't Know 0%

Interaction of community members with construction workers:

Intolerable 0% Tolerable 100% Don't Know 0%

Interaction of community members with construction traffic:

Intolerable 0% Tolerable 100% Don't Know 0%

If intolerable to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts/Make a Risk More Acceptable:

Do You Believe that Once NEA have met National Regulations the Impacts and Risks from the Project during Operation Are?

How would you qualify:

The existing noise level in the area?

Very Quiet 0% Quiet 100% Noisy 0% Very Noisy 0%

The existing air quality (dust levels) in the area?

Very Dirty 0% Dirty 50% Clean 50% Very Clean 0%

The availability of water resources for drinking, washing etc.

Very Poor 0% Poor 100% Good 0% Very Good 0%

The existing surface water quality in the area?

Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%

The existing ground water quality in the area?

Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%

Solid and hazardous waste management in the area is?

Very Poor 0% Poor 0% Good 100% Very Good 0%

The existing road traffic in the area?

Very Busy 0% Busy 100% Quiet 0% Very Quiet 0%

What are the main sources of existing pollution in the local area? Dusty road

Do you think the project could, either temporarily during construction or permanently during operation:

Increase existing noise levels in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Decrease existing air quality (dust) in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase pressure on availability water resources for drinking, washing etc.

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Decrease existing surface water quality in the area?

Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%

Decrease existing ground water quality in the area?

Yes: Intolerable 0% Yes: Tolerable 0% No 100% Don't Know 0%

Increase solid and hazardous waste in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase existing road traffic in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

If yes to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts:

Do you and your family have:

Socioeconomic Condition	Remarks
Access to electricity from national grid	100%
Access to electricity from an off-grid system (solar panel, etc.)	0% (in some houses)
Access to drinking water from home tap	100%
Access to drinking water from public well	0%
Access to drinking water from waterbody	0%
Access to clean sanitation facilities (toilet)	100%

Socioeconomic Condition	Remarks
Connection to sewerage system	100%
Access to health care close to home	100%
Access to public transportation system close to home (e.g. bus route)	100%
Access to private transportation system (motorbike, car, etc.)	50 %

How Do You Believe Socioeconomic Conditions Will Be Impacted By The Project?

Positively 100% Negatively 0% Don't know 0%

Elaborate on Potential Socioeconomic Impacts and Detail Measures the Project Can Consider to Mitigate Any Negative Impacts:
None

GENERAL

General Support for the Project:
Not Supportive 0% Neutral 0%
Slightly Supportive 0% Very Supportive 100%

Further Suggestions to Project on Environment, Health and Safety Impacts to be Considered Further and Measures that Could be Incorporated to Mitigate Them.

- Low voltage is hampering work and household works
- No continuous electric supply as frequent tripping
- Takes long time to repair any power failure
- Major short circuits during monsoons, Sparks are observed
- ROWs must not be over houses

PARTICIPANT DETAILS
Date: 19.06.2024
Components In Area: 11kV and LT lines) – new and bare to CC /ABC rehabilitation
Municipality / Rural Municipality of Respondent's Residence: Rural, Mugu area, along road -passes settlement, croplands, some house/shops inside ROW
No. of Participants: 08
Gender of Respondent: Female 02 Male 06
Age of Respondent: 40-60
Main Livelihood (Occupation): Shop, Agriculture
Secondary Livelihoods: Govt. Job.
Ethnicity: General and Tribal
Number of family members living under the same roof (as a single household): average 4-6 per family
Do you or any of your family members fall into any of the following vulnerable groups?: Parents and Children

Does your or any of your family members livelihood depend on the forest? None

How is Your and Your Family Members Underlying Health? Good

Awareness of the Project Prior to this Consultation:
Not At All Aware: 50% Slightly Aware 50% Very Aware 0%

LAND USE, LIVELIHOODS, AND SENSITIVE COMMUNITY RECEPTORS
Where is your residence and/or land located in relation to the following project locations:

	Residence	Land	Remarks
In the vicinity of the 11kV/LT line ROW	100%	0%	Lines passing along/over house/shops, croplands
In vicinity of proposed SS	0%	0%	None

Are you Concerned about Land Use being Adversely Impacted By The Project?
Yes: 0% No 100% Don't Know 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider to Mitigate Impacts, noting that compensation will be paid for land acquisition and resettlement:[14]
None

Are you aware of any sensitive community receptors that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Receptor	Remarks Potential Impact/ Suggested Mitigation
Community Farmland	Yes
Community Forest	None
Nursery or School	None
Clinic, Health Center, or Hospital	None
Religious Building (temple, shrine, heritage trees, etc.)	None
Footpath or track	Yes
Other … …	None

BIODIVERSITY

Are you aware of any legally protected areas or other sensitive ecological habitat that may be directly or indirectly adversely impacted by the project, please identify their location on map provided whenever possible:

Legally Protected Area or Sensitive Ecological Habitat	Location	Remarks Potential Impact/ Suggested Mitigation
None identified to be nearby	None	None

Is any biodiversity supported by the local area of social, economic, or cultural importance to your local community (e.g. fisheries, forests)?
None

[14] Under Land Use Consider Damage to Crops, Structures, Trees etc. but also Landscape/Visual Impacts

Does you livelihood depend on wild animals within the construction area, whether used for personal consumption or commercial purposes?
No

Does you livelihood depend on harvest of wild (not cultivated) plants including trees/timber, whether for personal consumption (heating, cooking, food, medicinal, religious) or commercial purposes, directly from the construction area? Forest use- Cooking fuel, house construction, fodder, medicinal plants

With reference to the photo guide provided, are you aware of any of these threated wild animal or plant species being present in the construction and area?
None
If yes, please elaborate on location:

Are you Concerned about Wild Animals and Plants being Adversely Impacted By The Project?
No

PHYSICAL CULTURAL RESOURCES

Are you Concerned about Physical Cultural Resources being Adversely Impacted By The Project?
No

Are you aware of any Physical Cultural Resources of either national or local importance (e.g. temples, shrines, religious forests, sacred groves or trees, heritage trees, cremation places etc.) that may be directly or indirectly adversely impacted by the Project, please identify their location on map provided whenever possible?

Name of Physical Cultural Resource	Location	Remarks Potential Impact/ Suggested Mitigation
None	None	None

HUMAN ENVIRONMENT

Are you aware of any of the following having occurred in the local area?
Earthquakes No Landslides Yes Storms No
Flooding No Drought No

Are you aware that, if not well managed, there may be safety risks associated with civil construction of the project?

Yes 0% No 0% Don't Know 100%

Please elaborate on Concerns and, if no, Suggest any Measures the Project Can Consider to Increase Awareness:
Live power lines can cause accidents

Are you aware that, if not well managed, there may be safety risks associated with operation of the project/electrical infrastructure?

Yes 50% No 0% Don't Know 50%

Please elaborate on Concerns and, if no, suggest any Measures the Project Can Consider to Increase Awareness:

- Issues with pole locations- realign away from front of houses

Are you Concerned about the Overall Community Health and Safety Impacts of the Project?:
Yes 100% No 0% Don't Know 0%
If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider Mitigating Impacts:

- Issues with pole locations- realign away from front of houses

Do You Believe that Once NEA have met National Regulations the following Impacts and Risks from the Project during Construction Are?
Influx of construction workers from outside the local area and/or Nepal during the construction period:

Intolerable 0% Tolerable 100% Don't Know 0%

Accommodation of construction workers in local communities:

Intolerable 0% Tolerable 100% Don't Know 0%

Interaction of community members with construction workers:

Intolerable 0% Tolerable 100% Don't Know 0%

Interaction of community members with construction traffic:

Intolerable 0% Tolerable 100% Don't Know 0%

If intolerable to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts/Make a Risk More Acceptable:

Do You Believe that Once NEA have met National Regulations the Impacts and Risks from the Project during Operation Are?

How would you qualify:

The existing noise level in the area?

Very Quiet 0% Quiet 100% Noisy 0% Very Noisy 0%

The existing air quality (dust levels) in the area?

Very Dirty 0% Dirty 0% Clean 100% Very Clean 0%

The availability of water resources for drinking, washing etc.

Very Poor 0% Poor 100% Good 0% Very Good 0%

The existing surface water quality in the area?

Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%

The existing ground water quality in the area?

Very Polluted 0% Polluted 0% Clean 100% Very Clean 0%

Solid and hazardous waste management in the area is?

Very Poor 0% Poor 0% Good 100% Very Good 0%

The existing road traffic in the area?

Very Busy 0% Busy 100% Quiet 0% Very Quiet 0%

What are the main sources of existing pollution in the local area? Dusty road and solid waste

Do you think the project could, either temporarily during construction or permanently during operation:

Increase existing noise levels in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Decrease existing air quality (dust) in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase pressure on availability water resources for drinking, washing etc.

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Decrease existing surface water quality in the area?

Yes: Intolerable 0% Yes: Tolerable 0% No 0% Don't Know 100%

Decrease existing ground water quality in the area?

Yes: Intolerable 0% Yes: Tolerable 0% No 100% Don't Know 0%

Increase solid and hazardous waste in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

Increase existing road traffic in the area?

Yes: Intolerable 0% Yes: Tolerable 100% No 0% Don't Know 0%

If yes to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts:

Do you and your family have:

Socioeconomic Condition	Remarks
Access to electricity from national grid	100%
Access to electricity from an off-grid system (solar panel, etc.)	0%
Access to drinking water from home tap	100%
Access to drinking water from public well	0%
Access to drinking water from waterbody	0%
Access to clean sanitation facilities (toilet)	100%
Connection to sewerage system	100%
Access to health care close to home	100%

Socioeconomic Condition	Remarks
Access to public transportation system close to home (e.g. bus route)	100%
Access to private transportation system (motorbike, car, etc.)	50 %

How Do You Believe Socioeconomic Conditions Will Be Impacted By The Project?

Positively 100% Negatively 0% Don't know 0%

Elaborate on Potential Socioeconomic Impacts and Detail Measures the Project Can Consider to Mitigate Any Negative Impacts:
None

GENERAL

General Support for the Project:
Not Supportive 0% Neutral 0%
Slightly Supportive 0% Very Supportive 100%

Further Suggestions to Project on Environment, Health and Safety Impacts to be Considered Further and Measures that Could be Incorporated to Mitigate Them.

- Major voltage drop due to long distance from the main grid
- Hampering business and livelihoods
- Roads need repair
- Major issue of water scarcity in the area
- Issues with pole locations- realign away from front of houses
- Full support during construction will be provided.

CONSULTATION PHOTOLOG

Photolog	Location
	11kV and LT Bheri area
	Jumla LT rehabilitation line

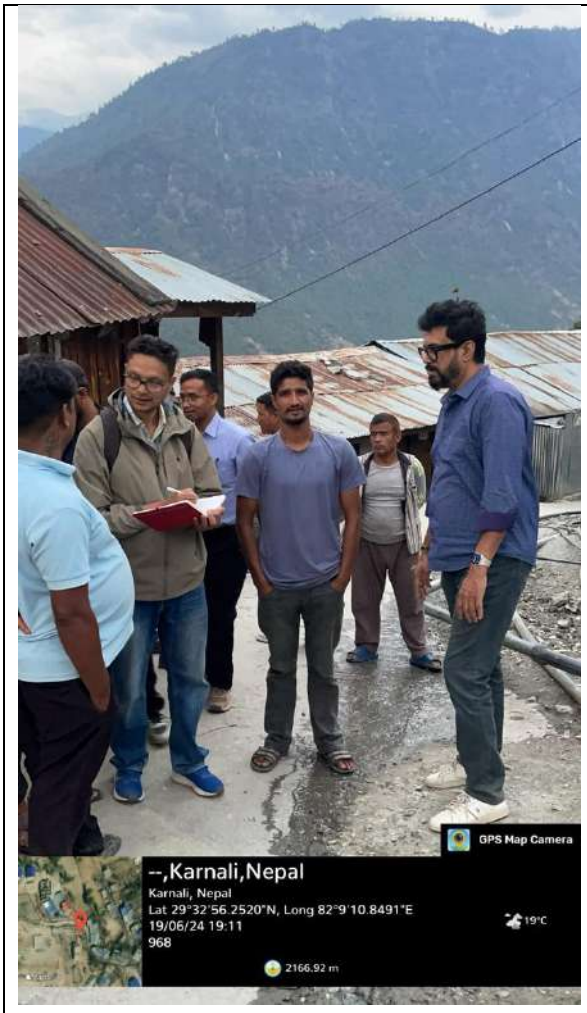
	11kV and LT Mofla, Fungra area
	LT Mofla, area

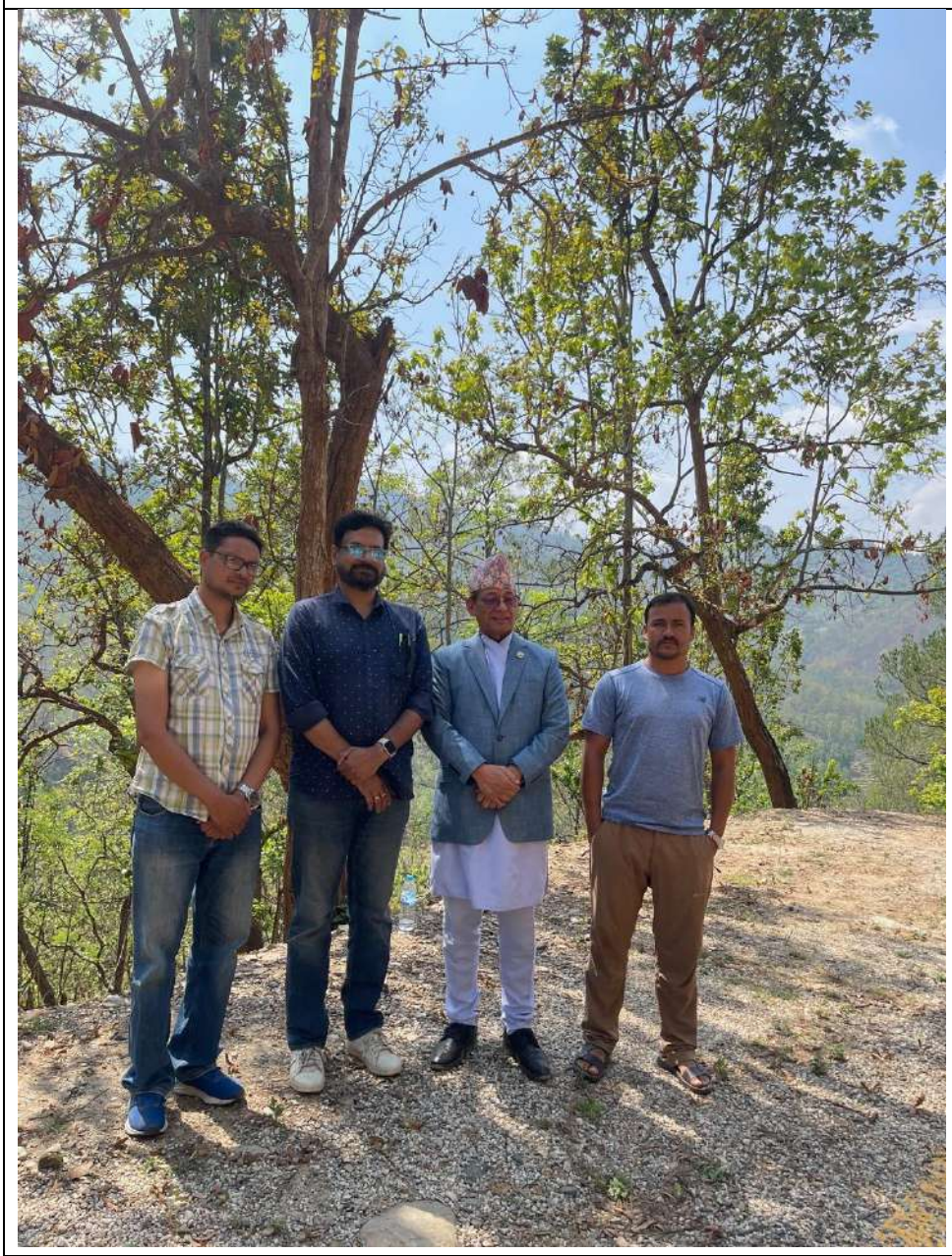
	Ward President Mofla
	11kV and LT line in non-electrified Sani gaon

	11kV and LT line in Jumla Bazar
	11kV and LT line in Jumla Bazar

	11kV and LT line in Jumla Bazar
	11kV and LT line in Jumla Bazar

	11kV and LT line in Jumla Bazar and Chandannath Area- Ward presdent and members
	DFO Jumla

	11kV and LT line in Mugu, Rara area
	11kV and LT line in Mugu, Rara area

	DFO Mugu area
	Agriculture Ministry, Karnali Province

	Consultation along 11kV alignment in Lumtoli, Jumla 29.3089125 N,82.3091680 E

	Consultation along LT alignment in Sunchaur, Sharda, Salyan with locals and Ward Head 28.3572662 N, 82.0786982 E
	Consultation along LT alignment in Andheri, Bangaad Kupinde, Salyan with locals

Source: ADB's TA Consultant

ATTENDANCE RECORDS OF CONSULTATIONS UNDERTAKEN

आज मिति २०८१ साल असाढ ६ गते चन्दननाथ नगरपालिका का नगरप्रमुख श्री राजुसिंह कठायतजूको अध्यक्षता तथा तपशिलमा उल्लेखित पदाधिकारीजूहरूको उपस्थितिमा नगरपालिका भित्रको विद्युत लाइन सुधार सम्बन्धमा बैठक बसी देहाय बमोजिम निर्णय गरियो।

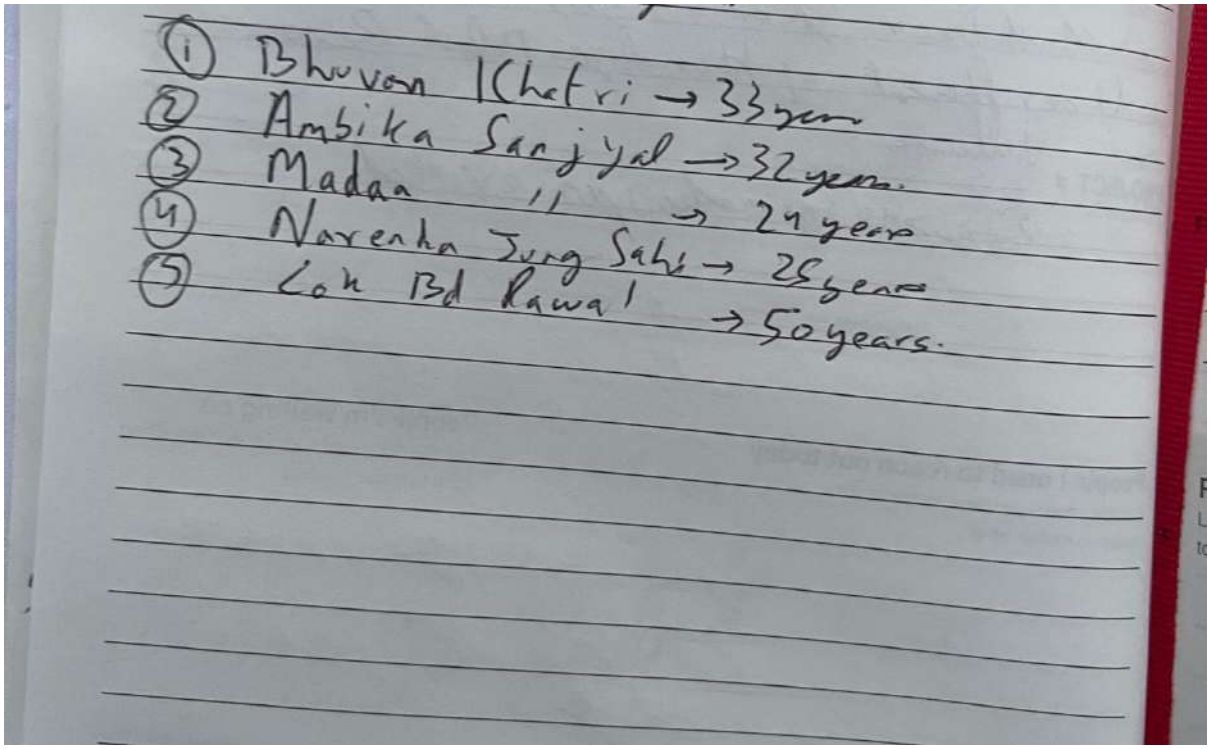
उपस्थिति

श्री राजुसिंह कठायत	नगर प्रमुख
श्री रामदेवी खड़का	नगर उपप्रमुख
श्री Dr. Dibyendu Banyan	Ex. Expt. ADB (TAC)
श्री नरेश रावल	इन्जीनियर बैलरेव वितरणकेन्द्र
श्री राम आशिष शाह	इन्जीनियर जुम्ला वितरणकेन्द्र
श्री आशिष ढकाल	ADB Conseltent
श्री धर्मराज न्यौपाने	प्रमुख प्रशासकीय अधिकृत
श्री गणेश महत	६ नं वडाध्यक्ष
श्री नमराज शाही	१० नं वडाध्यक्ष
श्री भिम बज रावत	९ नं वडाध्यक्ष
श्री मिना शाही	का पा सदस्य
श्री छप्सी रावत	का पा सदस्य

निर्णय

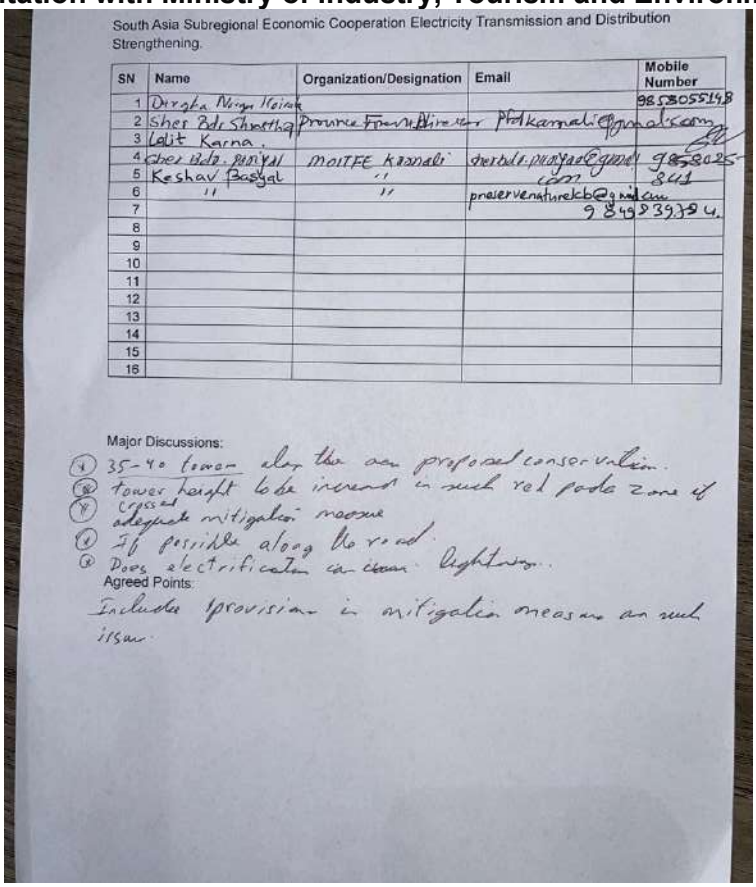
चन्दननाथ नगरपालिका भित्रको विद्युत लाइन सुधार का सम्बन्धमा माथी उल्लेखित पदाधिकारी बीच छलफल भयो। उक्त कार्यका लागि प्राविधिक पक्षका ADB Conseltent गर्ने कार्यमा नगरपालिकाका तर्फबाट सहजीकरण तथा सहयोग गर्ने निर्णय गरियो।

CS Scanned with CamScanner



1. Bhuvan Khatri → 33 years
2. Ambika Sanjyal → 32 years.
3. Madan " → 24 years
4. Narenka Jung Sahi → 25 years
5. Lok Bd Rawal → 50 years.

Consultation with Ministry of Industry, Tourism and Environment, Karnali Province



South Asia Subregional Economic Cooperation Electricity Transmission and Distribution Strengthening.

SN	Name	Organization/Designation	Email	Mobile Number
1	Dirgha Nirga Koirala			9858055148
2	Sher Bdr Shrestha	Province Forest Director	Pfdkarnali@gmail.com	
3	Lalit Karna.			
4	Sher Bdr. Paniyal	MOITFE Karnali	sherbdr.paniyal@gmail.com	9858025841
5	Keshav Basyal	"		
6	"	"	preservenaturekb@gmail.com	
7				9849839784.
8				
9				
10				
11				
12				
13				
14				
15				
16				

Major Discussions:

1. 35-40 tower along the area proposed conservation.
2. tower height to be increased in such red pada zone if crossed
3. adequate mitigation measure
4. If possible along the road.
5. Does electrification can cause lightning.

Agreed Points:

Include provision in mitigation measure on such issue.

5/19/2025 South Asia Subregional Economic Cooperation Electricity Transmission and Distribution Strengthening Project.

SN	Name	Organization/Designation	Email	Mobile Number
1	~~Badri Raj Dhungai~~	~~Dept. of Forest~~		
2		DG		
3	Hemendra Kumar	Ward President		9863118245
4	Badathoki			
5	Bal Bd Pun	Farmer 56		
6	Bed Pd. KC	A Ye B 38		9844979300
7				
8	Akash Badathoki	Student 28		
9				
10				
11				
12				

Major Discussions: Information on the project provided to ward president

- Not aware of the project
- Complaint through phone for any power cut issue
- We support for the power project
- Road condition is not good in the area
- Having hospital in the area will be beneficial to the village
- wildlife → Ghoral, Badel, Bader, Dumsi, Syal, Vulture (rare) Leopard (decline)
- Mill, Light, Fridge, TV.

Agreed Points:

- Cinaman, Rein and for Forest

APPENDIX 8: GRM TEMPLATES

Grievance Lodging Form

Grievance Form: ADB Project, NEA, Government of Karnali Province			
Grievance registration number:			
Contact details (may be submitted anonymously)	Name (s):		
	Address:		
	Telephone/Mobile:		
	Email:		
How would you prefer to be contacted (check one)	By mail/post: ☐	By phone/SMS: ☐	By email ☐
Preferred language	☐ Nepali/Karni	☐ English	☐ Other Please state: _____
Provide details of your grievance. Please describe the problem, type, who it happened to, when and where it happened, how many times, etc. Describe in as much detail as possible.			
What is your suggested resolution for the grievance if you have one? Is there something you would like NEA or another party/person to do to solve the problem?			
How have you submitted this form to the project?	Website ☐	Email ☐	By hand ☐
	In person ☐	By telephone ☐	Other (specify) ☐
Who filled out this form (If not the person named above)?	Name and contact details:		
Signature			
Name of NEA's PIU/ official assigned responsibility			
Resolved on site or referred to Level 1?	☐ Resolved	☐ Referred	If referred, date:
Resolved referred to Level 2?	☐ Resolved	☐ Referred	If referred, date:
Resolved referred to Level 3?	☐ Resolved	☐ Referred	If referred, date:
Completion			
Final resolution (briefly describe)			
	Short description	Accepted? (Y/N)	Acknowledgement signature
1st proposed solution			
2nd proposed solution			
3rd proposed solution			

Source: ADB's TA Consultant

Template for GRM Register Record

Registration number	**Type** (Env/ Soc/ H&S etc.)	**Date of complaint**	**Details of complainant** (name, address, email, contact number). If confidentiality is requested, highlight here.	**Mode/ Entry point of complaint** (person/ entity)	**Description of complaint**	**Date and content of communication to complainant** (date complaint acknowledged by level 1/2/3, feedback sent, etc.)	**Date of meetings held and outcome** (attach minutes of meetings)	**Timeline agreed upon for resolution and action plan**	**Status** (outstanding, overdue, solution agreed upon, solution under implementation, resolved)	**Other remarks**

Source: ADB's TA Consultant

APPENDIX 9: ENVIRONMENTAL MITIGATION PLAN

Table A9-1: Environmental Mitigation Plan–General (applicable to all works under distribution component)

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
Detailed Design/Pre-construction Preparations Phase							
Updating of IEE prior to commencement of coinstruction works	• NEA will develop the initial list of distribution lines to be included in the contract scope and provide the grid coordinates of start and end points and indicative routing as a GIS file in order to facilitate screening the routes against the criteria in the EMP • In updating the IEE NEA will consult IBAT and obtain PA and forest boundary mapping from MOFE and the site boundaries of national monuments from the Department of Archaeology • For all new 11 kV and LT routes in wards supporting internationally and nationally important environmental constraints, and a sample of other 11 kV and LT lines NEA will ensure a team of environment specialist/ecologist/archaeologist carries out on the ground surveys of the indicative routes and undertake consultations with interested stakeholders and the local community • NEA will ensure an ecologist undertakes forest habitat quality surveys (Annex A) for indicative routes passing through community forest and calculate if additional offset is required for no net loss • CHA report to be prepared to screen critical and natural habitats in distribution component area once list prepared by NEA to inform updated IEE/EMP. • Although the distribution routes assessed are mostly finalized and NEA have prepared the individual distribution lines list (per updated scope), the contractors when on board, during project implementation, the site-specific assessment checklist and consultation proformas will be completed by NEA and updated by the contractors.	IEE updated as required to reflect list of distribution lines to be included in contract scope and cleared by ADB Environmental clearance obtained before issue of bidding documents if applicable to the indicative routes	NEA counterpart fund	Prior to commencement of coinstruction works	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC	N/A

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	Based on the checklists this IEE and EMP may need to be updated and cleared by ADB with any government clearances or permissions obtained firstly before issue of bid documents and secondly before routings are approved by NEA and works commence. If required BES will be prepared and environmental clearance obtained.						
EMP in Bidding and Contract Document	• The EMP forms an integral and binding part of the bidding documents and any updates to it will be incorporated into the contract document, the definitive EMP to which NEA and their contractors must comply is that disclosed on ADB's website. This includes any site-specific EMP included in the updated IEE following detailed design or any updates in response to unanticipated impacts.[15] • Contractors will comply with any corrective action plan required by NEA and cover the costs where corrective action is required due to non-compliance on behalf of the contractor, its subcontractors or third parties. • Contractors will ensure all their subcontractors and third parties, irrespective of being formally or informally employed by them, also comply with the EMP and any updates to it, as well as their own CEMP and that this responsibility is cascaded down any chain involved. • Contractors will ensure subcontractors are provided a copy of the project EMP and CEMP with provisions for compliance in their contract. • Contractors will not engage in any activities described on the ADB Prohibited Investment Activities List in Annexure 5 of ADB's SPS (2009)	Definitive EMP cleared by ADB, and related provisions included in signed contract document. No breaches of EMP by contractor, subcontractors or other third parties with prompt corrective action taken if required	NEA counterpart fund Contractors to reflect in overall contract costs	Prior to issue of bidding documents and contract award for NEA. On award of contract for contractors.	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC Copy of EMP related contract extracts will be attached to first EMR submission, or the EMR for the period in which the contract was awarded.	Implement the mitigation measures, comply for duration of contract

[15] DL/DTR contractor will comply with the general and DL/DTR specific requirements.

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	• Contractors will put in place appropriate incentives and/or penalties for (non-) compliance by workers related to use of PPE, prohibition on firewood, fishing, hunting, or poaching by workers etc. • Hazardous waste collected will be regularly transported off at the contractor (suppliers) cost of disposal transboundary per national regulations and not be allowed to accumulate on site over long periods.						
EMP and statutory requirement compliances	• NEA and their contractors to comply with all applicable national and state environment, health, and safety (EHS) regulatory requirements, ADB's Safeguard Policy Statement 2009, the IFC EHS general guidelines and the sector guidelines for Electric Power Transmission and Distribution (April 2007) and ILO safety and health in construction and worker accommodation guidelines in addition to the mitigation measures set out in this mitigation plan and the EHS codes of practice (ECoP) (Appendix 9) and Labour Accommodation Requirements (Appendix 10)– if there is any conflict between national requirements and measures set out in the EMP the most stringent provisions will take precedence • Contractors are to obtain all applicable national EHS permissions or requirements prior to construction. • Prior to the approval of detailed designs NEA will consult ADB regarding the need to update the IEE. If required, the IEE will be updated for clearance and disclosure by ADB before approval and the start of related works including site establishment. If any other change in project scope or design occurs during project implementation, or if any unanticipated impacts are identified, NEA to immediately inform ADB of the change.	100% of permissions obtained, or requirements met, prior to construction No breaches of compliance with regulatory requirements or GIIP IEE updated as required to reflect detailed design and cleared by ADB prior to the start of related works	NEA counterpart fund Contractors to reflect in overall contract costs	Throughout project implementation period. Starting upon loan effectiveness for NEA. Starting upon contract award for contractors.	NEA PMU/Karnali Electrical Divisions and District Office supported by PMU	NEA PMU Safeguard Team support by PMC Copy of all EHS related permissions/ requirements to be attached to the EMR for the period in which they were obtained Immediately inform ADB if unanticipated impacts are identified at any point during project implementation and, if required, update the IEE for clearance and disclosure by ADB.	Implement the mitigation measures, comply for duration of contract Provide copies of EHS permissions/ requirements and support NEA in respect of any update to the IEE following detailed design. Immediately inform NEA if unanticipated impacts are identified at any point in their contract.

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
EHS Safeguard Staffing	• NEA to appoint suitably qualified and experienced EHS staff to the PMU upon loan effectiveness as detailed in the main body of the EMP • NEA to ensure the PSC includes suitably qualified and experienced staff to support with EMP implementation as detailed in the main body of the EMP • NEA Safeguards Officers to prepare a detailed training plan upon loan effectiveness elaborating how training and awareness raising activities required by EMP will be conducted and with the support of PSC conduct required training sessions on EMP implementation and GRM operationalization for all those with management responsibilities to clarify requirements, roles and responsibilities, record keeping and reporting at each stage of the project. • NEA Senior Environment Officer and Senior H&S Officer will be delegated authority under the contract to be able to halt construction works if any EHS issues arise. • Contractors to appoint a suitably qualified and experienced, dedicated environment safeguards team as detailed in the main body of the EMP who are to be based on site full-time • Each active construction site is to have adequate health and safety supervision to ensure the health and safety of all workers and local communities to include a suitably qualified and experienced EHS supervisor having NEBOSH/IOSH certification or similar qualification who is based on-site full-time with responsibility for ensuring EMP implementation, acting on the advice of, and reporting to their safeguards team. An EHS supervisor will not supervise more than one site/distribution line or more than 50 workers at a time.	100% of required safeguard staff required are on board to oversee EMP implementation Detailed training plan to reflect EMP requirements developed upon loan effectiveness and training records maintained Trainings and awareness raising delivered in accordance with the training plan Contractors and construction workers fully aware of their responsibilities under the EMP through training	NEA counterpart fund Contractors to reflect in overall contract costs including costs of safeguard staff as BOQ line	Upon loan effectiveness for NEA Upon contract award for contractors. Contractors to ensure requite staff are appointed to the project. Separate EHS staff for each contract package reporting to contractor's management.	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC Records of all training activities are to be retained. Training undertaken will be documented and reported in EMRs including photos and records of participants (including the gender breakdown data) List of safeguard staff and copies of CVs to be submitted in first EMR, any updates/ changes in safeguard staffing	Implement the mitigation measures, comply for duration of contract. Records of all training activities are to be retained. CVs for approval of all the safeguard team submitted as part of bid or immediately after receipt of award of work letter for approval of NEA before field mobilization. Once approved, safeguard team to be mobilized at site upon handing over of the site to the contractors by NEA or issue of mobilization letter whichever comes earlier

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	• All subcontractors will be required to appoint an EHS representative who will be available on each work site. • Use of day labor is to be discouraged, if day labor is used the contractor will have to ensure increased supervision on-site from their side due to increased risks from lack of health and safety awareness etc. • Contractors must not discriminate and must proactively encourage the employment of suitably skilled women on the project. • Contractors must proactively encourage local employment for unskilled roles whilst ensuring suitably qualified and experienced workers for skilled roles; local labor can be used for manual work and eligible local workforce for clerical and office jobs. However, precedence must be given to ensuring that all workers are appropriately skilled given the hazardous nature of distribution works and so local workers will be limited to few unskilled positions. • Workers to operate within the legal working hours and additional work hours are adequately compensated. All overtime hours are voluntary; coercion, threats or penalties not used to pressure the workers into overtime; Wages being paid to workers confirms to the minimum wage rated specified under applicable laws. All wages including overtime are paid within legally defined time limits. Pay statements shows earned wages, regular and overtime pay, bonuses and all relevant deductions. • Verifiable proof of age documentation to be maintained for every worker. • No child will be employed, and no under 18 will be engaged on construction site (hazardous work)					specified in subsequent EMRs	

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	• Contractors to provide medical/accident insurance for all workers (formal and informal) for the duration of their contracts • Contractors to provide at least 12 days sick leave for all construction workers						
Establishment and operation of GRM	• NEA to establish an effectively operating tiered GRM with an informal tier at contractor level as per the IEE and identify GRM focals and the GRCs. • Contractor's safeguards team will act as site GRM Focal and keep affected persons and local communities informed of the status of work and be readily available onsite to receive, document and deal with grievances at site level. • NEA with support of contractor to inform all potentially affected persons and local communities within 50m of distribution line ROWs/DTRs of the existence of the GRM as well as the GRM process and means of submitting project grievance to NEA. Community awareness raising of the GRM will be undertaken verbally, through ward/municipal/village heads, community meetings, one-on-one consultations with landowners; through the distribution of notices/pamphlets/posters; and through other media outlets – all awareness raising activities are to be documented. • Encourage use of the GRM and clarify that this does not prevent affected persons from pursuing any legal action, if they feel it is needed, and inform communities about the ADB Accountability Mechanism and their possibility to resort to it if any grievance is not resolved by the project level GRM. • Details of GRM, details of concerned persons – name, designation, contact numbers including phone/SMS/What's App, address and timeline of	GRM as stipulated in IEE operationalized, affected persons aware of its existence and are actively using GRM to raise their grievances. 100% of grievances received are recorded and resolved in a timely manner as per GRM process.	NEA counterpart fund Contractors to reflect in overall contract costs	Throughout project implementation period. Upon loan effectiveness for NEA. Upon contract award for contractors.	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU/Safeguard Unit support by PSC Records to be kept of all grievances received and their resolution for reporting per the IEE. Details of GRM being operation, including photos of awareness raising activities to be submitted in first EMR. Details of all grievances received and resolved during the period to be	Implement the mitigation measures, comply for duration of contract Implement the informal site level GRM per the IEE, and support NEA in resolving and addressing grievances entering the formal GRM, keep record of all grievances registered, status, time taken for redressal and outcomes, etc. Internal GRM for workers for work related grievances,

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	redressal are to be displayed at construction site offices. • NEA to post clearly visible signboards at the entrances to all district distribution offices with contact details including the name, designation, contact numbers, address plus the timeline and process of redressal together with a suggestion box that will be regularly checked for any grievances received. During construction, the contractors will be responsible for posting these highly visible signboards at the construction site offices and their active construction sites, including contact details of both the NEA and contractor's GRM focal persons as well as a suggestion box to be regularly checked. • GRM will be available to all workers for receiving and handling complaints about unfair treatment or unsafe living or working conditions, ensuring no coercion nor reprisal. Construction workers will be given access to register any grievances with the contractors or direct access to the NEA GRM Focal. • Contractors to carry out awareness raising for all construction workers about the GRM at the start of their employment on site including disseminating GRM contact details on noticeboards at construction site offices and at employer provided staff accommodation. Suggestion boxes to be provided for construction workers at construction site offices and at employer provided staff accommodation.					reported in subsequent EMRs.	keep record of all grievances registered, status, time taken for redressal and outcomes, etc.
Meaningful consultations and information disclosure	• NEA to locally disclose in a timely manner the draft and final IEE with executive summary translated into Nepali, Jumli and other local languages any other information to it, and other environment safeguards documentation as set out in the IEE e.g., via NEA website and available from staff in offices e.g., HQ/Karnali Division/district distribution offices, and DL/DTR construction site offices.	IEE and other environment safeguard documents locally disclosed and accessible to affected persons	NEA counterpart fund Contractors to reflect in overall	Throughout project implementation period. Upon loan effectiveness for NEA.	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC Consultation will be documented and reported	Implement the mitigation measures, comply for duration of contract Contractor to

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	• Brochures and posters on the main findings of the IEE and where the full version can be accessed, as well as a translation of the executive summary of the IEE, will be printed in the official local languages (Nepali/Jumli, etc.) and made available/displayed for public scrutiny at places easily accessible to affected persons and other interested parties – including but not limited to the NEA's district distribution offices, and construction site offices – and if requested access to a printed copy of the full IEE will be provided and if required translated free of charge. • NEA Senior Environmental Officer to prepare detailed consultation plan upon loan effectiveness to be followed by NEA and contractor • Contractors to undertake and document meaningful consultations in each district/ward including with potentially affected persons and local communities (50m of distribution line ROWs and DTR sites) as well as other stakeholders including ward/municipal heads and committee members, other local authorities and public utilities during detailed design in order that any concerns raised during consultations can be reflected in the design, route alignment and construction method – consultation proforma in Appendix 11 is to be completed by the contractor during detailed design of DL/DTR and will be submitted as part of the IEE update with validation by PSC. • Through community meetings, one-on-one consultations with affected persons, dissemination of brochures/pamphlets/posters, and other media outlets contractors to provide at least one-month advance notice to potentially affected persons and 50m of distribution line ROWs about the schedule and details of planned construction works including its anticipated impacts, including anticipated traffic	Consultation Plan developed reflecting ongoing consultation requirements upon loan effectiveness Local communities and other concerned stakeholders kept informed throughout project implementation, and aware of construction etc.	contract costs	Prior to the commencement of works for contractor, and then ongoing throughout construction		in updated IEE and/or EMRs including photos and records of participants (including gender breakdown data)	remain actively involved with local communities through ongoing consultations

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	disruption (road closures, diversions, including notices/signs on either end and marking of the diversion routes) to help manage any disruption and disturbance and potential conflicts with the local communities and then keep them updated of progress and changes in schedule throughout construction works – all meaningful consultations are to be documented. • Contractors to directly liaise one-on-one with the receptors within the distribution line RoWs who will be most affected, update them on a weekly basis so they are fully informed of the nature of works and their schedule. They will be specifically notified about the commencement of works and any high dust or noise activities (especially earthworks) • Local communities as well as individual property owners within 500m are to be consulted by contractors when selecting sites for temporary construction facilities outside of NEA substations sites prior to finalization of their location – all meaningful consultations are to be documented.						
EMP in detailed design, EHS impacts and risks of the project during construction in general, planning for onsite EHS	• Contractors to ensure that detailed designs reflect requirements of the IEE/EMP and international engineering best practice/good EHS practices • During detailed design contractors to ensure GoN seismic design requirements (e.g., NBC 105:2019) are followed especially for buildings and pole foundations; structural designs to be checked for seismic safety by design team and an independent expert, separate to design team, to confirm international good practice seismic design standards are met. • During detailed design climate change adaptation/resilience measures/structures from the ADB project CRA need to be incorporated by the contractors.	NEA approved detailed designs minimize impacts and risks on EHS during subsequent stages of the project NEA approved CEMP and subplans to minimize impacts and	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU/Safeguard Unit support by PSC Review detailed design, CEMP and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
management and preparation of CEMP	• Contractors to develop a Construction Environmental Management Plan (CEMP) including required sub-plans reflecting the IEE/EMP requirements including the ECoP and international engineering best practice/good EHS practices and submit their CEMP to NEA for approval prior to any works commencing on site including site establishment. • CEMP and sub-plans will be living documents, to be updated as required and re-approved by NEA as construction proceeds, if construction methods or site conditions change, in response to an accident, incident, near miss etc. • CEMP to provide details on how the contractors plan to implement the construction mitigation measures specified in the IEE/EMP and relevant parts of the WB-IFC EHS General/Electric Power Transmission and Distribution Guidelines including the Construction and Demolition section, as well as the ILO safety and health in construction guidelines. • CEMP will include Construction Method Statement identifying all construction activities, schedule, access routes, anticipated traffic volumes, and construction methods to be used as well as temporary construction facilities needed and their location e.g., laydown areas, stores, construction workers rest areas, toilets/washrooms, temporary worker camps/overnight accommodation etc. • CEMP will include (i) prohibitions on fishing, hunting, poaching, protected areas/buffers etc. (ii) a wildlife identification and rescue protocol including an emergency fauna rescue and handling procedure, including contacts of forest and protected area management, nearest veterinary etc. (iii) measures to avoid the spread of invasive species including the installation of washing stations for the pressure washing of vehicles at the site entrance, and (iv) a	risks on EHS during subsequent stages of the project.				Copy of CEMP and any updates to be attached to EMR during the period in which they are approved.	

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	Chance Find Procedure for physical cultural resources in accordance with the ECoP. • Contractor to seek to locate all temporary construction facilities required including laydown and storage areas within the boundaries of NEA land (substations) except for overnight accommodation for workers that could be provided in existing properties off-site. • If other public or private land is required for temporary construction facilities due to lack of space within NEA lands noisy and dusty facilities or those that may generate sediment laden runoff or wastewater (e.g., temporary worker camps, maintenance yards, storage areas) must be sited at least 500m from residential property and areas of high biodiversity or cultural heritage value (e.g., protected areas, buffer zones of protected areas, Ramsar, KBA/IBA, protected forest area, UNESCO tentative WHS, nationally protected monuments, religious forest) outside of the natural habitat, and physical cultural resources.[16] • Laydown and storage areas that are not potential pollution sources may be located minimum of 50m distant to residential properties but must not block accesses or road use. • No land requiring clearance of vegetation/supporting forest or other natural habitat is to be used – land use to be negotiated with private owner with submission of all necessary documents such as land ownership papers demonstrating agreement for temporary land use with a private landowner to NEA with a photographic record of pre-project condition						

[16] Locally important physical cultural resources, etc.

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Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	• Tents may be used for day rest areas but all overnight accommodation for workers must be provided in a structurally sound built structure providing adequate shelter from rain, wind etc. • Design of temporary worker camps/overnight accommodation to conform to IFC EHS general guidelines, ILO's guidance on worker accommodation[17] and regulations of GoN and to be approved by NEA. Contractors to provide all basic requirements (beds and beddings, mosquito nets, artificial lights, natural lights, windows and ventilation, fans, emergency exits, firefighting equipment, lockers, kitchen and dining halls, mobile charging points, toilets and washing facilities, potable drinking water, recreational space etc.) and comply with labour accommodation requirement (Appendix 10) • Contractors will use locally sourced materials as far as practical to reduce transportation, but all raw materials will be sourced only from existing NEA authorized/licensed sources. Records to be kept of all the materials used and source with copies of licenses etc.						
Generation of construction wastes; use of hazardous materials	• Use of any asbestos containing materials is prohibited. • Use of non-PCB based oil for transformers/transformer oil is prohibited. • Use of chlorofluorocarbons (CFCs) and halon-based substances are prohibited. • Equipment purchased by the contractors is to be accompanied by letter from the manufacturer stating that it is guaranteed PCB free and to be labelled as PCB free before its installation. Contractors to	NEA approved detailed designs minimize impacts and risks on EHS during subsequent stages of the project	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC Review detailed design, CEMP sub-plans and prerequisite inputs to confirm all measures	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site

[17] https://webapps.ilo.org/wcmsp5/groups/public/@ed_emp/@emp_ent/@multi/documents/publication/wcms_116344.pdf

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	provide NEA with material data sheets for the insulating oil used in transformers (associated facility and DTRs). • Contractors to develop as sub-plans of their CEMP reflecting the requirements of the General EHS Guidelines and the ECoP: o A pollution prevention plan (PPP) covering dust and emissions to air management, noise management, the protection of water resources and environmentally sound and safe storage, use, and disposal of all fuels, chemicals and oils used on site and an emergency preparedness and response plan in the event of any leaks or spills (e.g., of oil, etc.) or an incident such as flood in accordance with national laws and regulations and the IFC EHS General Guidelines in relation to the use and storage of fuel, oil, and chemical including prevention and control of hazards associated with spill prevention, emergency response, spill clean-up and remediation. o Construction waste management plan (CWMP) dealing with all solid and hazardous waste generated in an environmentally sound and safe manner, per national regulations and the IFC EHS General Guidelines section on Waste Management. Where possible, the CWMP will ensure surplus materials will be reused or recycled, disposal will be the last resort. It will cover the safe and sound handling and management of: ➢ Food waste which can be composted to reduce the need for landfill	NEA approved CEMP and subplans to minimize impacts and risks from hazardous materials and construction wastes during subsequent stages of the project. No breaches of compliance with regulatory requirements or GIIP				required by the EMP have been adequately incorporated. Copy of CEMP and any updates to be attached to EMR during the period in which they are approved.	establishment

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	➢ Plastic waste – prioritize reuse and recycling ➢ Other domestic waste e.g., cans, paper etc. much of which will be able to be recycled ➢ Metals – can be recycled ➢ Wood – can be recycled ➢ Hazardous waste including used oil which can be reused ➢ Liquid waste (wastewater) ➢ Movement of construction waste will need to be factored in given the given the lack of suitably engineered and licensed hazardous waste facilities in Karnali province and more widely in Nepal. Nearest country where suitably licensed hazardous waste management facilities exist is India. ➢ Contractors to provide adequate facilities for the collection, separation, and storage of construction waste (including from temporary workers camps/overnight accommodation) on-site and safe transportation for composting or recycling or disposal through reputable, legitimate, licensed third parties with all waste transfer records retained. Composting of biodegradable waste on-site may be permitted if facilities are established early on having sufficient volume to accommodate both construction and O&M wastes. Leaving or disposing of construction wastes by burying them on-site or disposing of them at unlicensed waste management facilities is strictly prohibited. ➢ Unsanitary open dumps in Karnali Province or outside are not to be used by the contractor or their third parties.						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	➢ Burning of waste on-site is also strictly prohibited.						
Occupational health and safety risks	• Contractors to comply with GoN occupational/labor rules and regulations for the protection of workers; statutory H&S and labor requirements including permits, licenses, and insurances for all workers to be obtained and maintained throughout the project. • Contractors to undertake facilitated H&S risk assessment with NEA through a workshop attended by PMU/PIU/PSC during the detailed design (and at other key stages) so that it can inform both the detailed design and pre-construction preparations, considering both occupational and community H&S risks resulting from subsequent stages of the project. Facilitated workshop will involve the design and construction team of the contractors and NEA operational staff. • Informed by the outcome develop a H&S Plan as a sub-plan to the CEMP to avoid, minimize and mitigate occupational H&S risks in accordance with the IFC EHS General Guidelines sections on Occupational Health and Safety as well as a labor management sub-plan addressing employment of migrant workers, sanitation and welfare, gender-based violence/sexual exploitation, abuse, and harassment prevention etc. NEA will be required to approve the H&S sub-plan and then ensure their own staff on-site follow it when on site. H&S Plan will include: • Safety Training Program – to provide general and specialized training courses for all workers on the site and at all levels of supervision and management. General courses will consist of (i) an initial Safety Induction which all workers will be required to attend prior to being allowed to work on site, all visitors and project workers who have not attended the safety	NEA approved detailed designs minimize impacts and risks related to Occupational Health and Safety during subsequent stages of the project Facilitated H&S risk assessment completed before approval of H&S Plan NEA approved CEMP and subplans to minimize impacts and risks to Occupational Health and Safety during subsequent stages of the project. No breaches of compliance with	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC Review detailed design, CEMP sub-plans and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated. Copy of CEMP and any updates to be attached to EMR during the period in which they are approved.	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	induction course must be always accompanied by inducted workers when within the working area. and (ii) periodic safety training refreshers covering similar to induction, conducted not less than once every six months. All subcontractor workers will be required to participate in relevant training courses appropriate to the nature, scale, and duration of the subcontract. Since they have heightened risk only trained workers must undertake certain activities e.g., working at height, working in confined spaces, working with electricity etc. Workers must have attended such training before they are involved in relevant works and the contractor must either offer an internal training course or organize for attendance at an external specialist training course. Workers must have a training record of attending a suitable training course. Untrained workers will not be permitted to work at height, enter confined spaces, work with live electricity etc. • Medical Check-Up/Health Surveillance – of workers fitness, eyesight, hearing, respiratory health, and communicable and noncommunicable diseases before works commence; and then repeated every six months by the contractor during construction. Only workers who have passed their fitness test and have the requisite medical clearance must undertake certain activities e.g., working with electricity etc. • Safety Meetings – as detailed in the IEE/EMP will be conducted monthly during construction phase by NEA. During construction the meetings will require attendance by the safety representatives of all contractors and subcontractors on-site. The minutes of all safety meetings including actions agreed will be taken and sent to NEA within seven days of the meeting.	regulatory requirements or GIIP					

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Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	• Safety Inspections – the contractor will regularly inspect, test, and maintain all safety equipment, scaffolds, guardrails, working platforms, hoists and other lifting equipment, ladders and other means of access, lighting and signage, firefighting equipment, first aid kit, stock take and condition of PPE etc. Signs will be graphic and in the languages of workers, kept clear of obstructions and legible to read. Lighting will meet illumination guidelines for the working area as per IFC EHS Guidelines on OHS. Equipment, which is damaged, dirty, incorrectly positioned or not in working order, will be immediately repaired, or replaced, by the contractor. • Site Audit - during construction the contractor's H&S officer and NEA will undertake monthly audits of compliance with the health and safety plan. • Personal Protective Equipment (PPE) as a last resort where risks cannot be avoided – workers will be provided (before they start work) with appropriate PPE at no cost to the workers. PPE provided to workers (regardless formal and informal, directly contracted or subcontracted) in accordance with GoN Ministry of Federal Affairs and Local Development Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR) – Occupational Safety and Health Guidelines, 2017 and the Table 2.7.1. Summary of Recommended Personal Protective Equipment according to Hazard in IFC EHS Guidelines on OHS including safety shoes, helmets, goggles, earmuffs, and face masks and ensure that this is always worn by them with a strict disciplinary system (no work condition if not compliant) being enforced for any non-compliance. • If working under live lines (HV or LV) then a safety scaffold will be installed so that the workers cannot come in contact with the OHL, with warning signs						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	provided – all works under HV and LV lines must have an activity specific risk assessment and management plan given the high risk of an incident • Work Zone Noise Levels: during construction protective measures need to be provided and as per the WB-IFC EHS Guidelines on OHS, Table 2.3.1. sets the level at 85 dB (A) for 8 hours exposure as well as 140 dB(C) peak/instantaneous noise exposure for workers working near the high noise generating machinery. High noise work areas must be adequately signposted. In these high noise work areas PPE in the form of sound reducing earmuffs/ear plugs to the workers are to be provided.						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	In the first instance however, reduction in noise levels to the lowest practical level must be achieved by adoption of suitable preventive measures, such as, use of enclosures with suitable absorption material, etc. Workers operating in the high noise work areas will be given auditory tests as part of health surveillance. • EMF levels at the construction site to be kept within international good practice levels as per ICNRP (reference and peak values) for the occupational exposure. • Electricity: IFC EHS Guideline on Electric Power Transmission and Distribution requirements for working with electricity will be observed with only licensed electricians that meet the requirements set out in them allowed to work on live electricity with strict adherence to safety standards including those listed in said guidelines. Live lines will be deactivated and properly grounded before work is performed on, or in proximity, to the lines and this will be checked and certified in writing by the contractor's Health and Safety Officer in advance. While working at heights personal safety measures such as harnesses, tool bags, ropes etc. will need to be provided. • Emergency Preparedness and Response Sub-Plan including communication systems and protocols to report an emergency e.g., health emergency, work-related accident including electrocution, traffic accident, accident involving the community, natural disaster including flooding, landslide, inundation, fire, virus outbreak etc. It will need to be developed in consultation with local emergency services with adequate fire and first aid first-responders based on the construction site to facilitate immediate response. Provide readily available first-aid for workers as well as access to an ambulance for more serious cases.						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	Make arrangements for a nurse and doctor on call and nearest Health Center and/or Hospital for emergency cares of workers. Regular drills will be required involving all workers to prepare for an incident. • In undertaking H&S risk assessment and preparing H&S Plan adequate attention will be given to the risks associated with any pandemic/diseases and must be complied with and ADB guidance to be followed, as well as further guidance detailed in the IEE. • Contractors will set up an accident reporting system for any health and safety incidents (near miss, minor, lost time, fatal) involving workers or community to be reported to NEA within 24 hours of occurrence with a response plan detailing the incident and how its reoccurrence will be avoided. NEA to then report any lost time or fatal incidents to ADB within 48 hours. Record of all incidents and response taken should include date, time, details of incident, treatment given and outcome, and lessons learnt for the future. Contractors will ensure all workers are covered by insurance to pay out in the event of a disability or fatality. • Emergency contact number and details for medical, fire, etc. are to be displayed in all construction sites. • Contractors will provide temporary facilities for construction workers e.g., sanitation and welfare facilities and a good standard of living and working conditions as per national and state laws and regulations and international good practice guidance						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	as per IFC EHS General Guidelines,[18] and ILO[19] including: • Indoor toilets (one per six staff) with hand washing facilities and if overnight accommodation[20] private bathing area, showers or baths, all connected to existing sewage system or septic tank with soak away, • Shaded rest area that is accessible and can accommodate the number of workers on site, • Indoor food preparation and separate clean eating area, provision of sufficient fuel supply for cooking other than wood, • Enclosed garbage bins for disposal of waste generated by workers, as burning of waste will be prohibited, and • Potability testing before work commencement, drinking water supply that meets GoN drinking water quality standards to be provided. • Contractors will determine if they source canned drinking water from an existing commercial supplier (as the preferred option, test certificates to be given) or provide their own source of treated water for workers; all drinking water provided is to be regularly tested and confirmed to meet GoN drinking water quality standards. For sources other than canned drinking water undertake baseline water quality sampling per EMoP (Appendix 13) to confirm source suitability and, if necessary, provide additional water treatment facilities during construction to facilitate safe drinking water supplies.						

[18] https://www.ifc.org/wps/wcm/connect/1d19c1ab-3ef8-42d4-bd6b-cb79648af3fe/2+occupational+health+and+safety.pdf?MOD=AJPERES&CVID=nPtgxyx
[19] https://www.ilo.org/media/340691/download
[20] Use of locally hired workers may eliminate the need for the establishment of temporary construction camps by contractors but all employee provided accommodation is to meet EMP requirements.

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	• Contractor to ensure all members of their project management team, safeguards team, design team, and construction management team attend the NEA provided EMP trainings. • Contractors to conduct their own trainings for their construction management and provide all workers and visitors on site, irrespective of them being formally or informally employed by the contractor, subcontractor or third party with an EHS induction before being allowed on site – induction to cover orientation on EHS requirements and roles and responsibilities in relation to EMP implementation, dos and don'ts in relation to the construction site, employer provided staff accommodation, code of conduct and interaction with local communities, protected areas, forest land, interaction with wildlife etc. • Contractors to ensure topics covered by training and induction include, but are not limited to, good housekeeping at all times; environmentally safe and sound waste management practices; hygiene and communicable disease prevention including HIV/AIDS; gender-based violence and sexual exploitation, abuse and harassment prevention; code of conduct, interaction with local communities and culturally acceptable practices; biodiversity conservation awareness; fire safety prevention; prohibition on firewood collection by workers; prohibition on trapping, hunting, fishing, or poaching by workers; chance find procedures; H&S including use of PPE; etc. • Prior to site establishment, contractors will prepare with guidance of labor experts a worker Code of Conduct and information video/brochure/leaflet for distribution to all workers during induction addressing culturally acceptable practices etc. Code must be						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	informed by the CEMP and address the following aspects: ○ Zero tolerance in respect of health and safety ○ Requirement on always wearing PPE on site ○ Zero tolerance of bribery or corruption ○ Respect for local community and customs, avoiding community conflict situations especially in IP areas ○ Zero tolerance of illegal and unacceptable activities/behavior, including but not limited to engagement in: prostitution; gender-based violence/sexual exploitation, abuse, and harassment; illegal sale or purchase of alcohol; sale, purchase, or consumption of drugs; gambling; fighting ○ Alcohol and drugs policy and testing regime ○ Role of workers in good housekeeping ○ Role of workers in maintaining good hygiene including ○ Respect of wildlife and the environment ○ Description of disciplinary measures for infringement of the code of conduct and other employer rules (e.g., immediate removal from site, fine etc.) • Contractors to familiarize and ensure their workers are aware of the cultural requirements of the areas in which works are undertaken, and any IP villages, and reflect this in the code of conduct. • Contractor to consider the use of security personnel to ensure workers comply with the code of conduct especially adjacent to the international border and in						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	other areas with a higher conflict risk.[21] • Contractors will prepare with guidance of health experts HIV/AIDS information video/brochures/ leaflets for distribution to all workers during induction, covering factual health issues as well as behavior change issues around the transmission and infection of HIV/AIDS and other communicable diseases. • Contractors to conduct regular emergency preparedness and response drills involving all workers irrespective of them being formally or informally employed by contractor, subcontractor or third-party to prepare them in case of an environmental or health and safety incident including fire, spillage, natural disaster, disease outbreak, etc. It will also cover identifying and reporting wildlife incidents. • Emergency preparedness and response training for construction management will include modules on first aid and fire safety including include training on how to use first aid and firefighting equipment provided on-site. • Contractors to continue to deliver short monthly EHS refresher sessions to construction management and all workers and cover pertinent environmental, health and safety to PMCs on daily basis in toolbox talks to be delivered to all workers. • Contractors to ensure workers with a specific role have, before been allocated the task, attended specialized health and safety trainings related that role e.g., health and safety stewards, first aiders, fire safety officers, as well as ensuring workers have received task-specific trainings for working at height, demolition, working with electricity, etc. Only allow						

[21] https://www.ifc.org/en/insights-reports/2017/publications-handbook-securityforces

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	suitably trained and qualified workers to work on electrical equipment and at height, these workers must have training record of attending suitable training course on electrical safety and working at height and be provided with and wear the appropriate PPE for their role. Untrained workers must not be permitted to work with live electricity or at height.						
Community health and safety risks	• Insurance to include a community liability clause for payment of compensation in case of any accidents because of construction. • Contractors to undertake facilitated H&S risk assessment with NEA through a workshop attended by PMU/PIU/PSC during the detailed design (and at other key stages) so that it can inform both the detailed design and pre-construction preparations, considering both occupational and community H&S risks resulting from subsequent stages of the project. Resulting H&S Plan especially the Emergency Preparedness and Response Sub-Plan will address the management of both occupational and community health and safety risks. • Contractors in conjunction with Ward/Municipal committee members, local government, village heads, and the media with the support of CSOs to organize health and safety campaigns for construction and electrical safety community awareness raising activities in local communities and schools in areas where community groups assemble and especially where children's and vulnerable individuals are present, within 50m of distribution line ROWs and DTR (even if pole mounted) sites prior to construction and then again prior to commissioning of substations/ energizing the distribution lines about how to avoid electrical incidents having greater emphasis on operational hazard and risks, etc.	NEA approved detailed designs minimize impacts and risks related to Community Health and Safety during subsequent stages of the project Facilitated H&S risk assessment completed before approval of H&S Plan NEA approved CEMP and subplans to minimize impacts and risks to Community Health and	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC Review detailed design, CEMP sub-plans and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated. Copy of CEMP and any updates to be attached to EMR during the period in which they are approved. Awareness raising will be documented and reported in EMRs	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision and Monitoring**	**Contractor**
	• In particular, the local community is needing to be educated (especially for those villages to be electrified) by the contractors and NEA with respect to the importance of maintaining the horizontal and vertical clearance from buildings in order that they do not erect new buildings within this zone as has reportedly occurred in all the instances where safety clearances are breached. • Community awareness programs will use distribution of posters, leaflets, and safety booklets to all households in the main official/local languages (e.g., Nepali/Jumli etc.) within 50m of distribution line ROWs and DTR sites as well as face-to-face orientation at the village/town, community level. Translations will also be available in other official local languages in the areas with tribal or minority communities. These posters and safety booklets will be available to also pick up within district distribution offices of NEA etc. • Contractors to develop and distribute leaflets/pamphlets/posters to the local community covering (i) health awareness including HIV/AIDS and other communicable diseases, and (ii) the conduct of construction workers that can be expected.	Safety during subsequent stages of the project. No breaches of compliance with regulatory requirements or GIIP				including photos and records of participants (including the gender breakdown data)	

Table A9-2: Environmental Mitigation Plan–Distribution Lines and DTRs

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
Detailed Design/Pre-construction Preparations Phase							
Impact on vegetation along alignment and interference with community activity, economic loss to commercial or farmlands, crops, etc.	• Contractor to complete with inputs of environment/ecology/cultural heritage experts the environmental assessment checklist included in Appendix 12 for each DTR site/distribution line (ideally on ward basis) for NEA approval (after having received ADB clearance) alongside detailed design and confirm all components meet the environmental criteria and principles set out in the main EMP document. • Meaningful consultation to be undertaken for each distribution line/DTR by contractor to inform affected communities and other interested stakeholders of the planned works - consultation proforma in Appendix 12 to be submitted for each DTR site/distribution line (ideally on ward basis) for NEA approval alongside their detailed design. • Prior to NEA approval of the detailed designs and commencement of construction seek ADB clearance of the consolidated environmental assessment forms and update the IEE as required, confirm no change from the impacts and risks described and assessed in the IEE, or undertake site-specific assessment and develop the site-specific EMP if required, seeking ADB clearance of any updated (format in Appendix 12) IEE before works start.	Final distribution route alignments and pole sites comply with the environmental principles of IEE/EMP. 100% of consolidated environmental assessment forms and consultation proformas submitted to and cleared by ADB before the commencement of works IEE updated by NEA and cleared by ADB prior to approval of detailed designs. 100% landowner consent obtained and/or compensation paid prior to commencement of works Pre-condition survey approved	NEA counterpart fund, contractors to reflect in contract costs NEA budget for compensation	Pre-construction stage. compliance prior to any works commencing on site including site establishment	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC Review environmental assessment checklists received via PIU and consolidate for onward submission to ADB together with the updated IEE. Consultation will be documented and reported in updated IEE and/or EMRs including photos and records of participants (including gender breakdown data)	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment Provide copies of completed environmental assessment checklists and consultation proformas to PIU for consolidation Advise NEA of need for pole replacement/rehabilitation or other temporary disturbances to private land. Support NEA in the update of the IEE for ADB clearance prior to

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• Contractor with environment/ecology/cultural heritage expert input to undertake ROW and DTR location walkover and enumerate any structures within the ROW/site and if safety clearances are being met, submit survey report alongside detailed design. • In all cases including conversion/rehabilitation of distribution lines where safety clearances are currently encroached upon the minimum horizontal and vertical electrical clearances, as required by the Nepal Electricity Act, Rules and Regulations, are to be maintained to ensure safety of human beings and buildings in the vicinity of the distribution lines. If safety distances are found not to be complied with during replacement of existing lines, the distribution line will have a minor realignment to facilitate compliance, or the resettlement requirements will be triggered. No houses or other regularly occupied properties must be sited under the DL. • Rehabilitation of existing lines will only be permitted if school compounds and playgrounds are not crossed, or minor rerouting takes place to avoid them. • Conversion/rehabilitation of existing lines and related facilities must minimize damage to existing trees and properties whilst ensuring horizontal and vertical safety clearances. • If deviation from existing alignment is required to ensure safety clearances new route to be determined in	before commencement of works Local Communities/Ward/Municipal and other concerned stakeholders kept informed throughout project implementation, and aware of construction etc. NEA approved detailed designs minimize impacts and risks on EHS during subsequent stages of the project				Review detailed design and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.	commencement of any works on site

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	consultation with affected communities to avoid or minimize economic/livelihood losses and inconvenience to landowners, road users etc. • Distribution line alignment to be designed to be within existing power line and road ROWs as far as is practical, having minimal impact on private land. Agricultural and other private land shall be avoided to the extent feasible, but if unavoidable, then compensation of standing crop damage/trees lost during installation shall be paid by NEA at the market value prior to construction in accordance with the RIPP/entitlement matrix. Schedule works to avoid or minimize crop disturbance where lines cross private land, such as undertaking works in between crops. • In built up areas poles/DTRs will be placed so they do block the footpath/road or sites used by access to shops/business, etc. OHL poles will be placed to avoid impacts on trees, properties, public utility services, etc. • Alignment to avoid impacting on rivers and groundwater sources especially water sources including wells/pumps used by local communities. • All OHL river/stream crossings required will be single span. • In relation to cumulative impact contractors to liaise with other utilities regarding the timing and extent of other construction works in the same road ROW and ensure plans for construction works are coordinated so						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	emissions/disruption/ disturbance are minimized. • For private property including physical cultural resources or public utilities that may be damaged during construction, including from potential damage (buildings, shops roads, drains etc.) photographic and/or structural pre-condition surveys are to be completed by the contractors and agreed with NEA prior to any works, including site establishment. These must be documented in a pre-project condition report, which will serve as baseline in case any inadvertent damage to property occurs. Contractors will be required to restore any structural or cosmetic property (like damage to front porch of buildings) damage that is caused by their works to at least pre-project condition at their own cost. • If risk of structural damage to adjacent properties from vibration identified due to setting or current condition, consider alternative construction methods or temporary relocation of occupants during works if at risk.						
Impacts on biodiversity and cultural heritage and important	• No lines that require IEE or EIA under national regulations will be taken up under the Output 2(iii) distribution components[22]. • All lines will use only CC or ABC with	Final distribution route alignments comply with the environmental criteria and principles in the IEE/EMP.	Contractors to reflect in contract costs	Pre-construction stage; compliance prior	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC	Implement mitigation measures, comply during

[22] For routes with Brief Environmental Study being required due to community forest land NEA will obtain requisite national permissions to undertake works in the forest land before approval of the updated IEE prior to issue of the bid documents.

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
sites and habitats for biodiversity and cultural heritage.	adequate spacing and insulation of conductors and equipment at the distribution poles in order to prevent electrocution of wildlife. • Lines and their related equipment in natural habitat will only be installed where site-specific biodiversity assessment demonstrates significant conversion or degradation of natural habitat can be avoided. • Lines and their related equipment in potential critical habitat will only be installed where site-specific biodiversity assessment demonstrates significant adverse impacts can be avoided. • No lines or related facilities in the National Parks, their buffer zones, Ramsar Sites, KBA or IBA, protected forest areas (conservation forests) will be taken up under the Output 2(iii) distribution components. • Distribution lines or related facilities in forest land (other than forest protection (conservation forests) areas) will only be taken up under the Output 2(iii) distribution components after they have been demonstrated to be compliant with GoN forest legislation with no objection received from Department of Forests (DoF) and local government. • For lines or related facilities in community managed forests permission from the community forest user group (or for leasehold or private forest, the applicable user and owner permissions) will be sought.	IEE updated by NEA and cleared by ADB prior to approval of detailed designs. NEA approved detailed designs minimize impacts and risks on EHS during subsequent stages of the project		to any works commencing on site including site establishment		Review environmental assessment checklists received via PIU and consolidate for onward submission to ADB together with the updated IEE. Review detailed design and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.	detailed design and prior to any works commencing on site, including site establishment Provide copies of completed environmental assessment checklists and consultation proformas to PIU Advise NEA of need for pole replacement/rehabilitation or other temporary disturbances to forest/natural habitat land. Support NEA in the update of the IEE for ADB clearance prior to commencement of any works on site

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• Only 11 kV CC and LT ABC lines following existing power line RoWs without minor diversions, or new lines or minor deviations of existing lines remaining in existing road RoWs, and not requiring new access track construction will be taken up in community (leasehold or private) forest land and only after having first received a written no-objection from the Community Forest User Group or equivalent and only as long as site-specific biodiversity assessment demonstrates that any significant adverse impacts can be avoided. • No lines or related facilities in the nationally protected monument sites of Nepal Department of Archaeology (DoA) or religious forests will be taken up under the Output 2(iii) distribution components, and in the tentative UNESCO sites and at all sites within 500 m of nationally protected monuments no lines or related facilities will be taken up unless no objection has been received from DoA following site-specific physical cultural resources assessment to demonstrate that any significant adverse impacts can be avoided. • Lines and related facilities will only be installed where significant damage to local physical cultural resources can be avoided, and physical cultural resources do not need to be removed from their current location.						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• New lines resulting in the significant conversion or degradation of natural habitats as defined by ADB SPS, 2009 or which occur in areas with presence of ADB Critical Habitat-qualifying biodiversity and have been demonstrated through a site-specific assessment not to comply with ADB's Safeguard Policy Statement 2009 requirements, shall not be taken up under the Output 2(iii) distribution components. • Lines and poles will adopt a "wildlife sensitive design" such that, at the poles, all equipment will be adequately spaced, and live infrastructure insulated in 2m of any earthed infrastructure. • New and rehabilitated/upgraded lines must meet all horizontal and vertical safety clearances with minor rerouting of existing lines taking place if it is required, no lines will cross over houses or other regularly occupied properties. • Lines will not be laid across school compounds, playgrounds, or other areas where children as vulnerable members of the community assemble without parental supervision, if adjacent "guarding net" will be installed.						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	 • Lines will not be laid across areas where community groups regularly assemble such as the grounds of temples unless agreed with the representatives of user groups. • Removal or rehabilitation of existing lines must minimize damage to existing trees and properties with “guarding net” put in place during conductor removal. • Lines and related equipment must avoid or minimize damage to trees, especially private/community forest user trees, whilst ensuring horizontal and vertical safety clearances are maintained, and before any are cut/trimmed/lopped ensure they are subject to ecological checks for nesting birds etc. • Lines and related equipment must avoid or minimize damage to locally important physical cultural resources, property including structures (e.g., buildings) and roads, crops, public utilities, etc. whilst ensuring horizontal and vertical safety clearances are maintained. Any compensation payments for damages to						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	private property must be undertaken by NEA in accordance with the social safeguards entitlement matrix before the works commence. • Lines and related equipment must create minimum disturbance to existing pedestrian and traffic routes in terms of blockages or diversions • Route alignment as far as possible to ensure works only take place on modified habitat. • Site DTR to avoid natural habitat. • Minimize the felling of the trees through route alignment and siting of DTR by avoiding areas with a high concentration of trees. Cutting or trimming of trees will only be planned when required to meet safety clearance requirements. • Prior to any vegetation clearance, EPC contractor's field ecologists, including an experienced ecologist/botanist, to undertake site and Right of Way (RoW) walkovers, map habitat and Critical Habitat-qualifying (if identified) species encountered, protected species of Nepal etc.[23] • These checks will also involve consultation with local communities since some local individual trees may have cultural/religious value to the local communities/Indigenous Peoples that must not be cut or damaged.						

[23] https://portals.iucn.org/library/sites/library/files/documents/1997-020-En.pdf

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• District Forest Officers and local communities will also be consulted on species occurrence by the field ecologists. • Survey reports will inform the environmental assessment checklist, be part of any site-specific assessment, and be used to update the IEE. • If Critical Habitat-qualifying species etc. are found during surveys, infrastructure will be micro-sited or re-routed to avoid any significant impacts. • All storage areas and any labor camps will be located inside nearest existing substations or outside of the high biodiversity value areas/natural habitat. • Develop and adopt a wildlife identification and rescue protocol. This will include stopping of all construction works in areas where Critical Habitat-qualifying wildlife and protected species of Nepal are observed, followed by communication to NEA/PMU and the relevant District Forest Officer to be involved in any rescue action required. This communication will include location, name of the species (if identified), injury to humans or animal (if any), and the present situation. Where necessary, the local police station will be contacted for support with crowd management and control. All assistance will be provided to the wildlife rescue team mobilized by the Ministry of Forest and Environment of Nepal. • During pre-construction train workers on identification of Critical Habitat-qualifying						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	species (especially in Mugu district), dos and don'ts regarding chance encounters with wild animals, and the wildlife rescue protocol; display contacts of District Forest Officers in the contractor office • For areas where biodiversity sites (protected areas, buffer zones, Ramsar, KBA, IBAs, etc.) are present, train workers on a code of conduct that specifies entry to these areas is prohibited and measures to ensure that biodiversity is protected. • Demarcate the working area by the contractor and avoidance of encroachment outside this working area. • OHL cable alignment to avoid tree crown zone, especially for mature trees. • For poles, root damage to trees is to be avoided so unstable trees do not present a public safety hazard. • Ensure the requisite Ministry of Forest and Environment of Nepal approvals for any tree trimming/looping are in place pre-construction; Department of Roads Nepal will also be consulted. • Some trees are to be felled as confirmed by NEA, those identified to be cut after final route alignment. Felling will be after permission from Ministry of Forest and Environment of Nepal/Community Forest User Group/DRO/ward committee has been secured. • NEA will fund the Forest Department • based on the number of trees counted to be cut and will monitor the progress of the compensatory reforestation to						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	ensure that no net loss of trees/forest habitat is obtained. • Compensate for the loss of any private • trees in the RoW based on their replacement cost, as defined in the RIPP/entitlement matrix and GoN norms • On OHL all live infrastructure will be insulated within 2m of any earthed infrastructure – see Annex 2 for details of accessories to be installed by the contractor such that there is no risk of electrocution.						
Impact on physical cultural resources and aesthetics due to presence of distribution lines	• No lines or related facilities in the nationally protected monuments of Nepal Department of Archeology or religious forests will be taken up under the Output 2(iii) distribution components, and in the tentative UNESCO sites and at all sites within 500 m of nationally protected monuments no lines or related facilities will be taken up unless no objection has been received from DoA following site-specific physical cultural resources assessment to demonstrate that any significant adverse impacts can be avoided. • Lines and related facilities will only be installed where significant damage to local physical cultural resources can be avoided, and physical cultural resources do not need to be removed from their current location. • Minimize visual impacts/amount of visual clutter through sensitive route alignment	NEA approved detailed designs minimize impacts and risks on EHS during subsequent stages of the project Local communities and other concerned stakeholders kept informed throughout project implementation, and aware of construction etc.	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC Review detailed design and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment of any works on site

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	of overhead lines and pole placement having cognizance of any above ground physical cultural resources adjacent. Communities to be consulted on their views about OHL presence (especially non electrified villages) - consultation to be undertaken by contractor and consultation proforma to be submitted for NEA approval alongside detailed design - consultation proforma in Appendix 11. • Contractors to conduct an inventory (and condition surveys) of physical cultural resources in and adjacent to the RoW and in 50m of DTR prior to the start of any works including site clearance along all new, rehabilitated and existing distribution line routes. Inventory to be conducted in consultation with local communities including indigenous peoples prior to the start of any works including site clearance along all new, rehabilitated and existing distribution line routes. • For physical cultural resources that shall be impacted receptor-specific management plan will be developed in consultation with the local community to ensure significant adverse impacts can be avoided. • Demarcation of the working area by the contractor and avoidance of encroachment outside the agreed corridor of impact. Also, demarcation of physical cultural resources (such as shrines, trees) to be avoided and retained.						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• Ensure workers do not loiter outside of temples etc. • Contractors to consult individual households where a new pole location is within or directly adjacent to private property or where the line passes directly over private property prior to finalizing detailed design - consultation proforma in Appendix 12 to be submitted for NEA approval alongside detailed design.						
Chance find of physical cultural resources during construction	• CEMP to set out the agreed procedures in case chance finds are encountered including stop work and inform NEA who shall inform ADB.	Chance find procedure in place before commencement of works	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC Review detailed design and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment of any works on site

Community health and safety risk from equipment mobilization, construction activities, toppling of poles during installation, traffic congestions, as a result of passing over/along/side houses, busy/congested settlements or sensitive land uses like schools, etc.	• Contractor to check with relevant local authorities (gas, electric, water, telecoms) whether there are known pipes, cables, or other utility lines and carry out a scan using Cable Avoidance Tool (CAT) to identify any unknown underground utilities prior to excavation • Contractor to obtain necessary approvals from the municipalities and other utility providers prior to the start of works. • Contractors to identify in consultation with service providers appropriate measures to minimize period of disruption to utilities and reduce health and safety risks during installation. • If services must be disrupted contractors (via service providers if appropriate) to notify affected communities well in advance of any power outage etc. • Should utilities need relocating in a different location consult with the relevant utilities and local community to ensure that there is no change in supply because of these changes. • Contractor to ensure structural safety of poles, especially in the event of high winds/cyclones (allowing for climate change) or an earthquake (Seismic High Risk Zone) by designing for maximum loadings; select an appropriate foundation design considering both climatic, landslide/mudslide and seismic risks present. • Design to include adequate pole foundation in order that all poles remain vertical during operation, and that the lines are tensioned. • Distribution poles to be located away from the banks of rivers/streams and outside of their flood/inundation zones, since Karnali Province is subjected to	100% of clearances obtained before commencement of works NEA approved. CEMP and subplans to minimize impacts and risks to Community Health and Safety during subsequent stages of the project. Compliance with ICNRP community EMF exposure levels (reference and peak values)	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	NEA PMU/Karnali Electrical Divisions and District Office supported by PMU	NEA PMU Safeguard Team support by PSC Review CEMP sub-plans and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment

	floods • Contractors to identify existing lines that need to be rerouted/rehabilitated to avoid passing over houses/meet safety clearances or where existing poles are located within the compound of houses/croplands/gardens etc. • For rehabilitation and reconductoring to ABC/CC old poles or poles previously incorrectly installed or wooden/damaged in some areas will need to be replaced. • Contractors to identify presence of and avoid locating poles on any unstable land. For distribution lines that are in significantly complex terrain (e.g., remote villages in Jumla district-Rugagaon/Sanigaon etc.) conduct geotechnical/slope stability analysis and identify slope stability measures during detailed design to minimize the risk of pole uprooting and causing the line to fall or landslide occurrence. Bioengineering methods can be considered for slope protection. Particular attention will be paid to the design of pole, foundations along steep roads, as most have eroded/broken embankment and sloping land on one or both sides. • New overhead lines must not be laid across school compounds. • Conversion to covered conductor or ABC will only be permitted if school compounds are not crossed, or minor rerouting takes place to avoid them being crossed. • No lines to be in areas where community groups assemble and especially where children's and vulnerable individuals are present. • Install on all poles a visual and written warning signages to the public to include						

	the ISO 7010 Hazard Type: Electrical Symbol warning of the risk of electrocution. • Install lighting arrestors along all distribution lines. • Install suitable means of ensuring security of the cable to avoid vandalism. • Design of all new ground mounted transformers (if any) to be mounted on impermeable surface bunded to 110% capacity to collect oil spill, leaks, and overflows • Ground mounted DTRs (if any) located in the public domain will be in a fenced, gated area or secured cabinet that automatically locks shut so that members of the public cannot access electrical equipment. • For new pole mounted transformers a suitable anticlimbing deterrent to be used • If not already in-situ install around the base of all ground mounted transformers to which distribution lines connect a fence with locked gate and for pole mounted transformers a suitable anticlimbing deterrent to be used, together with provision of hazard warning signs. • Contractors will also ensure that ICNRP occupational/community EMF exposure levels (reference and peak values) will be achieved • DTRs are to feature written and visual warning signs that meet the IEEE standards to include the ISO 7010 "Hazard Type: Electrical Symbol" warning of the risk of electrocution. • If during the route survey contractors identify existing transformers not maintained in good condition and to						

	which the distribution lines must connect these are to be reported to NEA. NEA will need to either remove/replace or maintain/repair the transformer, so it is left in good condition. Health and safety risk assessment for exposure to PCBs to be undertaken before removal/ maintenance/repair/connection work is undertaken on any existing transformers.[24] • Distribution line works shall be taken up during daytime unless otherwise agreed with the local community. • Unless in remote locations away from population installation works during 7am -10am as children are going to school and 3pm-5pm as they return back are to be avoided especially on narrow roads where no safe alternative/diversion route is available for them. If the works need to be undertaken during this time then a safe and signed pedestrian diversion route must be put in place with a pedestrian marshal to ensure that children do not go near the working area and a flag man to control traffic if required to ensure children are not put at increased risk. • H&S plan for distribution line works to include a Traffic Management sub-plan considering both the safety of pedestrians and vehicles and need to avoid traffic congestion (mostly narrow/steep hill roads in complex terrain); it is to be developed in consultation with relevant local authorities to ensure proper execution of traffic controls for pedestrians and cars including where temporary blockage of one lane of the road (no footpaths available) is needed for installation. • Traffic management will need to be done in consultation with the affected						

[24] In the absence of documentary evidence (e.g., contract specification or certification for supply of original transformer, maintenance records for oil replacement including material safety data sheet, or transformer oil test results etc.) for given transformers confirming they are PCB-free, all old transformers must be considered by the staff at risk of containing PCBs. Mineral oil-filled transformers were not designed to use PCBs, but many have been found to be contaminated with PCBs. If existing transformers are at risk of containing PCBs NEA will request contractors to test them. Unless transformers (DTR) have been certified PCB free workers interacting with them must wear suitable chemical and/or oil-resistant gloves, goggles, and protective clothing whilst taking samples and/or working with transformers. Water supply to sink/shower and eye wash station to be provided on-site during works due to risk of PCB coming into contact with skin. If oil meets the skin, the workers should immediately rinse the affected area with large amounts of running water. This may be done in a sink if the hands are the only portion of the body contacted or under a safety shower if the exposure area is more extensive. If large parts of the skin met with the oil, the workers should remove contaminated clothing while under the shower for a minimum of 15 minutes. Hand wash, safety shower and eyewash stations are therefore required to be available for immediate use.

	communities to ensure they are aware of likely disruption. • Post warning signs and manage traffic movements to protect the travelling public and its workers as necessary and ensure drivers obey road rules and travel at a safe speed given the nature of local roads and size of vehicles involved. Road safety and warning signs must be posted at 500m, 100m, and immediately in advance of the distribution line works at least two weeks prior to the works commencing to inform the public of turning vehicles and the temporary blockage of one lane of the road during pole installation works. • For congested and narrow roads with sharp bends, (almost all distribution component sites in complex terrain), flagmen must be utilized to warn road users of the situation. • Safety scaffolds and safety nets will be used to protect pedestrians and vehicles (and the conductor itself) from potential injury/damage during conductor stringing – this will be used wherever stringing of OHL conductor (or removal/rehabilitation of old OHL conductors) crosses over roads, presenting a possible risk to traffic, waterbodies, or is in settlement presenting a possible risk to local communities. • Cut vegetation, excavated soil, poles and conductors, and other equipment will need to be stored outside of habitation, not block access or road use. • Contractors will be required to ensure that safe access ways to public and private amenities (including schools, public health centers, places of worship (temples) etc.) are maintained throughout the construction period. •						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
Pre-Construction Enabling Works, Construction, and Commissioning Phases							
Construction area preparation, clearance of land and vegetation for distribution lines – temporary disturbance or accidental damage to agricultural crops, and natural vegetation.	• Comply with the EMP, including ECOP, and contractors' approved CEMP during construction works • Works at all sites within 500m of areas of high biodiversity value (if any like PA, buffer zone, Ramsar/KBA/IBA) and in or within 500m of areas supporting community forest or natural habitat will only be carried out under ecological supervision to minimize disturbance • Use existing access roads and power line ROWs to access work sites, in areas where access is restricted use manual labor to transport, install and string the distribution lines to minimize need to construct new access tracks • Demarcate the working area and avoid encroachment outside the working area. • Demarcate mature trees, or other trees to be avoided. • Only fell marked trees within the safety clearances (working area) • Follow design drawings and implement careful construction practices to avoid damage to vegetation outside the working area. • Undertake works requiring tree trimming outside the bird breeding season. Before trimming trees, check for presence of the nesting birds or roosting bats and – if found – delay cutting/trimming. • Remove invasive plant species (identified based on survey during detailed design phase by EPC	Compliance with GoN regulations and guidelines 100% of existing public and private property left in same condition as prior to construction. EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc. No outstanding biodiversity or property damage related grievances from local communities or other interested stakeholders	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC	Implement mitigation measures for the duration of construction

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	contractor's ecologist) during site clearance, without use of chemicals. • Store cut vegetation away from the roadside. Any vegetation material not handed over to the landowner will be immediately removed from site for disposal by a licensed waste management contractor once cutting works are completed. • Promptly revegetate disturbed areas on completion of works with plant species native to district. • Remove any existing poles (if required) by pulling the complete pole from the ground; poles will not be cut off at ground level. Poles will then be cleaned, and any material attached to the pole (including concrete) removed. Unused pits will then be backfilled and compacted completely with enough backfill piled above grade to prevent depressions being created by natural compaction, and the disturbed ground vegetated. Existing poles may be used for other utilities – e.g., street lighting – in which case some poles may need to be retained, or utilities shifted in conjunction with poles. • No construction works from one hour before sunset to one hour after sunrise within 500m of community forest and natural habitat settings, outside human settlements/in rural/remote areas away from the ROW of roads, and within 500m of protected areas, buffer zone, or Ramsar/KBA/IBAs.						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• Follow the wildlife identification and rescue protocol. • All unanticipated damage to vegetation will be restored to pre-project condition and/or compensated at the cost of the contractor in line with the entitlement matrix.						
ROW existing public utilities and chance find of physical cultural resources during construction.	• Comply with the EMP including ECoP during construction works and contractors' approved CEMP including chance find procedures. • On completion restore or rehabilitate any shut off or damaged utilities to at least their original condition in conjunction with the relevant utilities to minimize the public inconvenience • All unanticipated damage to existing public utilities shall be restored immediately to pre-project condition and/or compensated at the cost of the contractor in line with the RIPP entitlement matrix. • Follow chance find procedure if physical cultural resources are found during construction works; if physical cultural resources are encountered, all works at the find site to be immediately halted.	Compliance with GoN regulations and guidelines EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc. No outstanding property grievances from local communities or other interested stakeholders	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC	Implement mitigation measures for the duration of construction
Generation of dust, noise and general disturbance and disruption to affected communities	• Comply with the EMP including ECoP during construction works and contractors' approved CEMP including PPP sub-plan • Provide at least one-month advance notice to local community through Ward/municipal committee/Village Heads about the schedule of and details of planned construction works and	Compliance with GoN regulations and guidelines including emission standards No increase in existing background air	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction stage (mobilization	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU/Safeguard Unit support by PSC	Implement mitigation measures for the duration of construction

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	continue to undertake consultation with affected persons; directly liaise one-on-one with receptors in the ROW including business/shops and specifically notify them about the commencement of work etc. • Ensure all stationary emission sources are maintained in good working order in accordance with manufacturer instructions and have passed applicable emission tests. • Hold valid emission certificates/test reports of all construction vehicles • Open burning of wastes generated by project-related activities to be strictly prohibited • Provide a central covered warehouse for storage of construction materials; only volumes of material required for the day's work will be stored on-site while construction vehicles transporting stone, sand, and other dust generating materials will be covered with a canvas or tarpaulin. • Keep stockpiles of soil, aggregate and waste materials covered with canvas or tarpaulin when spoil heaps are not active to avoid suspension or dispersal of fine soil particles during windy days and to prevent disturbance by stray animals and stored at least 10m from waterbodies. • During the dry season or in windy conditions undertake water sprinkling at least twice a day on unpaved areas present along the ROW	pollution levels Compliance with noise levels: during daytime 65dB(A) at the nearest commercial properties, 45 dB(A) at the nearest residential properties including those within commercial zones and 50 dB(A) in peaceful/silent zones. EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc. No outstanding dust, noise and general disturbance and disruption grievances from local communities or other interested stakeholders		, construction, and commissioning works)			

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• Dust emissions will be further minimized by adopting a rolling construction method and immediately restoring the surface of excavations including road pavements once construction activities are completed. • Soil scattered on roads shall be immediately swept up to avoid windblown dust. • Impose speed limits on construction vehicles to minimize the spread of dust from roads along areas where sensitive receptors are located (residences, shops, schools, health centers, temples, etc.) • During night no works will be permitted, contractors working hours will be 7 am – 7 pm, unless in commercial zones with dense areas for reasons of road safety and avoiding traffic congestion it is otherwise agreed in writing with the municipal/ward authorities and following consultation with all adjacent residents/occupants of buildings to avoid noise nuisance • No noisy work and heavy vehicle movements will take place on Saturdays and for works in proximity to school no works during exam periods. No work on Sundays, holidays and festival days. Sensitive receptors to be consulted with any other special days when they would wish noise levels to be minimized. • Loud construction noise activities in particular, must be limited to very short periods of activity adjacent to receptors to minimize disturbance.						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• Maximum allowable noise levels are stipulated in Appendix 1 of the IEE based on the most stringent of GoN standards and WHO guidelines • If air and noise standards/guideline levels are exceeded, an increase in existing background air pollution or noise (>3dB) levels is recorded where they were already exceeded at the nearest substation, or complaints are received contractors will be required to implement additional dust or noise mitigation e.g., barricading/isolating sources of dust, adjusting working methods, or placing of temporary acoustically designed noise barriers to ensure the standard/guideline is met. • Sound levels received by workers must not be over 85 dB(A) during continuation of 8 working hours without wearing PPE.						
Interference with local drainage/water bodies and soil erosion during auguring and excavation for pole foundation.	• Comply with the EMP including ECoP during construction works and contractors' approved CEMP including PPP sub-plan • Slope stability measures identified during detailed design to be implemented during construction to minimize flooding, inundation risk. • Use of auguring to limit the area to be disturbed for installation pole foundation. • Excavation and other earthworks will be conducted during the dry season to minimize soil erosion and sedimentation of watercourses although this has potential to exacerbate dust impact.	Compliance with GoN regulations and guidelines No deterioration in soil and water quality from baseline levels EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC	Implement mitigation measures for the duration of construction

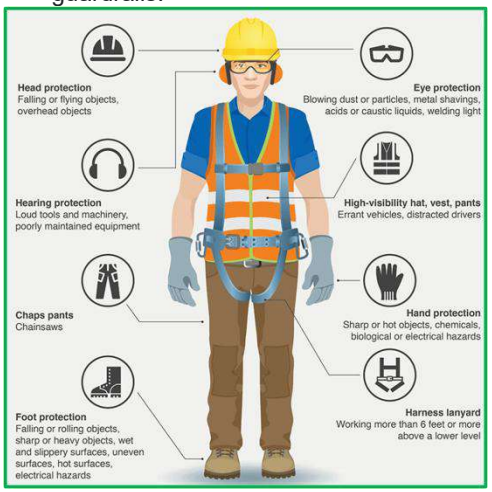
					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• Minimize removal of existing vegetation and topsoil, exposed surfaces will be promptly revegetated with native species to the District including the areas around the pole foundations and areas used for temporary construction facilities • Topsoil disturbed will be separately stored and used to restore the surface of the excavated areas. • Infertile and rocky material will where possible be reused as fill material, if it needs to be taken off site it will be disposed at designated disposal area suitable for inert waste. • Soil exposed to oil leakage from DTRs equipment that distribution lines are connecting to is to be removed from site for disposal as a hazardous waste • Records of excavated spoil, generated waste, and transfer records will be kept by the contractors. Contractors will keep copies of the waste management company's licenses on file at the site office. • Document all volumes and types of wastes generated and removed off site (inert, solid, hazardous) using transfer notes, to be taken by licensed waste contractors who should reuse/recycle or dispose of the waste according to type to suitably licensed and engineered waste management facilities. • Construction activities must not limit the availability of or restrict access to water sources used by local communities for drinking or hygiene purposes.	record etc. No outstanding grievances from local communities or other interested stakeholders					

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• No construction material, solid waste, toxic or hazardous material to be poured or thrown into drains or waterbodies for dilution or disposal. Care to be taken for alignments that pass over river crossings/bridges. • Natural flow of waterbodies must not be obstructed or diverted to another direction.						
Generation of construction wastes use of hazardous materials	• Comply with the EMP including ECoP during construction works and contractors' approved CEMP including PPP and CWMP sub-plans, following the General EHS Guidelines including on the use and storage of fuel, oil, and chemical including prevention and control of hazards associated with spill prevention, emergency response, clean up and contaminated soil remediation. • Fuel, oil, and chemicals used to be kept under lock and key and stored in labelled, sealed containers on drip trays to provide secondary containment. In designated storage areas, they will be located on an impermeable surface and be under cover. • If transformers are temporarily disturbed during pole replacement/rehabilitation, or during DTR refurbishment works they must be handled carefully and stored (ideally undercover) on drip trays to provide secondary containment of 110% of the liquid contents should they spill or leak. • Unless transformers have been certified PCB free workers interacting with them	Compliance with GoN regulations and guidelines including discharge standards No deterioration in soil and water quality from baseline levels EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc. No outstanding pollution or waste related grievances from local communities or other interested stakeholders	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC	Implement mitigation measures for the duration of construction

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	must wear suitable chemical and/or oil-resistant gloves, goggles, and protective clothing whilst taking samples and/or working with transformers. • Provide spill prevention kits (sorbent pads, loose sorbent material, etc.) at storage areas and other at-risk locations within clearly labelled containers. • Provision of designated hard standing areas for equipment servicing, refueling and wash down at least 50m from watercourses, and open/bore-wells, with drainage directed through oil and grease interceptors before being discharged into a settling pond prior to discharge offsite. • No wastewater will be discharged direct to surface waterbodies or groundwater without adequate treatment. • Use of pit latrines will be prohibited as will be open defecation and urination and uncivil use of roads or private premises by construction workers. • For the transient works provision of adequate on-site temporary sanitation facilities (one toilet per six workers) that do not allow untreated disposal of sewage to adjacent water bodies e.g., portable toilets where the wastewater generated is enclosed in a container and will later be taken offsite for wastewater treatment and disposal. In town areas arrangements for access to alternative sanitary facilities (e.g., existing public toilets) that do not allow untreated disposal of sewage to adjacent water bodies may be provided.						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• Minimize waste generation, restrict use of plastics and polyethene and use recyclable/biodegradable materials during construction to the extent possible • Collect and transport construction waste to appropriately engineered and licensed solid/hazardous waste management facilities. In Karnali there are no sanitary landfills but unsanitary open dumps and these are not to be used by the contractor. Residual solid waste is only to be disposed of to a licensed engineered (sanitary) landfill. No licensed engineered hazardous waste landfill exists in Karnali district. Municipal waste collection systems must not be used as this is likely to mean that the waste is open dumped. Hazardous waste will need to be safely stored for disposal per the GoN Solid Waste Management Act, 2012 and the Acid and Other Hazardous Chemical Act 2022 where suitably licensed hazardous waste management facilities exist (none in Nepal). • Removed electrical and mechanical equipment, old bare conductor lines and poles will be handed over to NEA or transported to designated NEA divisional/district warehouse as per the direction of NEA who will repair/reuse or recycle as per the condition of the equipment, if fit for use they will be stored for reuse by NEA. Disposal of old transformers and other hazardous wastes shall be as per the GoN Solid						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	Waste Management Act, 2012 and the Acid and Other Hazardous Chemical Act 2022.						
Occupational health and safety of workers – falls, electrocutions, accidents during loading and unloading activities, working along/beside roads, exposure to increased noise etc.	• Comply with the EMP including ECoP as well as following the agreed detailed design, complying with approved CEMP including H&S and labor management sub-plans and the IFC EHS General Guidelines in relation to occupational health including the IFC EHS Guideline on Construction and Demolition and the IFC Electric Power Transmission and Distribution Guidelines, and the ILO safety and health in construction guidelines and avoid H&S incidents by taking a "zero tolerance" approach to the works. • Contractor is responsible for ensuring H&S of everyone on construction site including visitors and sub-contractor workers regardless they have been formally or informally employed. **<u>Working at heights:</u>** • Contractors/sub-contractors must take necessary measures to ensure the safety of workers who work at height/on the pole. • Per GoN Labour Act 1992 and the Occupational Safety And Health Guidelines, 2017 employers/contractors/sub-contractors to ensure the safety of workers who work at height. This includes providing appropriate safety equipment, taking measures to prevent falls from height,	Compliance with GoN regulations and guidelines No fatalities or lost time incidents 100% of H&S incidents including near miss recorded, immediately investigated, and corrective action taken to prevent repeat. EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc. No outstanding health and safety grievances from workers	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC	Implement mitigation measures for the duration of construction Any incidents and how they were handled, will be reported in monthly progress reports by the contractor to the NEA. Any long-term absences of safeguards staff will be approved by NEA within 7 days of receiving official applications with CV of nominated alternate or replacement. CV may be declined if not comparable to the original staff.

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	and appointing a competent person to supervise work at height. • Safety equipment such as safety harnesses, safety belts, safety nets, and guardrails.  • Contractors must also ensure that workers are trained in the proper use of safety equipment and are aware of the hazards associated with working at height. • In addition to safety equipment, employers must also take measures to prevent falls from height. • This can include providing safe access to elevated work areas, ensuring that work platforms and insulated ladders are stable and secure, and conducting regular inspections of equipment and work areas.						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	   • There must be a competent person present to supervise work at height and						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	ensure that safety measures are being followed. • If working under live lines (HV or LV) then a safety scaffold will be installed so that the workers cannot come in contact with the OHL, with warning signs provided. There must be a competent person present to supervise work at height and ensure that safety measures are being followed. • Workers must be provided with adequate rest periods to avoid fatigue and must not be required to work at height during adverse weather conditions. First aid kit to include adequate ORS fluid/power packets. • Ensure adequate health and safety supervision is always on site (if staff temporarily off sick or on short term leave of less than a fortnight contractor to provide a named alternate in advance; if safeguard staff are on longer term leave, are posted elsewhere, or resign, contractor to ensure replacement CV is submitted to NEA in 7 days of the contractor becoming aware with the staff joining the site within one month). • Require workers to confirm they have seen and understood the requirements of the health and safety plan before proceeding with the work. • Each transient work gang will have with them on site at all times canned drinking water, first aid kit and fire extinguisher (in case of forest fires)						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• Equipment used on or around the site will be modern and fitted with appropriate safety devices. • Ensure good housekeeping at construction site, storage areas, staff accommodation, etc. - to be kept neat and tidy, e.g., no materials, equipment, trash laying around, clean-up worksites so that they are free of debris on daily basis. • Use good means of communication during works in lines and checklists with triple signatories to confirm the de-energizing/energizing is completed						
Community health and safety risk from equipment mobilization, construction activities, toppling of poles during installation, traffic congestions, as a result of passing over/alongside houses, busy/congested settlements or sensitive land uses	• Comply with the EMP including ECoP as well as following the agreed detailed design, complying with approved CEMP including H&S and traffic management sub-plans and the IFC EHS General Guidelines in relation to community H&S • Fence off construction site including material stockpiles/storage areas from public access. • Provide robust barricade/fence, hazard warning signage, and security presence whilst working in areas accessible to the public. • Do not allow children to play in or adjacent to the construction site. • Avoid construction as per school timings in Jumla Bazar Area and other municipalities and on narrow roads where school children have no alternative route available to them. • If works are not completed within the day the contractor must not leave any	Compliance with GoI and GoA regulations and guidelines No fatalities or lost time incidents 100% of H&S incidents including near miss recorded, immediately investigated, and corrective action taken to prevent repeat. EMP/CEMP requirements successfully implemented as determined	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)	NEA PMU/Karnali Electrical Divisions and District Office	NEA PMU Safeguard Team support by PSC	Implement mitigation measures for the duration of construction

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
like schools, etc.	hazardous conditions (e.g., unsigned, unfenced, and unlit open excavations without means of escape and emergency contacts in case an accident occurs) overnight unless absolutely no access by public can be ensured. • In the urban areas and narrow roads transport equipment only during non-rush hours i.e., avoid the hours of 7 am to 10 am and 3 pm to 5 pm with the timing of works planned (taking in consideration school timings - going and coming back) in conjunction with other construction works to minimize the cumulative impacts they may cause traffic congestion. • In dense town areas or on busy roads or narrow roads installation works affecting roads to avoid rush hours (school timings) i.e., avoid the hours of 7am to 10 am and 3 pm to 5 pm. • Stockpiling of old poles, spoil, and any new equipment (cable reels etc.) only in designated areas where no access or road use (school gates) will be blocked. • Temporary pedestrian and traffic diversions are to be put in place per the approved traffic management plan. Diversion works to be immediately dismantled on completion of works and the footpath and roads restored to their original condition. • Ensure that safe access ways to public and private amenities (including schools) are maintained, safe alternative routes provided and clearly signed where there are temporary diversions or blockages.	through regular site checks, photographic record etc. No outstanding health and safety grievances from local communities or other interested stakeholders					

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• Safety guides should be provided where works are on footpaths or in locations of pedestrian crossings to help guide pedestrians, especially vulnerable persons, safely around the working area. • Safe access to property, footpaths and roads should be maintained and safe alternative routes and access provided and clearly signed where there are temporary diversions or blockages. • Road safety standards and norms to be strictly implemented by contractor, construction vehicles to strictly follow GoN Department of Roads road regulations • Damage to roads must be immediately repaired to ensure that local communities can continue to safely use the public roads/highways. • On completion of construction works roads must be left by the contractors in no poorer condition than when construction started. • For congested and narrow roads trained and experienced flagmen should be utilized to warn road users of the situation. • For removal of existing lines scaffolds and safety nets will be used to protect pedestrians and vehicles (and the conductor itself) from potential injury/damage – this will be used wherever stringing crosses over roads and securing a road closure is not possible, presenting a possible risk to traffic, waterbodies, or is in settlement						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	presenting a possible risk to local communities where access cannot be completely prevented, especially where buildings have encroached into the safety clearances and in the vicinity of schools. • Where the execution of the works requires single-lane operation/beside public road the contractor will provide and maintain all necessary barriers, warning signs and traffic control signals to the satisfaction of the Local authority. Wherever traffic diversions, warning signs, traffic control signals, barriers and the like are required, the contractor will install them prior to commencing the work, in that area. • Upon completion of the works for which the temporary traffic arrangements or diversions have been made, the contractor shall remove all temporary installations and signs and reinstate all affected roads/sections and other structures or installations to the conditions that existed before the work started. • For schools and temples adjacent to ROW ensure workers do not loiter outside of temples/church and school gates; avoiding movement of materials to site and works during school start/finish times and any gathering in temples/churches.						
Operational and Maintenance Phase							
EHS impacts and risks of the	• During maintenance activities mitigation measures applicable to the construction phase are also applicable to NEA	Compliance with GoI and GoA regulations and	NEA internal cost	Prepare during	NEA/Karnali Electrical	PMU Safeguard Team	NA

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
project during O&M in general including occupational and community health and safety risks Community H&S risks due to presence of distribution lines – hazards of electrocution, lightning strike, strong winds snapping live cables etc. Humans can climb (accessing/sitting in DTR sites) poles and get electrocuted	maintenance workers or contractors and are to be followed • Carry out regular inspections (at least monthly) on the distribution lines and periodic maintenance to ensure that integrity of the poles and line is in good condition including possible conductor snapping and de-energizing of the line within three cycles to avoid the potential for electrocution from a breakage, the clearances are maintained, and electrical standards are being upheld. • Inspection protocol should confirm electrical safety warning signs and lighting arrestors in place and identify any missing or corroded parts (including protection for birds) for immediate replacement. • If property is found to be encroaching into the safety clearances notification is to be immediately issued to the owner/occupier by NEA along with awareness raising materials with respect to the importance of maintaining the horizontal and vertical clearance from buildings and the matter will be taken up further in consultation with the appropriate authorities. • Regular pruning or lopping of trees ensure the integrity and safety of the OHL • Removal of invasive plant species during routine vegetation maintenance in an ecologically sound manner • Prohibit the use of herbicides, pesticides or burning to control any vegetation growth or to manage vegetation waste.	guidelines 100% of project transformers are PCB free by 31.12.25 No fatalities or lost time incidents 100% of H&S incidents including near miss recorded, immediately investigated, and corrective action taken to prevent repeat. Compliance with safety clearances along OH distribution lines EMP requirements successfully implemented as determined through regular site checks, photographic record etc. No outstanding grievances from local communities or		pre-construction/ construction phase and comply throughout O&M	Divisions and District Office		

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	• DTR (linked to project lines) and access to other electrical equipment in the public domain to always be kept secure (gates shut and locked) • There is a risk of fire associated with DTR and all necessary precautions to ensure emergency procedures are to be posted and fire extinguishers available at the location of the DTRs in the event of a fire. • Maintain written warning signages including the ISO 7010 Hazard Type: Electrical Symbol warning of the risk of electrocution. • Maintain inventory of transformers on the distribution network, make, model, risk of PCBs and other details including transformer test report, details any maintenance works undertaken, dates oil changes, leakage incidents etc. • Carry out regular inspections and periodic preventive maintenance to minimize oil leakages; ensure values, nuts and bolts are fully functional and tightly secured, ensure rubber seals of radiators are intact. Any leaking oil that is observed must be immediately addressed. • Unless transformers have been certified PCB free workers interacting with them must wear suitable chemical and/or oil resistant gloves, goggles, and protective clothing whilst taking samples and/or working with transformers. • Maintain spill management materials (sorbent pads, loose sorbent material,	other interested stakeholders					

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	sand, etc.) at nearest substation for immediately soaking up any leaks or spills that do accidentally occur. • For all maintenance works undertake risk assessment and prepare H&S plan in accordance with EHS Guidelines, considering occupational and community H&S and including adherence to electrical safety standards and emergency preparedness and response plan with communication systems and protocols to report an emergency. • O&M to be performed only by suitably qualified and experienced workers who are regularly trained staff of NEA or a contactor under supervision of a Health and Safety Officer with an appropriately equipped first aid kit and appropriate fire extinguishers immediately available for use • Restricting working at height and with electricity only by workers who are trained to do so. • O&M workers to be given required PPE and other requisite safety equipment • Workers to observe guidelines to minimum approach distances for excavations, tools, vehicles, pruning, and other activities when working around power lines. • Testing of structural integrity prior to proceeding with the work and the use of fall protection measures such as harnesses, tool bags, ropes etc. • Proper grounding and deactivation of live power lines (using disturbance free						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	**Mitigation Measures**	**Performance Standard**	**Budget/ Source**	**Schedule**	**Implementation**	**Supervision**	**Contractor**
	and clear communication means) during maintenance work or when working near the lines. • In the event of an incident such as cable break NEA staff/community must immediately notify the nearest NEA incident coordinator for handling measures: power cuts, technical O&M staffing to inspect and repair. • NEA in conjunction with Ward committee, local municipalities, village heads, and the media with the support of CSOs to continue to organize health and safety campaigns on electrical safety community awareness raising activities in local communities and schools within 50 m of the ROWs. • In case of fire events, explosion, and other related situations, given the NEA may not be available immediately in rural locations the community should be educated with respect to emergency response with 24/7 emergency contact numbers for NEA included on signs; NEA will need to ensure this is manned 24/7 to ensure that it is effective reporting route.						

ADB's TA Consultant

MITIGATION PLAN ANNEX A: DETERMINATION OF FOREST HABITAT QUALITY

First, a preliminary map should be established using satellite imagery and/or aerial photography and/or existing land use-land cover maps. This map can then be refined using field data from surveys. These maps should distinguish between Modified and Natural Habitat within the ROW and identify the approximate condition of habitat. Figure 1 gives a generic example of a habitat condition map of a project area.

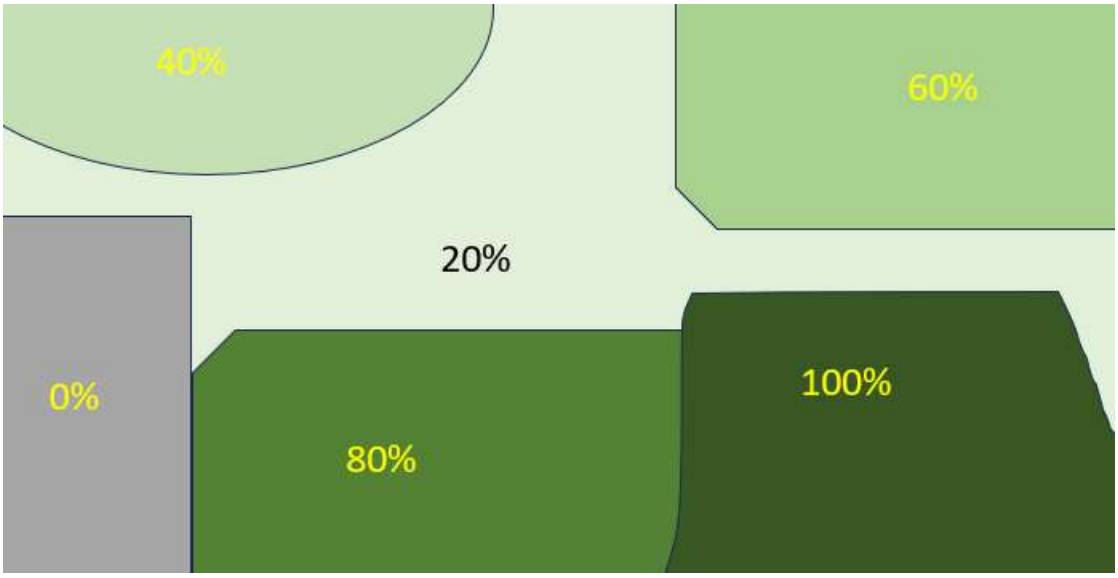


Figure 1. Generic example of habitat condition map

Table 2 gives a generic guide to how habitat condition could be classified, but the definitions would best be refined by the ecologist to be context-specific before surveys in agreement with NEA and ADB.

Table 2. Generic habitat condition classification

Habitat condition	**Condition in relation to 'perfect' habitat**	**Definition**	**Notes**
Benchmark	**100%** (90-100%)	Pristine habitat; the best quality of the type in the province	Unlikely except in the most remote areas of province.
Good	**80%** (70-90%)	Natural habitat which has been degraded in some way – e.g., selective logging, hunting, some clearings, and/or some invasive species	This can include natural grassland/shrub land areas where they occur.
Moderate	**60%** (50-70%)	More degraded natural habitat – e.g., with heavy logging, hunting, frequent	This can include natural grassland/shrub land areas where they occur.

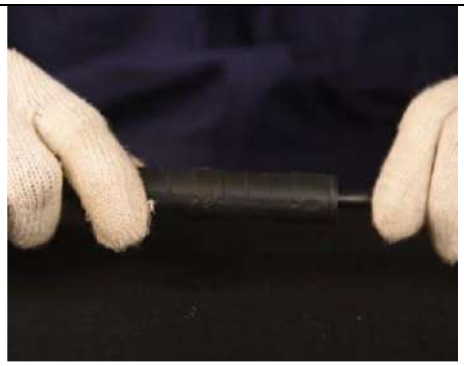
		clearings, and/or widespread invasive species	
Poor	**40%** (30-50%)	Heavily degraded habitat, with major loss of native species	Likely any lower altitude shrub land in the ROW
Very Poor	**20%** (10-30%)	Habitat that has been substantially damaged by human factors	Most likely areas of intensive cultivation, but possibly also some grasslands.
Absent	**0%** (0-10%)	Habitat has been completely lost	Only likely in already built-up areas (villages, roads, etc.)

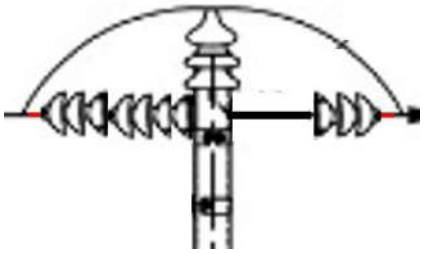
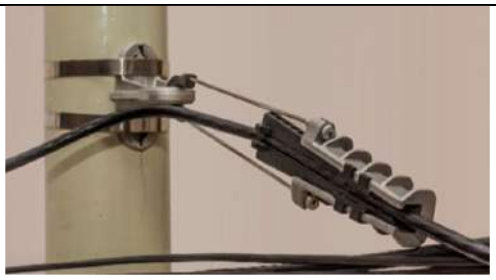
Assignment of specific habitats to condition classes should be based on a context-specific version of Table 2. For forest, it will usually be based on an overview of habitat structure, tree basal area, canopy cover, percentage of climax versus pioneer, and abundance of invasive species. In general, as habitat condition improves: the percentage of climax species increases versus pioneer species; the abundance of invasive species decreases; canopy cover increases; tree basal area increases (particularly for climax species); and habitat structure becomes more complex at first, but then simplifies at good and benchmark condition.

An experienced ecologist with botanical knowledge will be able to see these changes collectively, but they are not easily identified through specific plot/quadrat/transect samples, which necessarily only take a very small sample.

MITIGATION PLAN ANNEX B: BIRD SENSITIVE DESIGN MEASURES

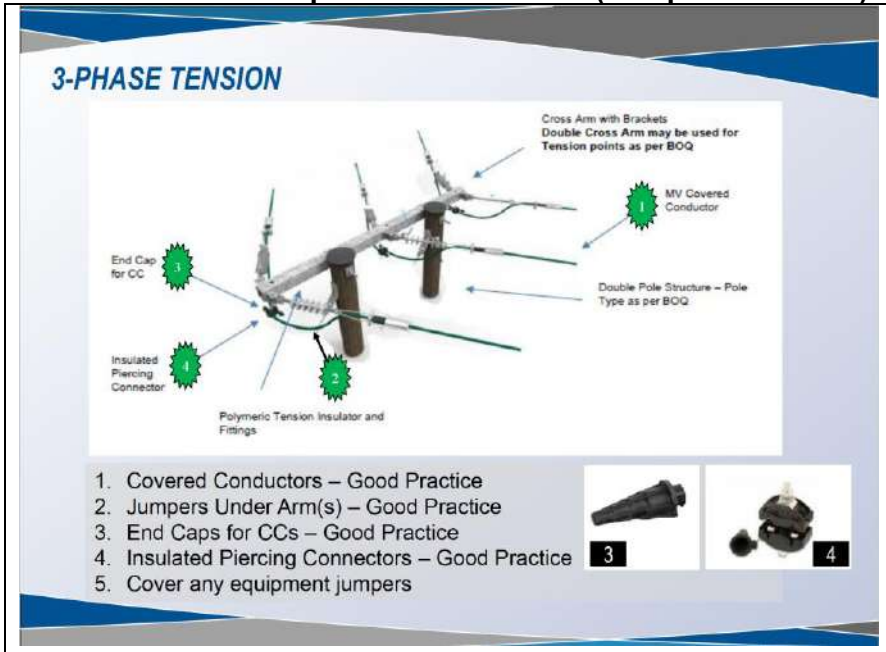
Bird Sensitive Design Measures will include, but are not limited to, the following:

Measure	Photo
Ensure no insulation gaps at wire splices	
Use insulation-piercing connectors with non-energized exterior for taps and equipment	
Use covered jumpers for taps and equipment	
Cover all primary voltage bushings with insulating wildlife caps	

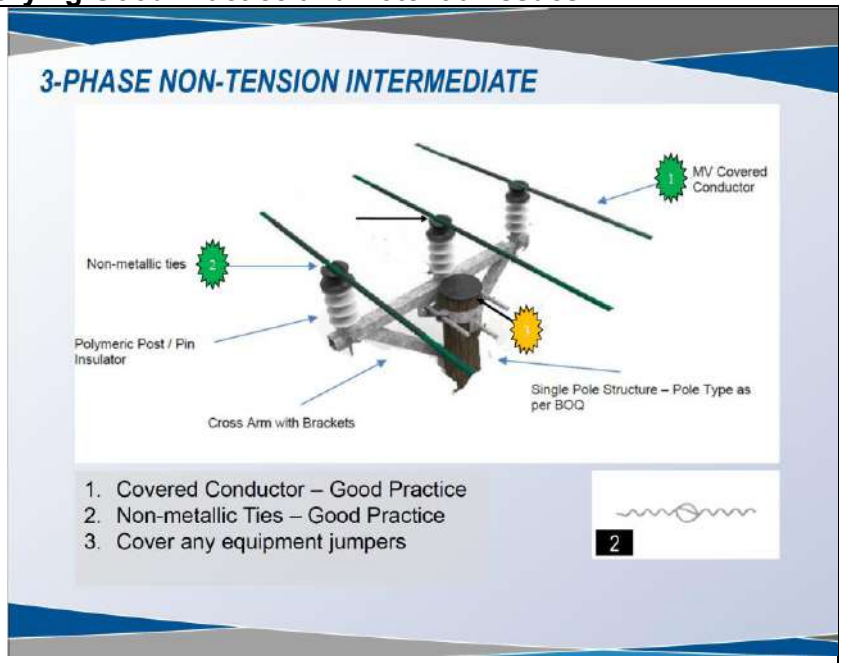
Measure	Photo
Extend wire-to-dead-end connection >1m from pole with insulator or link	
Maintain integrity of wire cover at tangent insulators (no stripping) Regardless of traditional or clamp-top tangent insulators being used, there should be no gaps in wire cover.	
Use anchoring clamps to secure cable to pole without coverage gaps, to secure ABC to poles without any wire stripping	

Source: ADB TA Consultant

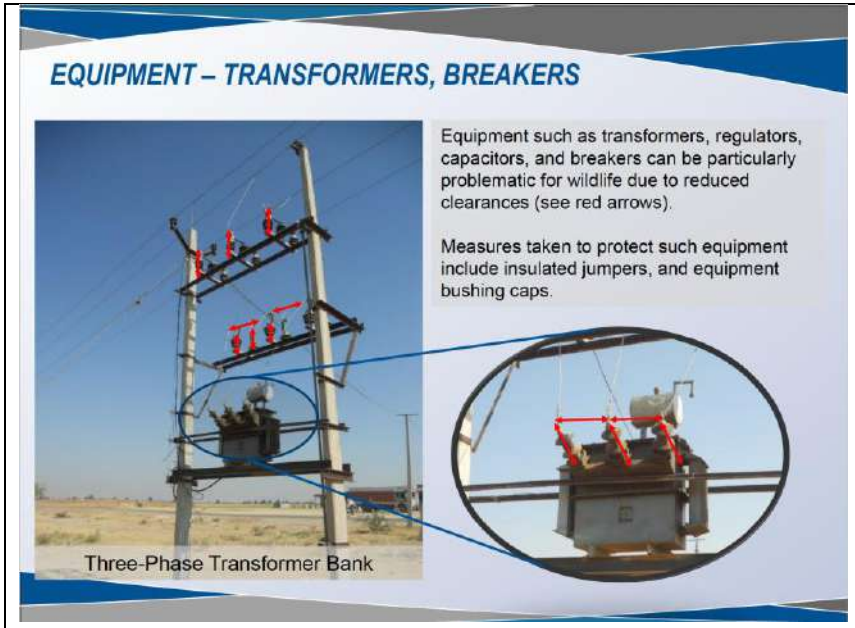
Examples of CC and ABC (Sample from India) Identifying Good Practice and Potential Issues

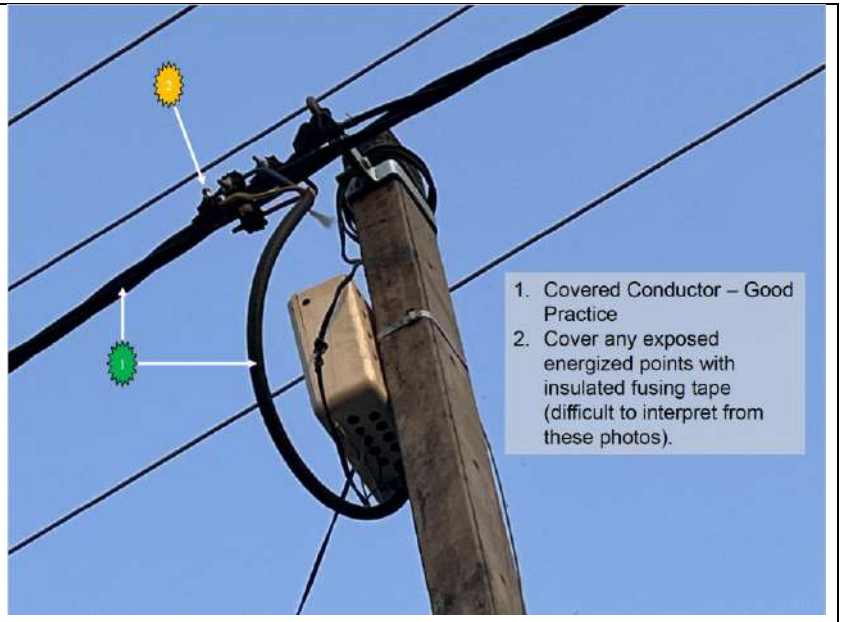


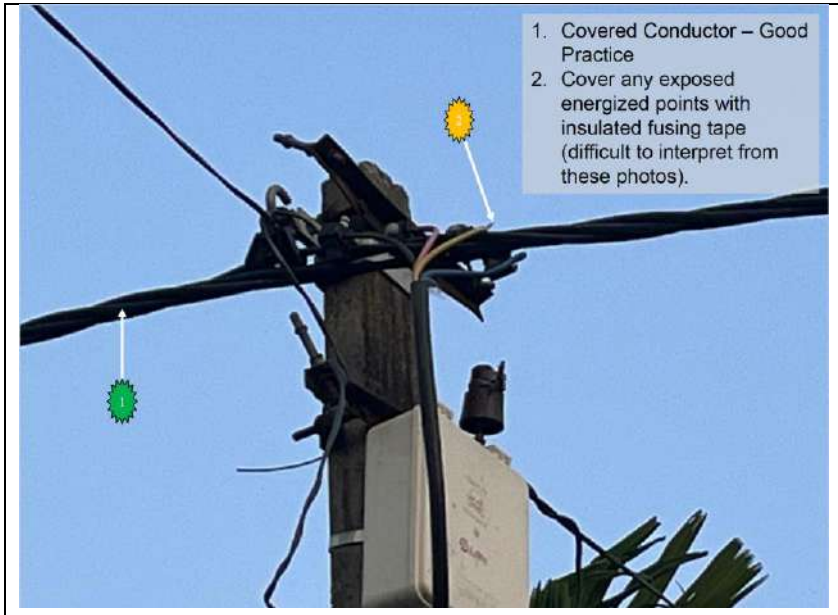
Note: insultated pole cap specified in BOQ

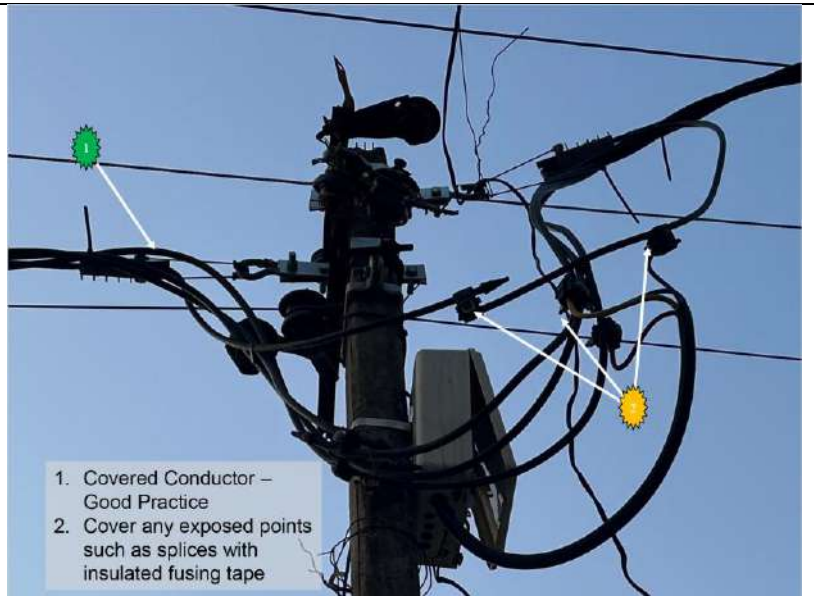


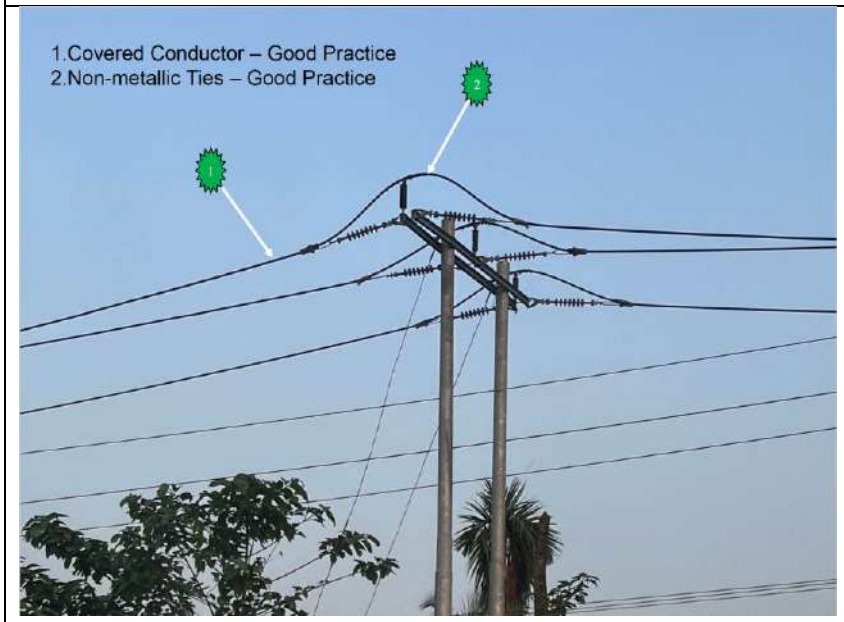
Note: insultated pole cap specified in BOQ

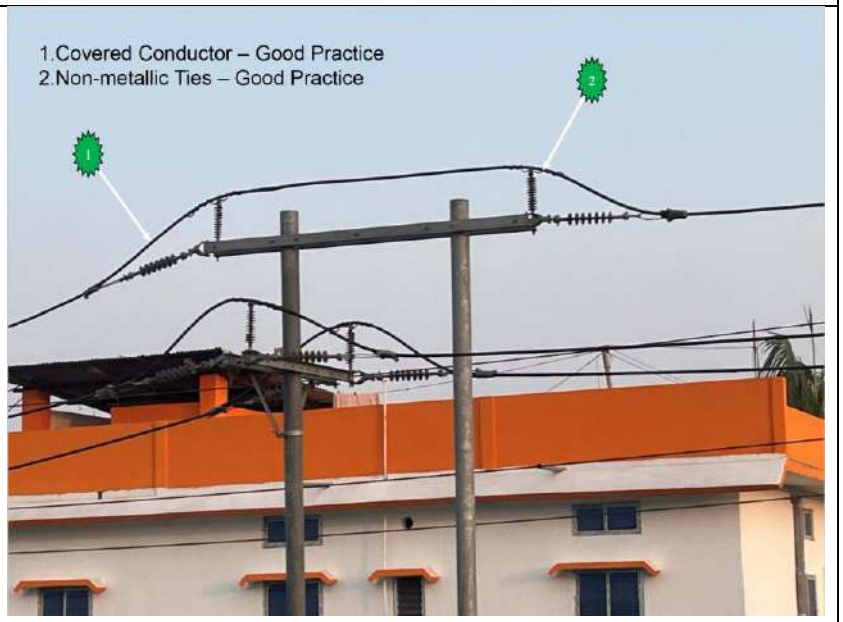

EQUIPMENT – TRANSFORMERS, BREAKERS
Equipment such as transformers, regulators, capacitors, and breakers can be particularly problematic for wildlife due to reduced clearances (see red arrows).
Measures taken to protect such equipment include insulated jumpers, and equipment bushing caps.
Three-Phase Transformer Bank

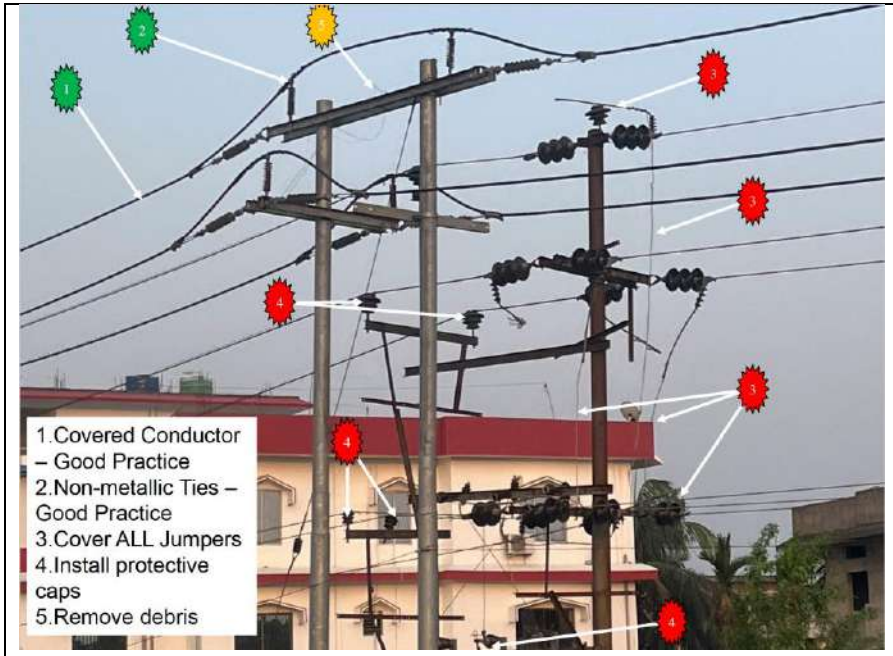

1. Covered Conductor – Good Practice
2. Cover any exposed energized points with insulated fusing tape (difficult to interpret from these photos).


1. Covered Conductor – Good Practice
2. Cover any exposed energized points with insulated fusing tape (difficult to interpret from these photos).


1. Covered Conductor – Good Practice
2. Cover any exposed points such as splices with insulated fusing tape


1.Covered Conductor – Good Practice
2.Non-metallic Ties – Good Practice


1.Covered Conductor – Good Practice
2.Non-metallic Ties – Good Practice



Source: ADB TA Consultant

APPENDIX 10: EHS CODES OF PRACTICE

The contractor shall acquaint themselves with the project-level EMP as well as the national and state EHS requirements of all the current statutes, ordinances, by-laws, rules and regulations or their instruments having the force of law including without limitation those relating to protection of the environment, social, health and safety, importation of labour, damages to property, protection of environment, etc. The contractor will take all necessary measures and precautions (i) to ensure that the execution of the works and all associated operations on site or offsite are carried out in conformity with these requirements, and (ii) to avoid any nuisance or disturbance to adjacent receptors/local community arising from the execution of works. The contractor shall record any incidents and the action taken to resolve the situation in a logbook. The contractor will also carry out daily on-site and off-site inspections at adjacent receptors to monitor compliance with the CEMP and subplans, levels of pollution (dust, waste etc.) experienced or any disruption/disturbance caused, record inspection results, and make the inspection log available when asked.

A. Environment

Biodiversity

- Ensure clear demarcation of the working area, avoid encroachment outside the agreed corridor of impact.
- Site clearance including demolition, vegetation clearance, tree cutting and earthworks will be conducted cautiously under the supervision of an ecologist to minimize impacts on vegetation/trees/wildlife.
- In the first instance works will be scheduled outside the nesting and breeding seasons of fauna found at the project site, generally during and immediately after the monsoon season.
- Prior to demolition, vegetation clearance, tree cutting and earthworks including excavations for foundations, the construction area will be checked by an ecologist for any signs of nests, burrows etc. If nesting or burrowing animals are observed, then construction works will be postponed until any young are confirmed to have left the nest/burrow and adequate time has been given for adult animals to depart. In the interim they will be demarked to avoid accidental damage or disturbance being caused. If nest/burrows occupancy is unclear, only manual works under close supervision of an ecologist will be permitted. Only when this indicates no animals are likely to be harmed by the works must they proceed.
- Tree cutting and vegetation clearance will only be conducted after detailed tree enumeration inventory (of the number, location, size, and species of tree that they will need to cut) has been completed by the contractor, trees to be cut have been individually marked, and the trees / vegetation / shrubs to be removed have been surveyed by an ecologist to confirm that no nesting or roosting fauna is present.
- Similarly, buildings or structures will only be demolished after they have been surveyed by an ecologist to confirm that no nesting or roosting fauna is present. Only when an ecologist indicates no nesting/roosting animals are likely to be harmed must the works proceed.
- Under GoN Forest Rules 2023, tree cutting clearance is required from the Department of Forest. Expenses incurred for cutting trees and transportation is to be borne by the infrastructure developer. Rule 6 (1) Development projects can be given permission for movement of vehicles and persons In the forest with conditions.

- Ensure clear marking of vegetation to be removed before clearance, and supervision of clearing activities to ensure clearance is kept to a minimum. No globally threatened or nationally protected plant species will be cut.
- Excavated pits will be robustly fenced or covered to prevent fauna accidentally falling in, further an escape ramp will be provided to allow their escape.
- Use of herbicides or burning to clear vegetation or burning of vegetation trimmings is strictly prohibited.
- All fuel, oil, and chemicals stored, and all refueling will take place at least 100 m from dense vegetation/trees to minimize the risk of fire.
- Strict prohibition on the purchase, sale, and use of firewood, timber and NTFPs by contractor and their workers – trainings are to be provided.
- Strict prohibition on trapping, hunting, fishing, poaching or intentional injury of wildlife by contractor and their workers – trainings are to be provided so that workers know the threatened species that could potentially be encountered, and that they must not intentionally disturb or attack wild animals.
- Contractor to provide good standard of staff accommodation with heating and all meals to help discourage breaches of prohibition by the workers – provide alternative fuel source LPG / electric heaters for communal kitchens and for heating of employer provided staff accommodation.
- No litter, food or other foreign material will be thrown or left around the site and must be placed in covered garbage bins to prevent it being taken by bear, monkeys etc.
- Regular, compulsory awareness raising activities with support of the PMC ecologist will be undertaken to reinforce these biodiversity prohibitions with strict penalties as well as how to interact with wildlife encountered on site.
- Drivers employed to be skilled and receive training on to how to avoid traffic collisions with wildlife especially when driving at night on rural roads.
- Dispose of any invasive plant material encountered in an ecologically sound manner.
- Imported materials must be free of any invasive plant material, certification of the same to be submitted to NEA for all the imported sand, gravel, and landscaping related material.
- Maintain records of sightings, supported by photographs, of any threatened species observed (identified by ecologist) or any animal casualties occurring at the project site or in traffic collision, including a cause of death if known, to be reported to NEA and District and other Forest Officials.
- From one hour after sunrise to one hour before sunset no noisy works will be permitted, to minimize disturbance to fauna.
- If wildlife including that which poses a risk to human (snakes, leopards, bears etc.) is observed, no works will take place in that area and a protection zone will be clearly marked to prevent any accidental disturbance until the wildlife has left the area or has been safely rescued and released in suitable habitat outside the project footprint, with support of the Forest Officials.

Chance Find Procedures

- Brief workers and drivers with the support of a local cultural heritage expert on the known physical cultural resources near the project site/along access roads and chance find protocol, the types of finds that will need to be reported and penalties

applying for tempering with them through induction and toolbox talks before the commencement of any works.

- Implement chance find procedure as soon as any potential physical cultural resources encountered during construction activities.
- If suspected physical cultural resources are encountered, all works at the find site should be immediately halted. Strictly ensure no known physical cultural resources or chance finds are tampered with.
- Contractor to declare a chance find to NEA within 24 hours of find. NEA to report on any chance find having occurred within 48 hours to ADB.
- The find should be assessed by a competent official of government (Department of Archaeology, Nepal) and procedures to avoid, minimize or mitigate impacts to such physical cultural objects should then be agreed in writing with them.
- Services of a local cultural heritage expert to be procured by the contractor if they are required to handle chance finds.
- All artifacts, structures, articles of antiquity value and other remains of cultural/religious and archaeological significance to be reported and handled as per the Ancient Monument Preservation Act 2013 and Ancient Monument Preservation Rules 1989 as amended, and all other applicable national requirements
- Work will not begin or resume until the procedures to avoid, minimize, or mitigate impacts to the physical cultural resources have been agreed with Department of Archaeology and implemented in full.
- If avoidance is not feasible, and no alternatives to removal exist, cost-benefit assessment needs to be carried out to assess whether the project works should continue or stop at site. If the project benefits outweigh the anticipated cultural heritage loss from removal which is unlikely unless in case of resource of local value, following clearance of ADB, the physical cultural resources should be removed and preserved using the best available technique in accordance with relevant provisions of national heritage protection laws and decrees as well as international best archaeological practice.
- Records to be maintained of all finds, including chain of custody instructions for movable finds.

Pollution Prevention

Pollution from Construction Equipment, Plant and Vehicles

- Use of modern equipment, exclude over-aged or worn-out equipment or vehicles from the construction site
- All equipment, plant, and vehicles used for construction works are of a modern design, use (i) battery or electric powered, or (ii) low GHG emission options where available.
- Take necessary measures to maintain all equipment in good condition. All equipment, plant, and vehicles including DG sets to be regularly serviced and maintained in good working order in accordance with manufacturer instructions and have passed applicable emission tests; keep log of maintenance work undertaken.
- Belching of black smoke prohibited.
- Prohibit engine idling

- All equipment, plant, and vehicles including DG sets to meet GoN emission standards and have the latest engine emission design (Euro III)
- All construction vehicles including those for transportation of personnel to have valid emission certificate
- Contractor will comply with gross vehicle and axle load limits
- Position any stationary emission sources (e.g., water pumps, diesel generators, compressors, etc.) as far as practical from the nearest properties

Air Pollution (Dust)

- Minimize the extent of earthworks and thus dust generation during construction.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site
- Housekeeping of the site will be regularly carried out to minimize the fugitive emission from material handling areas, internal access roads, and construction waste storage areas.
- Stockpiles of spoil and other dust generating materials to be kept to a minimum necessary to undertake works for the day and covered with tarpaulin
- Minimize double handling (loading and unloading) and drop loads to reduce the dust generation
- Cover exposed soil with materials like gravel to minimize re-suspension of dust, consider seeding stockpiles if not required to be used immediately to minimize the windblown dust
- Locate stores/stockpiles of loose construction material (cement, sand aggregates etc.) least 100m from the adjacent properties and enclose them by a solid fence to reduce windblown dust.
- If not in an enclosed building/store keep stockpiles of loose soil, aggregate and waste materials covered with heavy tarpaulin to avoid suspension or dispersal during windy days.
- Trucks importing loose raw materials or removing spoil must be covered with tarpaulin tied down securely to the body of vehicles to reduce dust generation.
- Impose speed limits on construction vehicles on off- and on-site access roads to minimize exhaust and dust emissions especially where access roads run adjacent to properties
- Sprinkle earthworks, off- and on-site access roads that are not blacktopped, and material stockpiles with water during the construction period to avoid dust being dispersed by wind and mitigate dust related issues due to frequent movement of construction vehicles as necessary i.e., 2-3 times per day but more often if needed during excavations, dry and windy conditions that enable dust to be easily mobilized and the dust to be visible.
- Regularly clean dust from the off-site access roads during and immediately after construction work is completed.
- Strictly prohibit the burning of wastes generated by project-related activities.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives
- Ensure workers working near or having long exposure to vehicle exhausts and earthworks are provided with clean N95 dust masks to avoid inhalation or particulate matter and other pollutants.
- Periodic medical respiratory checks to be performed on workers exposed to high dust levels.

Noise and Vibration

- Use of modern equipment, exclude over-aged or worn-out equipment or vehicles from the construction site
- All equipment, plant, and vehicles including DG sets to meet GoN noise emission standards.
- Select construction techniques and low noise generating equipment e.g., less than 55 dBA sound pressure level at 1m, and stage noisy works to limit their duration to minimize noise and vibration
- Fit all equipment and vehicles used in construction with exhaust silencers where the manufacturer's design allows this
- Position any stationary emission sources (e.g., water pumps, diesel generators, compressors, etc.) as far as practical from the nearest properties
- Prohibit engine idling
- Prohibit use of horn by construction vehicles
- Impose speed limits on construction vehicles on off- and on-site access roads to minimize noise emissions especially where access roads run adjacent to properties
- Provide appropriate PPE (acoustic ear plugs or earphones capable of reducing noise levels to 85 dB(A) for hearing protection) to any workers subjected to noise levels of 85 dBA for more than 8 hours per day and ensure they wear it e.g., if piling etc.
- No unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C) or average maximum sound levels of 110 dB(A).
- Periodic medical hearing checks to be performed on workers exposed to high noise levels of 85 dBA for more than 8 hours per day.

Soil and Water Pollution from Fuel, Oil, Chemical

- Avoid storage of all fuel, oil, and chemicals in areas located within 100m of surface water and groundwater springs, etc. to avoid direct contamination or contamination through run off
- Establish dedicated fuel, oil, and chemicals stores (drums/containers/tanks) on impermeable bunded area of 110% volume to avoid spills and leaks contaminating soil and affecting water quality
- Secondary containment design to also consider means to prevent contact between incompatible materials in the event of a release.
- Drums, containers or tanks of fuel, oil, or chemicals to be labelled and kept in a designated, labelled storage area under lock and key when not in use.
- Place all drums or containers of fuel, oil, or chemicals on drip trays if not sited on impermeable surface with 110% bunded capacity.
- There should be no full or empty containers, tanks or drums that are left on open ground.
- Place all equipment that containing fuel or oil on drip trays it not sited on impermeable surface with 110% bunded capacity.
- Undertake refilling or refueling only on areas of hard protected soil, preferably bunded, at least 100m from surface water with all drainage directed through oil interceptors. No vehicle or equipment maintenance activities will be permitted to take place on open ground

- Provide drip trays/catch basins or other overflow/drip containment measures at connection points or possible overflow locations during refilling or refueling
- Maintain adequate supplies of spill containment equipment/absorbents such as sand immediately on-hand in the event of an incident
- Use of dripless hose connections for vehicle tanks and fixed connections with storage tanks
- Use dedicated fittings, pipes, and hoses on containers or tanks and regularly inspect their condition
- Use of refilling or refueling equipment that is compatible and suitable for the characteristics of the materials being transferred and designed to ensure safe transfer
- Overfills of drums, containers, and tanks to be prevented as they are among the most common causes of leaks and spills resulting in soil and water contamination, this can be achieved by:
    - Checklist of measures to follow during filling operations
    - Provision of automatic fill shutoff valves to prevent overfilling
    - Installation of gauges on containers or tanks to measure volume inside
    - Use of pipe connections with automatic overfill protection (float valve)
    - Pumping less volume than available capacity by ordering less material than its available capacity
- Provision of overfill or over pressure vents that allow controlled release to a capture point
- Maintain procedures to prevent hazardous materials from being stored in incorrect containers or tanks
- Provide spill response kit with sufficient absorbent materials (e.g., sorbents, dry sand, sandbags) on-site for immediately soaking up any fuel, oil, or chemical leaks/spills that do accidentally occur
- Provision of oil-water separator on all drainage systems
- Do not allow washing of equipment or vehicles in surface water and ensure all washing water is discharged to sedimentation basin and oil interceptor instead of directly to surface water.
- Washing out concrete trucks will be prohibited on-site unless impermeable concrete washout area is provided specifically for this purpose; washouts to be emptied when 75% full.
- Cement will be stored in enclosed storage facilities and not exposed to the elements.
- Do not undertake any concrete mixing within 100m of surface water
- Spent engine oil from the equipment will be collected and sent for recycling and re-use.

Soil And Water Pollution from Sanitation

- Strict prohibition on open defecation and urination by construction workers
- No use of pit latrines
- Construction sites and employer provided staff accommodation will be equipped with toilets and washing facilities that do not discharge untreated water.
- Toilets and washing facilities to be connected to septic tank (with soakaway) – these will be located 100 m from any groundwater well (existing and new borewells) or alternatively sanitary facilities that do not allow the untreated disposal of sewage direct to adjacent water bodies or ground e.g., enclosed mobile toilets

for disposal of wastewater off-site to the nearest municipal sewage treatment works will be used.

- No untreated wastewater is to be discharged direct to surface water or the ground
- Licensed contractors will be required to collect septage/sludge from septic tanks and mobile toilets on a regular basis for disposal to municipal wastewater treatment
- Regular maintenance will be undertaken for the sanitary sewage treatment system during construction and contractor will immediately rectify any overflows, leakage, foul odor etc.
- Contractor is to maintain a logbook of water abstracted and used as well as effluent generated.

Soil Erosion and Surface Water Runoff Management

- Works over or near watercourses will adopt protection measures to guard against loss of soil that would result in the turbidity of water.
- Implement measures to prevent landslides to avoid contamination of rivers by soil.
- Undertake construction during the dry season to minimize exposed areas subject to erosion by surface water runoff and to avoid flood risk, leading to accidents and/or water contamination.
- In the working area separately strip any fertile topsoil and store in an ecologically sensitive manner in order that it may be reused in landscaping work. Topsoil will be stored in a designated area in low level spoil heaps to reduce compaction and retain soil structure and fertility to the extent possible; spoil heaps to be covered to prevent soil erosion by wind blow and surface water runoff.
- Minimize soil erosion and surface water runoff by reducing the extent of vegetation, soil clearance and earthworks, revegetating earthworks on completion, and covering stores of sand and spoil with tarpaulin. Undertake sequenced construction method and revegetate areas immediately construction activities are completed in one area rather than undertaking earthworks on all parts of the site to minimize the area of bare ground exposed at any one time.
- Material stores will be surrounded by cut off drains/silt fences to prevent sediment laden runoff.
- Ensure surface water runoff from the construction site shall not discharge directly to surface water. Sediment control measures in the form of silt traps and sedimentation tank will be provided to treat surface run-off before disposal.
- If water from excavations is pumped it must be disposed of via a sedimentation basin, it must not be disposed of directly to surface water.
- Water sprinkling will be controlled such that no excess surface water runoff or pooling/ponding occurs.
- Dumping of construction waste including excess spoil into streams and drains is prohibited.

Materials and Waste Management

- Import all materials from existing licensed sources and keep records of all materials used, and sources.
- Storage yards will be fenced using a solid fence to catch windblown material.
- Use durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time.

- Purchase perishable construction materials e.g., paints incrementally to reduce spoilage of unused materials.
- Use building materials that have minimal packaging to avoid generation of excessive packaging waste
- Use construction materials containing recycled content when possible and in accordance with technical standards
- Prior to the start of works the contractor will ensure the waste management (collection, storage, transport, and disposal) system is established at the construction sites and employer provided staff accommodation for domestic solid waste and construction waste is established at the construction site
- Waste shall be managed according to the waste management hierarchy of reduce waste generated, reuse waste materials where possible, recycle materials and finally safely and soundly dispose of residual waste material. Encourage recovery of recyclable wastes that could be reused or sold to recyclers, rather than disposing of it.
- Minimize waste generation, restrict use of plastics and polyethene and use recyclable/biodegradable materials during construction to the extent possible
- Store waste in designated areas to prevent soil degradation.
- Ensure stored wastes are regularly removed from site and not allowed to build up in excess quantities.
- Separate waste containers (drums, bins, skips or bags) will be provided for different types of waste; prevent the commingling or contact between incompatible wastes and allow for inspection between containers to monitor leaks or spills
- Sensitize workers on good housekeeping and the environmentally sound storage and disposal of construction and wastes, and importantly not to leave garbage lying around, provide regular toolbox talks and arrange color marked garbage bins to collect these different wastes so they are not thrown on the floor. Develop a procedure/system to penalize through escalating fines or similar any construction workers who breach these requirements.
- Collect and segregate construction wastes including scrap metal, oil, and solid waste; ensure all workers are familiar with this segregation and arrange garbage bins to collect these wastes so they are not thrown on the floor
- Clearly identifying (label) and demarcating the waste storage area(s) on a site plan
- Store all the wastes produced in an environmentally sound manner in designated, labelled area with separate waste containers (drums, bins, skips or bags) for each distinct type of waste.
- Store solid waste in enclosed bins to contain leachate and avoid vermin.
- Store hazardous waste to prevent accidental releases to air, soil, and water resources in closed containers away from direct sunlight and rain
- Limiting access to hazardous waste storage areas to workers who have received proper training
- Secondary containment systems to be constructed using materials appropriate for the wastes being contained
- Provide adequate ventilation where volatile wastes are stored
- Conducting periodic inspections of waste storage areas and documenting the findings
- Encourage recovery of recyclable wastes that could be reused or sold to licensed recyclers, rather than disposing of it.

- Prohibit use of waste (e.g., empty cement bags and containers, plastic, wooden planks) for backfilling – only inert spoil may be used for backfilling to avoid need for off-site disposal (any excess inert spoil is to be disposed of at suitably licensed waste facilities).
- Prohibit burning of construction wastes.
- Prohibit burying or dumping of construction wastes on-site, outside the site boundary, along access roads, into streams, forest/vegetated areas, in agricultural fields, at open municipal dump sites, allowing the waste to build up in storage areas etc.
- Provide weekly toolbox talk to remind of the importance of waste disposal, prohibition of disposal on the road, in drains etc., prohibition on burning of wastes, and open defecation and urination.
- Develop a procedure/system to penalize through escalating fines or similar any construction workers who breach these requirements.
- Document all wastes removed off site (including excavated soil, solid and hazardous waste) using transfer notes, to be taken by licensed waste contractors who should reuse/recycle or dispose of the waste to suitably licensed and engineered waste management facilities according to type
- Excavated spoil that cannot be reused to a licensed disposal site as suitable for accepting inert wastes ensuring no solid or hazardous wastes are comingled with the inert excavated spoil
- Collect solid waste and dispose of it to suitably engineered and licensed sanitary waste facilities
- Ensure any hazardous waste such as oily rags or old drums disposed of in suitably licensed hazardous waste facilities
- Waste containers designated for off-site shipment to be secured and labelled with the contents and associated hazards, be properly loaded on the transport vehicles before leaving the site, and be accompanied by a shipping paper, that describes the load and its associated hazards

Emergency Preparedness and Response Planning

For spills and leaks an emergency preparedness and response plan tailored to the hazards associated with the project, should include:

- SOP for the management of containment structures, specifically the removal of any accumulated fluid, such as rainfall, to ensure that the intent of the system is not accidentally or willfully defeated
- Implementation of inspection programs to ensure containment structures are physically intact and being well managed
- Identification of locations of hazardous materials and associated activities on an emergency plan
- Documentation of availability of specific personal protective equipment and training needed to respond to an emergency
- Documentation of availability of spill response equipment sufficient to handle at least initial stages of a spill and a list of external resources for equipment and personnel, if necessary, to supplement internal resources
- Description of response activities in the event of a leak, spill, release, or other emergency including internal and external notification procedures, specific responsibilities of individuals, decision process for assessing severity of the

incident and determining appropriate action, first aid and emergency medical treatment, evacuation routes, post-event activities such as clean-up and disposal, incident investigation, worker re-entry, and replenishment of used PPE and spill response equipment
- Inspecting, testing, and maintaining the emergency response equipment
- Training of workers on release prevention, including drills specific to hazardous materials stored on site

B. Health and Safety

Preventive and protective measures should be introduced according to the following order of priority:

- Eliminating the hazard by removing the activity from the work process.
- Controlling the hazard at its source through use of engineering controls.
- Minimizing the hazard through design of safe work systems and administrative or institutional control measures.
- Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE.

OHS Training:

- Provisions to be made to provide OHS orientation training to all new workers to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow workers.
- Training should consist of basic hazard awareness, site- specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Site-specific hazard or color coding in use should be thoroughly reviewed as part of orientation training.
- Specialty courses should be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments.
- Training to be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards.
- Workers with rescue and first-aid duties should receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co- workers.

Good H&S Practices:

- Always ensure good housekeeping in the premises, including on construction site, workers camps, storage areas, etc.
- Perimeter is to be kept neat and tidy, with no trip hazards on the ground e.g., open channels, materials, equipment, trash laying around.
- Do not leave hazardous conditions (e.g., unlit open excavations without means of escape) overnight
- Drums/containers/tanks that may contain substances that are hazardous because of chemical or toxicological properties, or temperature or pressure, to be labelled as to the contents and hazard, or appropriately color coded.
- Check the load of the vehicles before use, all drivers, and passengers to fasten seatbelt and comply with all transportation-related H&S laws and regulations
- Examination of all equipment and tools' quality and the presence of operational safety features before use

- Checking all electrical cords, cables, and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools
- Untrained workers will not be permitted to work with live electricity or at height.
- Observe IFC EHS Guideline on Electric Power Transmission and Distribution requirements for working with live electricity - only allow suitably trained workers that meet the requirements set out in above-referred IFC guideline to work with live electricity with strict adherence to safety standards including those listed in said guidelines; these workers must have training record of attending suitable training course on electrical safety and be provided with and wear the appropriate PPE for their role.
- Ensure proper grounding and deactivation of any live electricity during construction work or before any work near power lines and that this has been checked and certified by the H&S Officer in advance.
- Measure exposure levels to electromagnetic fields (EMF) and provide workers working in zones where EMF levels are above reference levels with personal EMF monitoring device to be attached onto their PPE.
- Require workers to observe the minimum approach distances for excavations, tools, vehicles, pruning, and other activities when working around power lines.
- Double insulating/grounding all electrical equipment used in environments that are, or may become, wet; using equipment with ground fault interrupter protected circuits
- Marking all energized electrical devices and lines with warning signs
- Labelling of service rooms housing high voltage equipment (electrical hazard) and where entry is controlled or prohibited conducting detailed identification and marking of all buried electrical wiring prior to any excavation work
- Fall prevention and protection measures should be implemented whenever a worker is exposed to the hazard of falling >2m:
- Observe IFC EHS Guideline on Electric Power Transmission and Distribution requirements for working at height; only allow suitably trained and qualified workers to work at height, these workers must have training record of attending suitable training course and be provided with and wear the appropriate PPE for their role.
- Require workers to test the structural integrity of towers prior to proceeding with the work.
- Proper use of ladders and scaffolds by trained workers
- Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area
- Use fall protection measures when working on towers, i.e., mobile elevated working platform, and all workers at height are required to wear body harness. Safety belt and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self- retracting inertial fall arrest devices attached to fixed anchor point or horizontal lifelines
- Ensure sufficient harnesses and gear are available on site for all workers, that workers are trained to use such harness and are obligated to always use the latter when working at height.
- Inclusion of rescue and/or recovery plans, and equipment to respond to workers after an arrested fall

- Implementation of safety measures while excavating to avoid collapse e.g., shoring if soil unstable
- PPE to be provided for all workers (regardless formal and informal, directly contracted or subcontracted) in accordance with Table 2.7.1. Summary of Recommended Personal Protective Equipment According to Hazard in IFC EHS Guidelines on OHS.
- Enforce disciplinary system (e.g., immediate removal from site) for non-compliance with PPE requirements.
- Eye wash station and water supply to shower to be provided during works due to risk of fuel, oil, or chemical encountering skin.
- During construction works, ensure qualified first aider and trained fire marshal is always available on-site with an appropriately equipped first aid kit and appropriate fire extinguisher and other firefighting equipment immediately available for use.
- Provide an ambulance for more serious cases to transport the patient to the hospital for treatment
- Prepare signboards reminding of health and safety measures and procedures to follow in case of accident, including key contact details (ambulance, doctor, hospital, etc.)
- Keep a log of all incidents, near-misses and accidents and include these in monthly monitoring reports
- Check health condition of workers on daily basis, for example, use of self-certification forms and temperature checks before being allowed on the construction site with more thorough monthly health checks by qualified medical professional.
- Temporary construction camps will include proper sanitation, alternative fuel to firewood, clean eating area, water supply, and secure storage of domestic solid wastes for disposal off site to suitably licensed waste management facilities.
- Pit latrines prohibited, and adequate number (about 1 toilet per 6 workers, can refer to ILO and EBRD guidance notes on workers' accommodation) of toilets and washing facility with hot and cold running water.
- Toilets to be equipped with soap and hand sanitizer.
- There should be an indication of whether toilet and washing facility is "in use" or "vacant" if not gender segregated
- Toilets should be cleaned at least twice daily to ensure they are kept in a hygienic condition.
- Prevent standing water as it may become a breeding habitat for mosquitoes etc.
- Provide workers with access to a shaded rest area on-site.
- Provide workers with a clean eating area for breaks and lunchtime.
- Provide all construction workers will an adequate supply of potable drinking water meeting national standards.
- If ground or surface water is used for drinking water, it must first be tested to confirm it meets drinking water standards and continue to be regularly tested. If drinking water standards are not met, potable water shall be imported to site.
- If workers are not local to the area use may be made of existing accommodation facilities but if a construction camp is provided it must be adequately equipped with sufficient toilets (about 1 toilet per 6 workers; proportional to the number of workers being accommodated), hand washing facilities, showers or baths, food preparation and clean eating area, beds, beddings, mosquito nets, potable drinking water, etc.

- Installation of barriers (a temporary fence ideally solid fence) at construction areas with hazard warning signs to deter people from accessing the construction site
- Require all project drivers to always abide by GoN Depart of Roads safety regulations.
- Road safety and warning signs must be posted at 500m, 100m, and immediately in advance of the works at least two weeks prior to the works commencing to inform the public of the temporary blockage.
- Access to the construction site will be under traffic controls when trucks enter and exit.
- Establishing rights-of-way, site speed limits, vehicle inspection requirements, operating rules and procedures, and control of traffic patterns or direction
- Ensuring drivers undergo medical surveillance
- Ensuring moving equipment with restricted rear visibility is outfitted with audible back-up alarms
- Construction workers including subcontractors will be given awareness raising in HIV/AIDS, other communicable diseases including sexual, exploitation, abuse, and harassment with strict penalties (e.g., immediate removal from site) for any non-compliance of workers to an agreed code of practice
- Avoid ponding of water during construction to avoid habitat creation of vector borne diseases e.g., malaria, Japanese elephantiasis, dengue.
- Working schedule to be developed to allow enough breaks and enough rest time in-between the shifts.
- No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- Use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
- Hearing protection is preferred for any period of noise exposure more than 85 dB(A) an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the allowed exposure period or duration should be reduced by 50 percent.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible

Fires and or explosions resulting from ignition of flammable materials or gases can lead to loss of property as well as possible injury or fatalities to project workers. Prevention and control strategies include:

- Storing flammables away from ignition sources and oxidizing materials.
- Defining and labelling fire hazards areas to warn of special rules (e.g., prohibition in use of smoking materials, cellular phones, or other potential spark generating equipment)
- Providing specific worker training in handling of flammable materials, and in fire prevention or suppression
- Oxyacetylene burning equipment will not be permitted in any confined space.
- Burning equipment of the oxy-propane type shall be used.

Occupational Health and Safety Plan for Construction

- Occupational Health and Safety Plan will aim to ensure that the workplace is safe and healthy by addressing the hazards and risks at the workplace; outlining the procedures and responsibilities for preventing, eliminating, and minimizing the effects of those hazards and risks; identifying the emergency management plans for the workplace or workplaces; and specifying how consultation, training and information are to be provided to employees at various workplaces.

Steps to Ensure Maximizing of Safety at Construction Site

The contactor will be responsible for implementation of the following:

(i) Installation of signboards and symbols in risky and hazardous areas, to inform workers to be careful.
(ii) Ensuring that materials are all stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapse.
(iii) Vehicles will be moved only along pre-assigned routes and have well-functioning horns, reverse light and buzzer, rear view mirrors, etc.
(iv) Removing all scrap and waste material from the immediate work area as the work progresses.
(v) Use only trained staff to construct, install, handle, and repair all electrical equipment to prevent risks of electrical shocks and electrocution.
(vi) Install fire extinguishers and/or other fire-fighting equipment at every work site to prepare for any accidental fire hazards.
(vii) First aid kits shall be always made available throughout the entire construction period. Arrangement shall be made to ensure medical attention for workers who have met with an accident or sudden illness at any time during the construction period.
(viii) Fire protection: the employer shall be responsible for a fire protection and prevention throughout all phases.
(ix) Hand and power tools: Conditions of all hand and power tools or other reciprocating, rotating, or moving parts of equipment shall be maintained by the employer in a safe condition to prevent any accidents.
(x) Aisles and passageways shall be kept clear to provide for free and safe movement of material handling equipment and workers. Material if stored/stacked at roadside must not hinder free movement of vehicles and persons.
(xi) The areas used for construction shall be kept in good repair to ensure safe movement of vehicle or person.

Personnel Protective Equipment. Risks to the health and safety of workers can be prevented by provision of Personal Protective Equipment (PPEs) to all workers. Personal protective equipment like safety gloves, helmet, mufflers etc. will be provided during the construction period and during the maintenance work. Depending on the nature of work and the risks involved, contractors must provide without any cost to the workers, the following protective equipment.

(i) Helmet shall be provided to all workers, or visitors visiting the site, for protection of the head against impact or penetration of falling or flying objects.
(ii) All PPE must be of good quality with mark of quality standard certification.
(iii) Safety belt shall be provided to workers working at heights for bridge construction, etc.
(iv) Safety boots shall be provided to all workers for protection of feet from impact or penetration of falling objects on feet.
(v) Ear protecting/ earmuffs/plugs shall be provided to all workers in high noise zones.
(vi) Eye and face protection equipment shall be provided to all welders to protect against sparks.
(vii) Respiratory protection devices shall be provided to all workers during occurrence of fumes, dusts, or toxic gas/vapor.
(viii) The supervisor must ensure that appropriate personal protective equipment is available to workers; properly worn when required and properly cleaned, inspected, maintained, and stored.
(ix) A worker shall be responsible for using the items of personal protective equipment provided by the employer.
(x) A worker who is required to use personal protective equipment must-
- Use the equipment in accordance with training and instruction.
- Inspect the equipment before use.
- Refrain from wearing protective equipment outside of the work area which if done so would constitute a hazard; and
- Report any equipment malfunction to the supervisor or employer.

(xi) A worker who is assigned responsibility for cleaning, maintaining, or storing personal protective equipment must do so in accordance with training and instruction provided.
(xii) The safety and emergency procedures manual will be kept. Necessary training regarding the safety aspects of the personnel working at the project site will be provided.
(xiii) First aid facilities will be made available, and doctors called in from nearby village/towns when necessary.

Personal Protective Equipment for Safety of Different Body Parts

Sr. No.	Body Part to be protected	Personal Protective Equipment
1	Head	Safety helmet, hard hat, Crash helmets
2	Eye	Eye protectors, eye protectors for radiations, shield and helmet, zero power goggles
3	Ear	Earplug, earmuffs
4	Noise-Mouth	Du respirator, gas mask, self-contained breathing apparatus, dust masks
5	Hand	Standard work gloves, cutting gloves, leather work gloves, heat protective gloves, anti-vibration gloves
6	Foot	Industrial safety boots, chemical-proof boots
7	Body	Standard work clothing, chemical-proof clothing, heat protective clothing, leather apron
8	Others	Safety belts, personal protective equipment for radiation protection, back support belts

Contents of First-Aid Box

Sr. No.	Description	Quantity
1	First aid leaflet	1 copy
2	Sterilized finger dressing	10 nos.
3	Sterilized hand or foot dressing	10 nos.
4	Sterilized body or large dressing	6 nos.
5	Sterilized burns dressing - small	4 nos.
6	Sterilized burns dressing - large	2 nos.
7	Sterilized burns dressing – extra large	6 nos.
8	Sterilized cotton wool (25 gms)	2 tubes
9	Cetavolon	2 tubes
10	Eye pads	6 nos.
11	Adhesive plaster	1 spool
12	Assorted roller bandage	6 nos.
13	Triangular bandages	6 nos.
14	Safety pins	6 nos.
15	Scissors, ordinary, 12.7cms, both sides sharp	1 pair
16	Antiseptic liquid, 150 ml, or equivalent	2 nos.
17	Cotton wool for padding, 100 gms	2 packets
18	Eye Ointment of sulphacetamide preparation	1 tube
19	Loose woven gauze (28”x8”), compressed pack	1 packet
20	Aspirin, 300 mg (10 tablets)	5 strips
21	Note Pad, with a pencil in a plastic cover	1 no.
22	Adhesive dressing strips	10 strips
23	Field dressing of modified army pattern	3 nos.
24	Record cards in a plastic cover	1 set
25	Torch, medium size	1 no.
26	Eye wash	1 no.
27	Wooden splints, small	1 set
28	Wooden splints, big	1 set
29	Disinfectant, Spirt, 100ml	1 bottle

Health Management Plan. Nearby, full-fledged hospital facilities should be made available round the clock for attending emergency arising out of accidents, if any. All working personnel should be medically examined at least once in every six month and at the end of his/her term of employment. This is in addition to the pre-employment medical examination. Contractor will implement the following:

(i) Medical Emergency Response Planning for Disaster Management Plan.
(ii) Control of vectors in the project site; stagnant water to be drained off, raise awareness among the workers to combat spread of vector borne diseases, self-hygiene.
(iii) Screening Programs for Diabetes, Hypertension, AIDS, and Occupational Diseases etc.
(iv) Preventive Health Examinations e.g., Pre-employment, Periodic (Annual) health examinations.
(v) Medical Surveillance Program for health impacts of hazards.
(vi) Workers Immunization against Tetanus, Hepatitis, etc**.**

Records and Documentation. Contractor will document and keep record making them available for review. Reports prepared by the contractor shall include information on the place, date and time of the incident, name of persons involved, cause of incident, witnesses present and their statements. Based on such reports, the management can jointly identify any unsafe conditions, acts or procedures and recommend for the contractor to undertake certain mitigative actions to change any unsafe or harmful conditions.

Accidents and Diseases Monitoring: Establish procedures and systems for reporting and recording:

(i) Occupational accidents and diseases
(ii) Dangerous occurrences and incidents
(iii) These systems should enable workers to report immediately to their immediate supervisor any situation they believe presents a danger to life or health.
(iv) The systems and the employer should further enable and encourage workers to report to management all:
- Occupational injuries and near misses
- Suspected cases of occupational disease
- Dangerous occurrences and incidents

All reported occupational accidents, occupational diseases, dangerous occurrences, and incidents together with near misses should be investigated with the assistance of a person knowledgeable/competent in occupational safety. The investigation should: Establish what happened; Determine the cause of what happened, identify measures necessary to prevent a recurrence, Distinction is made between fatal and non-fatal injuries. The two main categories are divided into three sub-categories according to time of death or duration of the incapacity to work. The total work hours during the specified reporting period should be reported to the appropriate regulatory agency.

Compensation for Injuries and Death. Any casualty or injury resulting from occupational activities should be compensated as per GoI regulations. Where compensation is sought by the injured party, proper procedures for documentation of the case will be followed, including a detailed report on the accident, written reports from witnesses, report of the examining doctor and his/her recommendation for treatment. Each individual contractor will be responsible for ensuring compensation for the respective workers.

Offences. Workers should abide by the following regulations also, which are to be supervised by the Contractor:

(i) No gambling is to be in project site area, either construction site or camps, which may lead to conflicts
(ii) No drugs or alcohol abuse to be tolerated in the project site area
(iii) Workers should not be minor (below 18 years age)

Restriction on keeping any dangerous arms or equipment (licensed or not) when in the project area, except for security personals.

Structural Safety of Project Infrastructure

(i) Inclusion of buffer strips or other methods of physical separation around project sites to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odors, or other emissions
(ii) Incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, cyclone, cloud burst, flooding, landslides, and fire. To this end, all project structures should be designed in accordance with engineering and design criteria mandated by site-specific risks, including but not limited to seismic activity, slope stability, wind loading, and other dynamic loads
(iii) Application of locally regulated or internationally recognized building codes to ensure structures are designed and constructed in accordance with sound architectural and engineering practice, including aspects of fire prevention and response
(iv) Engineers and architects responsible for designing and constructing facilities, building, plants, and other structures should certify the applicability and appropriateness of the structural criteria employed.

Fire Prevention. Fire prevention addresses the identification of fire risks and ignition sources, and measures needed to limit fast fire and smoke development. These issues include:

(i) Fuel load and control of combustibles
(ii) Ignition sources
(iii) Interior finish flame spread characteristics
(iv) Interior finish smoke production characteristics
(v) Human acts, and housekeeping and maintenance

Fire Suppression and Control. Fire suppression and control includes all automatic and manual fire protection installations, such as:

(i) Automatic sprinkler systems
(ii) Manual portable extinguishers
(iii) Fire hose reels

Emergency Response Plan: An Emergency Response Plan is a set of scenarios–based procedures to assist staff and emergency response teams during real life emergency and training exercises. This chapter of the Fire and Life Safety Master Plan should include an assessment of local fire prevention and suppression capabilities.

Traffic Safety: Traffic safety should be promoted by all project personnel during displacement to and from the workplace, and during operation of project equipment on private or public roads. Prevention and control of traffic related injuries and fatalities should include the adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents. Road safety initiatives proportional to the scope and nature of project activities should include:

(i) Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. Measures should include:
(ii) Emphasizing safety aspects among drivers
(iii) Improving driving skills and requiring licensing of drivers
(iv) Adopting limits for trip duration and arranging driver rosters to avoid overtiredness
(v) Avoiding dangerous routes and times of day to reduce the risk of accidents
(vi) Use of speed control devices (governors) on trucks, and remote monitoring of driver actions
(vii) Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.
(viii) The procedures for transportation of hazardous materials should include:

- Proper labelling of containers, including the identify and quantity of the contents, hazards, and shipper contact information
- Providing a shipping document (e.g. shipping manifest) that describes the contents of the load and its associated hazards in addition to the labelling of the containers. The shipping document should establish a chain-of-custody using multiple signed copies to show that the waste was properly shipped, transported and received by the recycling or treatment/disposal facility
- Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved
- Ensuring adequate transport vehicle specifications o Training employees involved in the transportation of hazardous materials regarding proper shipping
- procedures and emergency procedures using labelling and placarding (external signs on transport vehicles), as required
- Providing the necessary means for emergency response on call 24 hours/day

APPENDIX 11: LABOUR ACCOMMODATION REQUIREMENTS

Temporary Worker Accommodation

In addition to GON requirements for temporary overnight labor accommodation follow ILO Safety and Health in Construction and worker accommodation guidelines and the below points to comply with the core labor standards etc.
Day camps with temporary structures to provide protection against the weather conditions for rest and eating of food will be required at site as a rest area but these are not to be used for sleeping overnight. Adequate quantity of safe drinking water and container for their safe storage shall be provided at day camps; at least 4 liters of water per person per day to be provided for consumption during the working day at each site. If no existing toilets within 100m that can be used, temporary sanitation facilities for men and women workers shall be provided where the wastewater generated is enclosed in a container to be later taken offsite for wastewater treatment and disposal. Food provided to day camps should be cooked off site; if it is to be reheated at site fire-safety measures must be adopted with LPG cylinders or kerosene purchased from authorized vendors. After completion of the construction work the temporary structures shall be removed and the land will be restored to its earlier condition.

1.1 General living facilities
Location

- Appropriate siting to avoid flooding or other natural hazards
- Location within a reasonable distance from the worksite to be unaffected by the worksite's noise, emissions or dust but avoiding undue amount of time travelling to work
- Safe and free transport to the worksite where remotely located
- Built with structurally sound materials, kept in good repair, clean and free from rubbish and other refuse
- After completion of the construction work the temporary structures shall be removed and the land will be restored to its earlier condition.

Drainage

- Adequate drainage, no waterlogging

Heating, air conditioning, ventilation and light

- Adequate heating, air conditioning and ventilation where appropriate
- Adequate natural light and artificial light, including emergency lighting

Water

- Easy access to an adequate supply of free, safe and potable water
- Constructed and covered storage tanks to prevent water from pollution or contamination
- Regular monitoring of drinking water quality

Wastewater and solid waste

- Adequate discharge of wastewater, sewage, food and any other waste materials

  Disposal of sewage and other wastewater shall be made connected to an existing sewerage system or made through a septic tank-soak pit arrangement
- Separate enclosed (lidded) bins with proper markings in terms of recyclable or non-recyclable waste shall be provided in the labor camps and kitchen premises in sufficient numbers for collection of garbage.
- Specific containers for rubbish collection in adequate number and being regularly emptied
- Pest extermination, vector control and disinfection throughout the living facilities

1.2 Rooms/dormitories facilities

- Kept in good condition, aired and cleaned at regular intervals

- Built with easily cleanable flooring materials
- Adequate furniture (such as table, chair, mirror, bedside light) for every worker
- Lockable doors and windows with mosquito screens when necessary
- Living space and space for privacy
- Adequate living space (see also International standards for spacing at migrant workers' accommodation)
- Adequate headroom, providing full and free movement, of not less than 203 cm
- Inside dimensions of a sleeping space of at least 198 cm by 80 cm
- Minimized number of workers sharing the same room/dormitory (recommended 2–8 worker)
- Mobile partitions or curtains to ensure privacy
- Gender-segregated accommodations, except in family accommodation
- Separate sleeping rooms for shifts to ensure no workers working during the day share a room with workers on night shifts
- Bed arrangements and storage facilities
- A separate bed for each worker
- Minimum space of 1 m between beds
- Minimized use of double deck bunks and no use of triple deck bunks
- Enough clear space between the lower and upper bunk of the bed where double deck bunks are in use (recommended 0.7–1.1 m)
- Reasonably comfortable bedding materials (mattress, pillow, cover and clean bed linen) for each worker
- Bedding and bedframe materials designed to deter vermin
- Individual, lockable storage facilities for each worker to secure their belongings

1.3 Sanitary facilities

- Sanitary and toilet facilities provided for men and women including private bathing area, showers, or baths in overnight accommodation.
- Separate housekeeping staff shall be engaged for regular cleaning of the accommodation.
- Frequent cleaning and kept in good condition
- Located within the same buildings with rooms/dormitories
- Constructed from easily cleanable materials
- Shower/bathroom flooring made of anti-slip hard washable materials
- Adequate privacy, including ceiling to floor partitions and lockable doors
- Adequate number of sanitary facilities (a minimum of one toilet, one wash basin and one tub or shower for every six persons)
- Convenient and easily accessible location
- Compliance with minimum standards of health and hygiene
- Separate sanitary facilities for men and women, except in family accommodation
- Suitable light and good ventilation to open air, independently of any other part of the accommodation
- Adequately stocked soap and hygienic paper
- Adequate supply of hot and cold fresh running water (at least 80-100 liters per capita per day)

1.4 Canteen, cooking and laundry facilities

- If workers cook their own meals, kitchen space is provided separately from the sleeping areas.
- No labor shall be allowed to collect fuel wood/NTFP or purchase fuel wood/NTFP from unauthorized vendors.
- LPG cylinders or kerosene purchased from authorized vendors shall be provided.

- Being built with adequate and easy to clean materials
- Being kept in clean and sanitary condition
- Common dining rooms, canteens or mess rooms, and kitchen space located away from sleeping areas
- Enough space in the canteen (1–1.5 m2 per worker)
- Adequately furnished canteen (tables, benches, individual drinking cups and plates)
- Adequate facilities to maintain adequate personal hygiene (enough washbasins, clean water, materials for hygienic drying)
- Places for food preparation adequately ventilated and equipped to protect against contamination between and during food preparation
- Kitchen floor, ceiling and wall surfaces adjacent to or above food preparation and cooking areas built in non-absorbent, durable, non-toxic, easily cleanable materials
- Wall surfaces adjacent to cooking areas made of fire-resistant materials; food preparation tables equipped with a smooth, durable, non-corrosive, non-toxic, washable surface
- Adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment
- Adequate sealable containers to deposit food waste and other refuse; refuse frequently removed from the kitchen to avoid accumulation
- Implementation of the WHO “5 keys to safer food” or equivalent process in relation to food safety
- Provided food containing appropriate nutritional value and considering migrant workers' religious/cultural backgrounds
- Adequate facilities for washing and drying clothes, appropriately situated and furnished laundry facilities
- Collection of wastewater from washing areas and kitchens further disposed through existing sewerage connection or septic tank with soak away

Medical facilities

- Adequate number and stock of first aid kits
- Adequate number of staff/workers trained to provide first aid
- Residents are provided guidance on alcohol, drug and HIV/AIDS and other health risks
- On site medical facilities/services (where possible and depending on the medical infrastructure existing in the community)
- Separate facilities for sick workers to prevent the spread of transmissible diseases among occupants
- Appropriate and reasonable accommodations in connection with pregnancy, childbirth and nursing

1.6 Leisure, social and telecommunication facilities

- Basic collective social/rest spaces and adequate recreational areas where not otherwise available in the community
- Dedicated places for religious observance
- Reasonable access to internet facilities, telephone or other modes of communications free of charge or at affordable/public prices

2.1 Management and staff

- An appointed person with adequate background, competency and experience to manage the accommodations or monitor third-party service providers
- Clear contractual management responsibilities and monitoring and reporting requirements where third-party service providers are being used
- Adequate staff to implement the accommodation standards (cleaning, cooking, security, general maintenance)

- Basic health and safety training for staff, including training in nutrition and food handling for those in charge of the kitchen
- Frequent inspection and maintenance of premises and records kept

2.2 Fees and costs for accommodation and related services

- Accommodation free of charge where migrant workers are not free to look for their own accommodations
- Fair and transparent renting arrangements, not costing migrant workers more than a small proportion of income (when costs are charged)
- Adequate information to migrant workers about all payments made
- Clearly specifying renting arrangements and regulations in migrant workers' employment contracts
- Food and other services provided at the facilities for free or reasonably priced (this means not above the local market price)
- No in-kind payments for accommodation and related services

2.3 Health and safety

- Adequate health and safety management plans including electrical, mechanical, structural and food safety
- Available emergency plans on health and fire safety and other specific occurrences (earthquakes, floods, tornadoes, pandemic)
- Regular training in safety and health rules and procedures for all occupants
- Posting of safety notices and operational instructions in language migrant workers understand or visual form
- Adequate number of staff/workers trained in providing first aid
- Easy access to medical facilities and medical staff, including women doctors/nurses where appropriate Guidance on alcohol, drug and HIV/AIDS and other health risks-related activities provided to migrant workers
- Access to adequate contraception measures and mosquito nets (where relevant)

Fire safety

- Specific and adequate fire safety plan and measures
- Training of fire wardens
- Installing, periodic testing and maintenance of fire equipment (alarms, extinguishers, etc.)
- Training for migrant workers in fire procedures and periodic drills (in a language they understand)
- Bedding not containing flammable materials
- Radiators and other heating apparatus properly placed to avoid risk of fire, and shielded where necessary to prevent discomfort to occupants
- Emergency evacuation plans are displayed at strategic areas in language understood by workers
- Clearly marked emergency exits
- Adequate means of escape provided and properly maintained

2.4 Security

- Security at worker's accommodation shall be ensured.
- A security plan including clear measures to protect migrant workers against theft and attack and clear provisions on the use of force
- The backgrounds of security staff checked for previous crimes or abuses
- Clear instructions for security staff not to harass, intimidate, discipline, discriminate against migrant workers or restrict the freedom of movement
- Adequate training for security staff in dealing with violence and harassment and the use of force (including gender-based violence and sexual harassment)

- Body searches only performed in exceptional circumstances by specifically trained security staff; pat down searches on women workers only performed by women security staff

2.5 Migrant workers' rights, rules and regulations on migrant workers' accommodation

- Migrant workers' 24/7 access to the accommodation; security measures reasonable and not unduly restricting migrant workers' freedom of movement
- Adequate transport system to the surrounding communities
- Withholding migrant workers' documentation papers prohibited; migrant workers entitled to keep their documents in their own lockers
- Trade union representatives' access to migrant workers in the accommodation site
- Visitor access allowed in accordance with company rules for privacy or safety
- Migrant workers' religious, cultural and social backgrounds respected
- Adequate information to migrant workers about their rights and obligations (a copy of the accommodations' internal rules, procedures and sanction mechanism in a language or through a media they understand)
- Non-discriminatory, fair and reasonable house regulations
- Effective grievance mechanisms for migrant workers to articulate their grievances
- Display of contact information of consular services, company personnel and civil society organizations at the facilities

Permanent Worker Accommodation (Substation Design)

In addition to GON requirements for permanent labor accommodation follow ILO worker accommodation guidelines and the below additional points to comply with the core labor standards etc.

Integrity of Structures

- Surfaces, structures and installations should be easy to clean and maintain, and not allow for accumulation of hazardous compounds.
- Buildings should be structurally safe, provide appropriate protection against the climate, and have acceptable light and noise conditions.
- Fire resistant, noise-absorbing materials should, to the extent feasible, be used for cladding on ceilings and walls.
- Floors should be level, even, and non-skid.

Severe Weather

- Structures should be designed and constructed to withstand the expected elements for the region and have an area designated for safe refuge, if appropriate.

Exit

- Passages to emergency exits should be unobstructed at all times.
- Exits should be clearly marked to be visible in total darkness. The number and capacity of emergency exits should be sufficient for safe and orderly evacuation of the greatest number of people present at any time, and there should be a minimum of two exits from any work area.
- Facilities also should be designed and built taking into account the needs of disabled persons.

Fire Precautions

- Equipping facilities with fire detectors, alarm systems, and fire-fighting equipment. The equipment should be maintained in good working order and be readily accessible. It should

be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present, and the maximum number of people present.
- Provision of manual firefighting equipment that is easily accessible and simple to use
- Fire and emergency alarm systems that are both audible and visible

Lavatories and Showers
- Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work/live in the facility and allowances made for segregated facilities, or for indicating whether the toilet facility is “In Use” or “Vacant”. Toilet facilities should also be provided with adequate supplies of hot and cold running water, soap, and hand drying devices.

Potable Water Supply
- Adequate supplies of potable drinking water should be provided from a fountain with an upward jet or with a sanitary means of collecting the water for the purposes of drinking
- Water supplied to areas of food preparation or for the purpose of personal hygiene (washing or bathing) should meet drinking water quality standards

Lighting
- Workplaces should, to the degree feasible, receive natural light and be supplemented with sufficient artificial illumination to promote workers’ safety and health, and enable safe equipment operation. Supplemental ‘task lighting’ may be required where specific visual acuity requirements should be met.
- Emergency lighting of adequate intensity should be installed and automatically activated upon failure of the principal artificial light source to ensure safe shut-down, evacuation, etc.

Safe Access
- Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe, and appropriate access
- Equipment and installations requiring servicing, inspection, and/or cleaning should have unobstructed, unrestricted, and ready access
- Hand, knee and foot railings should be installed on stairs, fixed ladders, platforms, permanent and interim floor openings, loading bays, ramps, etc.
- Openings should be sealed by gates or removable chains
- Covers should, if feasible, be installed to protect against falling items
- Measures to prevent unauthorized access to dangerous areas should be in place

First Aid
- Ensure that qualified first-aid can be provided at all times.
- Appropriately equipped first-aid stations should be easily accessible throughout the place of work
- Eye-wash stations and/or emergency showers should be provided close to all workstations where immediate flushing with water is the recommended first-aid response
- Where the scale of work or the type of activity being carried out requires, dedicated and appropriately equipped first-aid room(s) should be provided. First aid stations and rooms should be equipped with gloves, gowns, and masks for protection against direct contact with blood and other body fluids

- Remote sites should have written emergency procedures in place for dealing with cases of trauma or serious illness up to the point at which patient care can be transferred to an appropriate medical facility.

Air Supply

- Sufficient fresh air should be supplied for indoor and confined work spaces. Factors to be considered in ventilation design include physical activity, substances in use, and process-related emissions.
- Air distribution systems should be designed so as not to expose workers to draughts
- Mechanical ventilation systems should be maintained in good working order. Point-source exhaust systems required for maintaining a safe ambient environment should have local indicators of correct functioning.
- Re-circulation of contaminated air is not acceptable. Air inlet filters should be kept clean and free of dust and microorganisms.
- Heating, ventilation and air conditioning (HVAC) and industrial evaporative cooling systems should be equipped, maintained and operated so as to prevent growth and spreading of disease agents (e.g. Legionella pneumophilia) or breeding of vectors (e.g. mosquitoes and flies) of public health concern.

Temperature

- The temperature in work, rest room and other welfare facilities should, during service hours, be maintained at a level appropriate for the purpose of the facility.

OHS Training

- Provisions should be made to provide OHS orientation training to all new employees to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow employees.
- Training should consist of basic hazard awareness, site- specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or color coding in use should be thoroughly reviewed as part of orientation training.

Permanent Accommodation

- A separate bed for each worker
- Adequate headroom, providing full and free movement, of not less than 203 cm
- The minimum inside dimensions of a sleeping space should be at least 198 cm by 80 cm
- Beds should not be arranged in tiers of more than two
- Bedding materials should be reasonably comfortable
- Bedding and bedframe materials should be designed to deter vermin
- Separate accommodation of the sexes
- Adequate natural light during the day- time and adequate artificial light
- A reading lamp for each bed
- Adequate ventilation to ensure sufficient movement of air in all conditions of weather and climate
- heating where appropriate
- Adequate supply of safe potable water
- Adequate sanitary facilities (see below)
- Adequate drainage

- Adequate furniture for each worker to secure his or her belongings, such as a ventilated clothes locker which can be locked by the occupant to ensure privacy
- Common dining rooms, canteens or mess rooms, located away from the sleeping areas
- Appropriately situated and furnished laundry facilities
- Reasonable access to telephone or other modes of communications, with any charges for the use of these services being reasonable in amount
- Rest and recreation rooms and health facilities, where not otherwise available in the community
- In workers' sleeping rooms the floor area should not be less than 7.5 square metres in rooms accommodating two persons; 11.5 square metres in rooms accommodating three persons; or 14.5 square metres in rooms accommodating four persons. If a room accommodates more than four persons, the floor area should be at least 3.6 square metres per person. Rooms should indicate the permitted number of occupants.
- As far as practicable, sleeping rooms should be arranged so that shifts are separated and that no workers working during the day share a room with workers on night shifts.

Sanitation Facilities

- Adequate sanitary facilities should include a minimum of one toilet, one wash basin and one tub or shower for every six persons. They should be provided at a convenient location which prevents nuisances.
- Sanitary facilities provided should meet minimum standards of health and hygiene. They should also provide reasonable standards of comfort, including hot and cold fresh running water.
- There should be separate sanitary facilities provided for men and for women.
- Sanitary facilities should have ventilation to the open air, independently of any other part of the accommodation.
- Soap and hygienic paper should be adequately stocked.
- Measures should be taken to prevent the spread of diseases. Separate facilities should be provided for sick workers to prevent the spread of transmissible diseases among the occupants.
- Fire safety measures should be taken, including installing and maintaining fire equipment (alarms, extinguishers, etc.).
- Workers should be trained in fire procedures.
- Bedding should not contain flammable materials.
- Radiators and other heating apparatus should be placed so as to avoid risk of fire, and shielded where necessary to prevent discomfort to occupants.

Inspection of premises

- Premises should be inspected frequently to ensure that the accommodation is clean, decently habitable and maintained in a good state of repair. The results of each such inspection should be recorded and be available for review.

Vacating the premises upon termination of employment

- When a worker's contract of employment is terminated, the worker should be entitled to a reasonable period of time to vacate the premises, in accordance with national law and custom.

Water Conservation

- Regularly maintain plumbing, and identify and repair leaks

- Shut off water to unused areas
- Install self-closing taps, automatic shut-off valves, spray nozzles, pressure reducing valves, and water conserving fixtures (e.g. low flow shower heads, faucets, toilets, urinals; and spring loaded or censored faucets)
- Operate dishwashers and laundries on full loads, and only when needed
- Install water-saving equipment in lavatories, such as low- flow toilets

APPENDIX 12: ENVIRONMENT ASSESSMENT CHECKLIST AND CONSULTATION PROFORMAS

DISTRIBUTION LINE AND DTR SITE SPECIFIC ASSESSMENT FORMS, CONSULTATION PROFORMA, AND FINAL ROUTE ALIGNMENT IEE UPDATE TEMPLATE

Distribution Line Specific Assessment Forms

1. One consolidated set of distribution line specific assessment forms (Form A1 or A2, B, and C) is to be completed for each distribution line/ward for 11kV and LT distribution lines with the consolidated forms to be submitted to ADB for clearance prior to the commencement of any works associated with the distribution line covered by them. An orientation program is proposed for NEA and their contractors on how to complete the assessment forms at the start of project.

Form A. Project description – *complete one form for each distribution line and related DTR*

- New 11kV and LT lines and DTR, complete Form A1
- Rehabilitation of bare conductor to covered conductor or ABC, complete Form A2

Form B. Baseline setting – *complete one form for each distribution line and related DTR*

- New 11kV and LT lines and new DTR installation complete all items of the form
- Rehabilitation (reconductoring) of 11kV bare conductor to CC and ABC following existing alignment with no or minor diversion, e.g. only restringing of conductors and no new pole locations/shifting of 1-2 poles within the existing ROW complete bold items of form only
- Rehabilitation (reconductoring) of 11kV bare conductor to CC and ABC with a moderate-major diversion, e.g., shifting 3 or more poles and/or realigning outside the existing ROWs or the installation of a new DTR complete all items of the form

Form C. Environment assessment checklist *– complete one form for all distribution lines/DTR on ward basis*

2. Provide requested maps and photographs as separate files using clear naming protocol to identify them.

A. PROJECT DESCRIPTION

Form A1.

Items	Details
Distribution Line Name/kV	
Electrical District Office/Ward	
Administrative District/Ward/Municipality	
Names of Settlements Served	
Contract Package/Lot	
Contractor	
Construction timeline	
Start Point Coordinate	
Starting Substation (if applicable)	Photo of the substation (if available)
End Point Coordinate	
Ending Substation (if applicable)	Photo of the substation (if available)
Length (km)	

Items	Details
Type (CC/ABC)	
No. type and grid coordinates of new DTRs (under project scope)	Type: ground mounted/pole mounted Landownership: Photo of proposed location **.kmz file should also be provided to support validation**
Elevation	
Topography (flat land/rolling/complex)	
Ground Conditions (stable/unstable)	
Map of final route alignment (map(s) to be provided for entire route)	Insert or provide as a separate file map showing the line alignment at readable scale (use GPS to map during site visit walkover) **.kmz file should also be provided to support validation**
Number of road crossings (type used if different to main type)	
Number of river crossings (type used if different to main type)	
Existing transformers distribution line is connected to: (details provided for all transformers; photo(s) of transformers provided as a separate file)	Type: ground mounted/pole mounted Model and date of manufacture: Date of last oil change or maintenance, if known: Evidence of oil leak: none/minor/major Existing safety features: fence/warning sign/climb deterrent Pollution prevention features for ground mounted transformers: none/concrete platform/bund Photo of the transformer (if available)
Temporary facilities, location/size, if any (may be used for multiple components)	
Temporary workers camp location/size (may be used for multiple components)	

Form A2.

Items	Details
Distribution Line (Ward/Municipality) Name	
Electrical Division Office/Ward	
Administrative District/Ward/Municipality	
Contract Package/Lot	
Contractor	
Construction timeline	
Start Point Coordinate	
Starting Substation (if applicable)	Photo of the substation (if available)
End Point Coordinate	
Ending Substation (if applicable)	Photo of the substation (if available)
Length (km)	
Type (CC/ABC)	
No. type and grid coordinates of new DTRs (under project scope)	Type: ground mounted/pole mounted Landownership: Photo of proposed location **.kmz file should also be provided to**

	support validation
Topography (flat land/rolling/complex)	
Ground Conditions (stable/unstable)	
Topography (flat land/rolling/complex)	
Map of final route alignment(s) (map(s) to be provided for entire route)	Insert or provide as a separate file map showing the line alignment(s) at readable scale, including details of any minor diversion (use GPS to map during site visit walkover) **.kmz file should also be provided to support validation** (existing and new line mapped as applicable)
Maximum shift in alignment from the existing route (m)	
Realignment within the RoW of the existing route (number of meter)	
Realignment outside the RoW of the existing route (number of meter)	
Number of road crossings (type used if different to main type)	
Number of river crossings (type used if different to main type)	
Existing transformers distribution line is connected to: (details provided for all transformers; photo(s) of transformers provided as a separate file)	Type: ground mounted/pole mounted Model and date of manufacture: Date of last oil change or maintenance, if known: Evidence of oil leak: none/minor/major Existing safety features: fence/warning sign/climb deterrent Pollution prevention features for ground mounted transformers: none/concrete platform/bund Photo of the transformer (if available)
New poles on existing alignments	Number of poles:
New poles on minor diverted routes, if required for rehabilitation or in order to meet the conductor clearances (maps to show details of any diversions)	Number of poles:
Temporary facilities, location/size, if any (may be used for multiple components)	
Temporary workers camp location/size (may be used for multiple components)	

B. BASELINE SETTING[25]

Land Use and Sensitive Receptors	**Details**
Land use setting of distribution line (dense semi urban/rural settlement/rural)	
Minority dominated communities (IP) (details)	**yes/no**
DTRs in or distribution line ROW following existing road	No. DTRs:

[25] Route surveyors who should include environmental/ecological/cultural heritage experts can use the checklists similar to those used during the IEE preparation to obtain sufficient information from the field to inform the baseline setting

Land Use and Sensitive Receptors	Details
reserve in habitation	km of line:
DTRs in or distribution line ROW on existing road reserve outside habitation	No. DTRs: km of line:
ROW crossing of roads	Number of roads crossed:
DTRs in or distribution line ROW outside forest land (maps to be obtained from MOFE)	**No. DTRs:** **km of line:**
DTRs in or distribution line ROW in forest land (maps to be obtained from MOFE)	**Type of forest land:** **No. DTRs:** **km of line:**
DTR site or distribution line ROW with agricultural land [arable, grazing land or fallow] traversed	No. of DTR: km of line: number of poles:
DTR site or distribution line ROW with plantation/private garden traversed (detail type)	No. or DTR: km of line: number of poles:
DTR site or distribution line ROW with forest or scrub habitat (detail type) **Note: this includes forest outside of notified areas, regardless of level of habitat degradation observed**	**No. or DTR:** **km of line:** **number of poles:**
DTR site or distribution line ROW with other land type traversed: (detail land types)	No. of DTR: km of line:
Other land types within 50m of the DTR or and distribution line ROW: (detail land types)	
ROW crossing of waterbodies e.g., rivers, streams, drains, etc.	Number and types of waterbody crossed: Insert of provide as a separate file a clear photo of each waterbody to cross
Other waterbodies within 50m of the DTR or distribution line route e.g., rivers, streams, drains, etc.	Number and types of waterbody:
In 500m of DTR site or distribution line presence of a national park, buffer zone, Ramsar site, KBA, IBA or a protected forest area (conservation forest) informed by the IEE, findings of ecology walkover surveys, and confirmed in consultation with forest officials and local community etc.	**yes/no** **If yes, list together with minimum distance to the DTR and distribution line route**[26] **No lines or related facilities in National Parks, Buffer Zones, Ramsar Sites, KBA or IBA, protected forest area will be taken up under the Output 2(iii) distribution component.**
Presence of ecoregion supporting high biodiversity values (informed by IEE)	yes/no
Risk of Karnali province-wide critical habitat qualifying and GoN protected species being found within 50m of the DTR or distribution line route; informed by the IEE, findings of ecology walkover surveys, and confirmed in consultation with forest officials and local community etc.	**yes-high/yes-medium/yes-low/no**
Risk of other CR/EN/VU and endemic species being	**yes-high/yes-medium/yes-low/no**

[26] IBAT to be run for a wider study area of 10km around distribution line to identify the presence of legally protected areas, important bird areas etc. IBAT report to be attached to confirm search undertaken. However, it is to be noted that forest land is not included in IBAT so this will also need to be manually checked.

Land Use and Sensitive Receptors	Details
found within 50m of the DTR or distribution line route; informed by the IEE, findings of ecology walkover surveys, and confirmed in consultation with forest officials and local community etc.	
Habitat types found within 50m of the ROW: (detail habitat types, see ADB SPS 2009 definition of modified and natural habitats)	modified/natural
In 500m of DTR or distribution line presence of nationally important physical cultural resources in ward, informed by IEE, findings of cultural heritage walkover surveys, and confirmed in consultation with Department of Archaeology and local community etc. Including tentative UNESCO sites, Department of Archaeology protected monuments and religious forest.[27]	**yes/no** **If yes, list together with minimum distance to DTR and distribution line route** **No lines or related facilities in nationally protected monuments or religious forest will be taken up under the Output 2(iii) distribution component.**
Locally important physical cultural resources in 50m of the distribution line route or DTR e.g., shrines, heritage trees etc.	yes/no If yes, provide details of these physical cultural resources including photos as separate files
Private / public trees located within the safety clearance or DTR footprint and requiring to be cut (if required after final design) **(if a large number of trees is to be cut an alternatives analysis will be required for the route)**	**Numbers trees outside forest land to be cut:** **Numbers trees in forest land to be cut:** **Total numbers of tree species requiring compensation at 1:10 cut:** **Total numbers of tree species requiring compensation at 1:25 cut:** **Confirm species to be felled do not include CR, EN, VU, GoN protected species or Critical Habitat Qualifying Species (informed by IEE): yes/no**
Buildings located within the **(i) ROW** **(ii) safety clearances**	**(i) yes/no** **(ii) yes/no** **If yes, provide photos clearly showing baseline situation (attach as separate files) with a map clearly showing details of the line alignment, and how safety clearances will be achieved**
School compounds, playgrounds or other similar facilities located within **(i) ROW** **(ii) safety clearances**[28]	**(i) yes/no** **(ii) yes/no** **If yes, provide photos clearly showing baseline situation (attach as separate files) with a map clearly**

[27] No database is readily available so this will need to be manually checked.

[28] Existing distribution lines being rehabilitated which cross school compounds or playgrounds and other similar community facilities will be marginally realigned to ensure that the same requirements as for new lines are met, arrangements plan for any existing lines with such facilities in the ROW including realignments required will be attached following detailed route surveys being completed by the contractor.

Land Use and Sensitive Receptors	Details
	showing details of the route alignment, and how safety clearances will be achieved
School compounds and/or playgrounds situated within 50m of the DTR route alignment	yes/no If yes, provide photos clearly showing baseline situation (attach as separate files)
Other public/private buildings that are situated within 50m of the DTR route alignment	yes/no If yes, provide photos clearly showing baseline situation (attach as separate files)

C. ENVIRONMENT ASSESSMENT CHECKLIST

3. Potential environmental impacts have already been identified at the project level and mitigation for these impacts has been identified in the project-level EMP so only locational issues need further consideration. If the answer to any of the assessment questions below is a yes or not known, then as part of updating the IEE a site-specific assessment might be required for any components/activities of concern to determine the significance of potential impacts and any site-specific mitigation measures required. Further consultation should be undertaken with ADB environment safeguards specialist if the answer to any of these questions is identified to be a yes.

Distribution Line Specific Assessment	Yes	No	Not Known	Remarks
A. DTR/Distribution Line Siting				
Is any DTR/distribution line ROW adjacent to (e.g., within 50m) or in close proximity to (e.g., within 500m) any of the following? Informed by Environment Baseline Form/IBAT Check				
▪ National Park				
▪ National Park Buffer Zone – including buffer zone of national park within the neighboring provinces				
▪ Important Bird Area				
▪ Key Biodiversity Area				
▪ Ramsar Site				
▪ Protected forest area (conservation forest)				
▪ Community forest land				
▪ Other forest land (e.g. private, leasehold)				
▪ Ecoregion supporting high biodiversity values				
Is any distribution line ROW adjacent to (e.g., within 50m) or in any of the following? Informed by Environment Baseline Form				
▪ Tentative UNESCO site				
▪ Department of Archaeology monuments				
▪ Religious Forest				
▪ Locally important PCR (only if adjacent)				
B. Environment Criteria				
Will the DTR or distribution line route				
▪ Require an IEE or EIA under national law				If yes, drop from project scope
▪ Require a BES under national law				If yes, attach copy BES report and copy of requisite permission
▪ Use a bare conductor				If yes, drop from project scope (only CC and ABC are allowed)
▪ Be in, or pass through National Park, Buffer Zone, Ramsar site, KBA or IBA, protected forest area, Department of Archaeology protected national monuments or a religious forest				If yes, drop from project scope
▪ Be in natural habitat where significant conversion or degradation of natural				If yes, drop from project scope (or conduct site specific

Distribution Line Specific Assessment	Yes	No	Not Known	Remarks
habitat has not been demonstrated to be avoided through a site-specific assessment				assessment and reroute or redesign per recommendations)
▪ Be in critical habitat where significant adverse impacts have not been demonstrated to be avoided through a site-specific assessment				If yes, drop from project scope (or conduct site specific assessment and reroute or redesign per recommendations)
▪ Be in, or pass through, forest land (other than protected forest area or religious forest lands)				If yes, confirm how GoN forest laws have been complied with and attach no objection of DoF and local government, plus CFUG, owner, user permissions
▪ Be in, or passing through, KBAs and IBAs outside of a pre-existing powerline or Rights of Way (RoW)				If yes, drop from project scope
▪ Be in, or passing through community forest (or similar) and requiring either a new or deviations to an existing RoW [powerline or road]				If yes, drop from project scope
▪ Be in, or passing through community forest (or similar) and requiring access track construction				If yes, drop from project scope
▪ Be in, or passing through, community forest (or similar) without a site-specific biodiversity assessment demonstrating that any significant adverse impacts can be avoided				If yes, drop from project scope (or conduct site specific assessment)
▪ Be in, or pass through, UNESCO tentative area or within 500m of a nationally protected monument				If yes, attach no objection of DoA and site-specific assessment demonstrating how significant adverse impacts can be avoided
▪ Require the removal of physical cultural resources from their current location?				If yes, drop from project scope
▪ Be within 50m of a local physical cultural resources				If yes, attach site-specific assessment demonstrating how significant adverse impacts can be avoided
C. Potential Environmental Impacts Does the DTR or distribution line have the potential to:				
▪ cause significant adverse environmental impacts that are irreversible, diverse, or unprecedented				If yes, drop from project scope (see IEE/EMP for the principles)
▪ result in the conversion or degradation of natural habitat because the ROW passes through or adjacent natural habitat including forest habitat, wetland area etc. Even if habitat not notified by GoN or it is degraded? refer to ADB SPS 2009 for definition of natural habitat				If yes, conduct site specific assessment and reroute or redesign per recommendations

Distribution Line Specific Assessment	Yes	No	Not Known	Remarks
▪ encroach areas with known presence of Critical Habitat-qualifying biodiversity or GoN protected species				If yes, conduct site specific assessment and reroute or redesign per recommendations
▪ impact on species that the province/districts support critical habitat for by virtue of location or design? refer to IEE for details of critical habitat species				If yes, conduct site specific assessment and reroute or redesign per recommendations
▪ encroach directly or indirectly (e.g., worker disturbance) on any internationally or nationally important biodiversity areas as per Section A?				If yes, check criteria and if it is necessary drop from scope. Ensure EMP measures are followed.
▪ present an electrocution risk to wildlife? For CC and ABC there is a risk if a “wildlife sensitive design” is not adopted.				If yes, conduct site specific assessment and redesign per recommendations; for CC and ABC adopt a “wildlife sensitive design”
▪ require the cutting of any trees in forest land?				Tree cutting is envisaged for the distribution component. If yes, update IEE, obtain tree cutting permits and calculate compensatory plantation due to ensure No Net Loss
▪ require the cutting of any trees outside of forest land?				Tree cutting is envisaged for the distribution component. If yes, update IEE, demonstrate how No Net Loss will be achieved Refer to RIPP entitlement matrix for compensation due if the private trees are to be cut (see IEE/EMP for the principles)
▪ encroach directly or indirectly (e.g., worker disturbance) on any internationally or nationally important physical cultural resources as per Section A?				If yes, check criteria and if it is necessary drop from scope. Ensure EMP measures are followed.
▪ result in damage to locally important physical cultural resources e.g., temples, shrines, religious trees or springs etc.?				If yes, conduct site specific assessment and reroute or redesign per recommendations
▪ encroach indirectly (e.g., worker disturbance) on the GoN Department of Archaeology protected monuments as per Section A?				If yes, check criteria and if it is necessary drop from scope
▪ cause damage to property (structures, roads, crops etc.)				If yes, ensure EMP measures are followed (see IEE/EMP for the principles)
▪ encroach on or be within the safety clearances for buildings?				If yes, reroute or resettle to ensure safety clearances are met (see IEE/EMP for the principles) No houses or other regularly occupied properties must fall under the DL

Distribution Line Specific Assessment	Yes	No	Not Known	Remarks
				If any resettlement or compensation payments are required, please refer to the RIPP entitlement matrix
▪ encroach on or be within the safety clearances for school compounds, playgrounds, or other areas where children as vulnerable members of the community assemble without parental supervision?				If yes, rerouting will be required (see IEE/EMP for the principles)
▪ create disturbance to existing pedestrian and traffic routes, in terms of creating blockages or diversions				If yes, ensure EMP measures are followed (see IEE/EMP for the principles)
▪ cause damage to public utility services (water, telephone lines, cable TV, etc.)				If yes, ensure EMP measures are followed (see IEE/EMP for the principles)
D. Other Impacts Will the distribution line route cause any additional site-specific impacts to those detailed in the IEE and covered by the project-level EMP…				
▪ *[insert details]*				
▪ *[insert details]*				
▪ *[insert details]*				
▪ ….				

Submitted by:
Name and signature:
Position:
Date:

Reviewed by:
Name and signature:
Position:
Date:

Note from the Reviewer, if any:

CONSULTATION PROFORMA RECORD FOR DISTRIBUTION LINES

4. Meaningful environmental consultations must be conducted for each distribution line/DTR together with the district electricity office/distribution center staff with one consultation proforma record to be completed for each before the detailed design is approved by NEA. The meaningful consultation for the IEE update will be carried out by the route surveyors with the support of NEA. The consultation material will use photographs to help explain the scope of work and convey the findings of the IEE to disseminate information on the potential impacts and their management, as well as informing of the works. An orientation program is proposed for NEA and their contractors on how to conduct meaningful public consultations. NEA and the contractor are also responsible for completing all other consultations during the Output 2(iii) subproject implementation in accordance with the EMP.

5. For environment the following government or civil society representatives should be met for each distribution line in the district electricity office/distribution centers as part of the IEE update prior to detailed design. Identification of key stakeholders during detailed design will be done by the contractors in due consultation with officials of NEA safeguards team, in line with this guidance and the stakeholder engagement (community liaison) plan prepared by NEA during pre-construction.

- Forest Officers (District Forest Officers – Karnali Province)
- Senior Conservation Officers of the Department of National Parks and Wildlife Conservation under MoFE for mapping of any PA, Buffer Zone, Forest Land including Community Forest and its CFUG Committee, internationally important biodiversity areas like Ramsar/KBA/IBA, or critical habitat qualifying and GoN Protected species within district etc.
- Department of Archaeology for any nationally important physical cultural resources within districts
- Ward Presidents and committee members from villages and municipal areas within 50m for distribution lines
- Temple head or similar for any physical cultural resources within 50m of distribution lines
- School/Technical Institutes/student hostels, head for all education facilities within 50m of the distribution lines
- Bird Conservation Nepal and other ecological NGO on critical habitat qualifying and GoN Protected species within district etc.

Table 1: Summary Record of Subproject Environment Meetings and Discussions with Government and Civil Society Representatives*

Date	Location	Name of the Person	Position or Title, Agency	Topics Discussed	Suggestions for Alignment and Mitigation	Contact Number	Signature

* Provide photograph of the meeting in progress

6. The contractors concerned with guidance from NEA (PMU/PSC) will identify appropriate methods for public consultation at each location and suitable dissemination platforms for broader reach. The contractors with guidance from NEA (PMU/PSC) will develop appropriate communication materials in local language (Nepali/Karni) for the purposes of consultation especially where affected people include tribes/indigenous peoples. For disclosure purposes, the communication materials will include the positive and negative impacts, mitigation measures, grievance redress mechanism, construction schedule etc. Consultation process will be utilized to address the concerns and project implementation issues raised by the affected people during the consultation.

7. The contractors will give advance notice about the consultations or other engagement and will disseminate properly for wider participation of beneficiaries or affected people especially women and the scheduled tribes/indigenous peoples.

8. Public meetings are to be attended by at least 10% of the affected population and have at least 30% representation of women excluding NEA and contractor representatives. If it is not possible at the public consultation to achieve these levels of female participation a separate gender focus group must be held to ensure the concerns of women and vulnerable groups are heard.

Table 2: Summary Record of Public Consultations and Focus Groups*[29]

Distribution Line Name		
District/Ward/Municipality		
Village(s)		
Date and Time		
Total Population of Affected Persons within 50m of ROW (estimate)		
Total Number of Participants	Male:	Female:
Number of Participants from Vulnerable Groups		
Names and Designations of Key Participants		
NEA		
Contractor		
District administration/village representatives		
Topics Discussed and Findings		

[29] Those undertaking the consultations can use checklists similar to those used during the IEE preparation to obtain sufficient information to be able to complete summary record. Photographs and attendance sheet to be attached with the consultation proforma.

Presence of internationally (KBA/IBA/Ramsar) and nationally important (NP/Buffer Zone) biodiversity sites and tentative UNESCO sites/nationally protected monuments/religious forest in the area	
Presence of critical habitat species in the area	
Presence of GoN protected species in the area	
Presence of any threatened species in the area	
Presence of community forest (or similar) in the area	
Presence of trees along alignment and if require cutting	
Presence of local physical cultural resources along alignment	
Presence of buildings along alignment and if conductor clearances are met	
Presence of school compounds, playgrounds, or other community facilities along alignment and if conductor clearances are met	
Existing community H&S incidents and/or concerns with existing distribution lines	
Existing community H&S incidents or pollution (oil leak) and/or concerns with existing transformers	
Concerns of community related to H&S of new distribution lines (especially new lines in non-electrified villages)	
Concerns of community related to pollution and waste management during the works	
Concerns of community related to noise, vibration, dust, air pollution during the construction	
Concerns of community related to disturbance to agricultural activities during works	
Concerns of community related to disturbance to ongoing access and traffic management issues during works	
Concerns of community related to incoming skilled workers and their accommodation during the works	
Concerns of community related to local employment (jobs created for unskilled workers by construction are very minimal if any)	
GRM and types of grievances related to environment, health and safety that could be raised	
Etc.	
Suggestions for Alignment and Mitigation	

* Provide photographs of the public meeting and/or focus groups on progress and copy of sign in sheet

Submitted by:
Name and signature:
Position:
Date:

Reviewed by:
Name and signature:
Position:
Date:

Note from the Reviewer, if any:

IEE UPDATE OUTLINE

9. NEA will determine if the IEE will be updated with respect to all works under each district. For the new distribution lines as the contractor determines the siting and the routing of these components all the sections will need to be updated.

10. Unless site-specific assessment and management planning is required for a new distribution line based on the final route alignment the site-specific assessment forms and consultation proformas consolidated by NEA for all works under each district/ward will comprise the basis for the IEE update. The IEE update will be attached to the IEE in the form of an annex. If a site-specific assessment is required, based on the potential impacts and informed by the criteria/principles in the IEE, notably in relation to biodiversity or physical cultural resources then a detailed assessment of the potential impacts and risks is to be included in the update annex, together with a site-specific EMP to accompany the project-level EMP for implementation by the contractor.

- **Description of the Project,** attach project description section based on completed project description forms for all the distribution lines under the district/ward under the scope of work.
- **Description of the Environment,** attach the baseline setting section based on completed baseline forms for all the distribution lines under the district/ward under the scope of work.
- **Site-Specific Environmental Impacts and Mitigation Measures** required only when NEA/ADB identifies a site-specific assessment and management planning is required due to the presence of any sensitive receptors or unanticipated impacts being identified.
- **Information Disclosure, Consultation, and Participation**, for each district/ward provide summary per below table and attach copies of completed consultation proformas.

Consultation Activities	**Yes**	**No**	
Meaningful consultations with community were conducted before finalizing the alignment			Details of consultations undertaken, Table 1 and 2
Suggestions received in finalizing the alignment			Suggestions provided, Table 3
If suggestions received, are they incorporated into design			

- **Site-Specific EMP,** not required unless site-specific EMP is required by NEA/ADB based on site-specific assessment.

APPENDIX 13: ENVIRONMENTAL MONITORING PLAN

Table A13-1: General Monitoring Parameters (applicable to all works)

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision (NEA PMU/PSC/ Safeguards Unit)
Health and Safety – incidents	Pre-Construction Enabling Works, Construction, and Commissioning	Records of health and safety incidents	Keep records of near miss, minor, lost time, and fatal health and safety incidents related to the project, compile records from construction sites Carry out interviews with workers and the community to identify if any unrecorded incidents occurred.	Ongoing for record keeping	DL and DTR construction sites, including temporary construction facilities	Zero lost time incidents or fatalities (among workers and community) For 100% lost time incidents or fatalities immediate action taken to avoid repeat or escalation of situation All incidents including minor and near miss dealt with in accordance with EMP with lessons learnt for future 100% lost time and fatalities reported to NEA within 24 hours and ADB within 48 hours	Contractor to undertake monitoring and report to NEA management in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
	Operation and Maintenance			Ongoing for record keeping	All distribution lines		NEA substation management and District Electrical Office/Committee to undertake monitoring and report monthly to NEA PMD	Check monitoring being undertaken and document compliance in EMR
Water resources	Pre-Construction Enabling Works, Construction, and Commissioning	Water volume used and source	Keep records of all water used and source.	Ongoing for record keeping	DL and DTR construction sites, including temporary construction facilities	No grievance received during construction or operation regarding conflict with other water users	Contractor to undertake monitoring and report to NEA in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision (NEA PMU/PSC/ Safeguards Unit)
Hazardous materials– incidents	Pre-Construction Enabling Works, Construction, and Commissioning	Pollution incidents	Records of pollution incidents (e.g., type of material spilled, amount in kg or m^3, and action taken to clean up) Carry out visual inspection and interviews with workers and the community to identify if any unrecorded incidents occurred	Ongoing for record keeping Monthly visual inspection	DL and DTR construction sites, including temporary construction facilities, storage areas and, if applicable, workshops.	Zero major incidents occurred. Minor incidents responded to in accordance with EMP with lessons learnt for future.	Contractor to undertake monitoring and report to NEA in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Natural Resource Use (Construction Materials) and Waste Generation	Pre-Construction Enabling Works, Construction, and Commissioning	Volume of construction materials used, and waste generated, and disposal route	Keep records of all types of materials used and wastes produced by type, volume/ weight. Document waste disposal through transfer notes including type, volume/ weight, transport provider, intermediaries if any and final treatment or disposal facility (with its license and capacity)	Ongoing for record keeping Monthly visual inspection	DL and DTR construction sites, including temporary construction facilities	Transfer of 100% of construction wastes documented, and all wastes disposed of in an environmentally safe and sound manner in accordance with IFC General EHS Guidelines	Contractor to undertake monitoring and report to NEA in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Soil (earthworks)	Construction Enabling Works, Construction, Commissioning	Volume of soil disturbed during construction	Keep records of earthworks involved, including total volume in m^3 of soil excavated and reused (any	Monthly	DL and DTR construction sites involving earthworks	Earthworks documented, and all excavated and cut and fill volumes accounted for, either reused on-site or disposed	Contractor to undertake monitoring and report to NEA in monthly and quarterly	Check monitoring being undertaken and document

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision (NEA PMU/PSC/ Safeguards Unit)
			disposed of as spoil off site to licensed waste disposal facilities recorded as per waste generation)				progress reports.	compliance in EMR

Table A13-2: Monitoring Parameters Requiring Expert Input (applicable to all works)

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (NEA PIU/ District Electrical/Distribution Center Office for Distribution Component)	Supervision (NEA PMD/PMC/ Safeguards Unit)
Property Damage	Pre-construction preparations	Surveys of existing property condition including structures, physical cultural resources, roads, canals, rail, utilities, etc.	Photographic and/or structural engineering pre-condition surveys of existing property condition	One time for baseline establishment prior to the start of any activity on site	Properties along distribution lines and adjacent DTR requiring condition survey (see EMP)	Damages avoided but if caused paid for by contractor	Contractor to undertake monitoring and report to NEA in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Vegetation Loss and Wildlife Disturbance	Pre-construction preparations	Habitats, presence of notable flora and fauna pre-construction	Habitat walkover survey by field ecologist with specialist ecology surveys if required for natural and critical habitat assessment, determination of forest habitat quality for calculation of any offset requirement if trees are to be cut	One time for baseline establishment prior to the start of any activity on site	DL and DTR construction sites, including temporary construction facilities	No significant conversion and degradation of natural habitat Minimum loss and disturbance to trees/avoid felling and lopping of trees through appropriate detailed design.[30] No damage to other habitats/trees/ vegetation outside the construction sites Zero biodiversity incidents occurred.	Contractor to undertake monitoring and report to NEA in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
		Number of trees to be removed or lopped/trimmed	Record all trees to be felled or lopped/trimmed including before and after photos during construction, and replacements					

[30] If trees are required to be felled compensatory plantation will comprise a national compensation plantation component per forest legislation and an additional offset that is calculated considering lost forest habitat quality which will be determined by the ecologist in updating the IEE. The IEE will need to be updated before any tree felling takes place.

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (NEA PIU/ District Electrical/Distribution Center Office for Distribution Component)	Supervision (NEA PMD/PMC/ Safeguards Unit)
			planted (including species, size, and economic value)			No loss of CR/EN/VU and GoN Protected species of flora and fauna including critical habitat qualifying species. Temporarily disturbed areas restored to at least pre-project construction condition.		
	Pre-Construction Enabling Works, Construction, and Commissioning	Restoration of habitats, presence of notable flora and fauna post-construction	Habitat walkover survey by field ecologist to compare to baseline situation	One-time during commissioning once construction completed and temporary construction facilities restored			Contractor to undertake monitoring and report to NEA in monthly and quarterly progress reports.	
		Undertaking of compensatory plantation by Forest Department on behalf of NEA[31]	PMU with support of PSC to monitor compensatory plantation progress by Forest Department Signing of MoU (agreement) between NEA and the Forest Department wherein the Forest Department will agree to monthly monitoring by NEA and provide the		Compensatory plantation sites of Forest Department	100% of trees removed compensated for with 1:10 replacement or 1:25 (if applicable per species) and additional offset if required based on forest habitat quality with native tree species in suitable alternative location to achieve “no net loss” biodiversity on project completion.	PMU to obtain records from Forest Department	Check monitoring being undertaken and document compliance in EMR

[31] NEA may also choose to carry out the compensatory plantation themselves in which case they can monitor their direct intervention

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (NEA PIU/ District Electrical/Distribution Center Office for Distribution Component)	Supervision (NEA PMD/PMC/ Safeguards Unit)
			records required to monitor progress to PMU Signed and stamped records of all saplings (species and location) planted and maintained by Forest Department using NEA funds and survival records to be obtained by PMU on a six-monthly basis from Forest Department			100% survival of compensatory reforestation trees, or continual replacement of those that did not survive		
Hazardous materials - existing transformers (oil and PCBs)	Pre-construction preparations	Transformer oil for PCB content Contamination survey and testing if evidence of oil leakage e.g. pH, TPH, heavy metals, PCBs, PAHs, and any other contaminants indicated by	Testing of transformer oil should follow UNEP Guidelines for PCB-testing (testing of hermetically sealed transformers on the distribution network may need to be done once the DTR is received at an	One time for baseline establishment prior to the start of any activity on site	Existing transformers at risk of containing PCB	Stockholm Convention (all transformers on distribution network PCB free by 31.12.25) International soil quality guidelines e.g., Australian Management of soil contamination	Contractor to undertake monitoring and report to NEA in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (NEA PIU/ District Electrical/Distribution Center Office for Distribution Component)	Supervision (NEA PMD/PMC/ Safeguards Unit)
		contaminated land professional	NEA repair workshop but should be conducted before any repair works commence) Contamination testing if presence oil leakage to soil is indicated. Soil samples to be taken from surface and at depth in a clean, non-contaminated, well-sealed container and tested within the next 48 hours by accredited laboratory			in accordance with EMP		

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (NEA PIU/ District Electrical/Distribution Center Office for Distribution Component)	Supervision (NEA PMD/PMC/ Safeguards Unit)
Drinking water supplies	Pre-Construction Enabling Works, Construction, and Commissioning	Nepal National Drinking Water Quality Standard parameters (main suite unless further investigation required)	APHA- Standard Methods for the Examination of Water And Wastewater, 24th Edition. Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48 hours by accredited laboratory	One time for baseline establishment to ensure source of water suitable as drinking water	Sources of drinking water for construction of DL/DTR for which supplier is unable to provide copies of drinking water tests to confirm compliance – if supplier provides test results contractor does not need to monitor but will provide copy of test results to NEA instead	Nepal National Drinking Water Quality Standard (Annex 1)	Contractor to undertake monitoring and report to NEA in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

APPENDIX 14: EMR TEMPLATE

Contractor's Monthly Environmental Monitoring Report

Reporting Period {Month Year}
Submission Date {Day Month Year}

{Project Name, Contract Package/Lot}

Prepared by {Contractor} for NEA

1.0 Introduction

{Succinctly convey the details of the contract package/lot, details of construction camps and other temporary facilities}

{Highlight any unanticipated impacts in relation to change in the project scope, locations or alignments of components no matter how minor the contractor considers they may be, construction methods, and/or implementation schedule during the reporting period, if none confirm this.}

{Describe the implementation stage reached (design, pre-construction, construction, commissioning) and the % progress, main project activities and milestones achieved during the reporting period. Report on updates to IEE/EMP that were required during the reporting period, status of delivery of documents, permissions received, required amendments, consultation and disclosure undertaken etc.}

{Include table and/or organogram of environmental safeguards staffing at contractors/subcontractors and relationships between subcontractors, etc. Highlight any changes in the project organization and environmental safeguards staffing during the reporting period, if none confirm this}

Details of Contract

Contract Package/Lot	Scope of Work	Contract Amount	Appointed Date	Expected Date of Completion

Scope of Works / Summary of Construction Progress

Name	Scope including km for distribution lines	Stage Reached (Design/Construction/Commissioning)	Construction Progress Status

Environmental, Health & Safety Staff

Name	Designation	Location	Mobile	Email address	Mobilization Date (Demobilization Date if Applicable)	Total Days Absent in last month	Total present (Months)

Details of Temporary Facilities Established as on Month Year

Sl. No.	Type e.g., stores	Name	Location	Landowner	Details e.g., capacity	CTE Date	CTO Date	Remarks on Status
1								
2								

Details of Temporary Labour Camps Established as on Month Year (if applicable)

Sl. No.	Camp Name	Camp Location	Occupants (No.)	Grade	Facilities
1					• Toilets: XX No. • Lodging: XX No. • Kitchen XX No.
2					• Toilets: XX No. • Lodging: XX No. • Kitchen XX No.
3					• Toilets: XX No. • Lodging: XX No. • Kitchen XX No.
4					• Toilets: XX No. • Lodging: XX No. • Kitchen XX No.
5					• Toilets: XX No. • Lodging: XX No. • Kitchen XX No.

2.0 Compliance to National Regulations and International Agreements

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where the requirements of regulations or agreements were breached along with details of responses taken to rectify the breach once identified. Include all the applicable National Regulations and International Agreements following the sample table below attaching copy of the consents/license in the period they were obtained}

Status of Legal Compliance as of Month Year

Sl. No.	Activities	Statutory Authority	Status (Yes, No or Partial only)		Expiry Date	Remarks
			Applied	Obtained		
1	Labour License					License No. xxx dated xxx
2	Registration of Vehicles/ Pollution Under Control Certificates					
3	Other…					

3.0 Compliance to Environmental Management Plan

{With reference to the EMP of the project, include a table following sample table below with the compliance status during the reporting period, with sufficient details (evidence) to show how compliance was achieved, or corrective action to be taken if there was non-compliance including timeline and budget}

{Flag if previous environmental monitoring report(s) included corrective action plan, if it did details of that corrective action plan should be incorporated into the EMP table and compliance status reported}

{Provide explanations of any instances where performance standards were temporarily exceeded during the reporting period, along with details of any response taken to rectify the exceedance once identified, even if at the end of the reporting period the project is deemed as being compliant}

{Copies of clearances, CEMP, construction method statements, and other documentation produced in accordance with EMP during the reporting period should be included as an Appendix}

Item #	Requirement	Prior Corrective Action	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide sufficient details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}

4.0 Environmental Supervision and Monitoring Results

{With reference to the contract budget earmarked for EMP (if any) summarize details of budget allocated and the current spend profile}

Activity	Allocated Budget	% Spent	Remarks
TOTAL			

{With reference to the EMP capacity development plan summarize trainings for staff and subcontractors, and other activities completed. Include as appendices the training agenda, attendance sheets, and photos. If no trainings or other activities in reporting period, please confirm. Copies of training records related to EMP during the reporting period should be included as an Appendix}

Trainings	Number and Position of Participant/s	Location/s and Date/s	Remarks

{Site inspections and audits completed – summarize the number and type of site visits, persons involved, the issues covered, and status of compliance with them, the number of non-compliance

notices given out to your own staff or sub-contractors because of the site visit, and the checklists/reporting format used (sample of checklists and reports to be included as an Appendix)}

Date	Type and Purpose of Visit	Location/s Visited	EA, IA, Consultant Staff Participating	Remarks

4.2 Quantitative Environmental Monitoring

{Environmental monitoring results – summarize in a table the reporting period's quantitative monitoring activities and data obtained in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified. Attach survey reports}

Typically, this section will include the results of:

- Flora and fauna surveys
- Drinking water quality surveys

{Indicate monitoring locations using a map or plan with grid coordinates, dates, times, duration of samples as applicable, weather conditions as applicable, parameters measured, equipment used, standards, tests, and limits used etc.}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Calibration and QA certifications of monitoring equipment and laboratories analyzing samples should be included as an Appendix}

Drinking Water Quality Monitoring Results

S.N.	Parameters	Location			National Drinking Water Quality Standards	
		Location xx	Location xx	Location xx	Limits	
1	Turbidity				5	NTU
2	pH				6.5 – 8.5	
3	Color				5	TCU
4	Taste and Odor				Should not be offensive	
5	Electrical Conductivity				1500	µS/cm
6	Iron				0.3 (3)	mg/l
7	Manganese				0.2	mg/l
8	Arsenic				0.05	mg/l
9	Fluoride				0.5-1.5 (min-max)	mg/l
10	Ammonia				1.5	mg/l
11	Chloride				250	mg/l
12	Sulphate				250	mg/l
13	Nitrate				50	mg/l

S.N.	Parameters	Location			National Drinking Water Quality Standards	
		Location xx	Location xx	Location xx	Limits	
14	Copper				1	mg/l
15	Zinc				3	mg/l
16	Aluminnium				0.2	mg/l
17	Total Hardness				500	mg/l
18	Residual Chlorine				0.1 - 0.5	mg/l
19	E-coli				0	CFU/100ml
20	Total Coliform				0	CFU/100ml

4.3 Pollution Control Monitoring

{Pollution control monitoring results – summarize any pollution incidents during the reporting period in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Include the pollution control trainings/drills/inspections conducted during the reporting period following the sample table below. Include as appendices the training/drill/inspection agenda, attendance sheets, and photos. If no trainings/drills/inspections, please confirm}

Trainings/Drills/ Inspections	Number and Position of Participant/s	Location/s and Date/s	Remarks
Example: Oil Spill Drill	50 Laborers	Substation, 15 Aug 2018	Participants safely controlled simulated spill…

{If there were any materials used, solid or hazardous waste, or wastewater generated in the reporting period report following the sample table below. If no materials used or waste generated, please confirm}

Type of Materials/Waste	Approximate Volume (units)	Source or Destination	Remarks
Material examples: Transformer Oil Sand for Fill			
Waste examples: Sanitary Wastewater Spoil from Earthworks			

Old Transformers Hazardous Waste			

4.4 Occupational and Community Health and Safety Monitoring

Type	Number Worker				Employment Type		
	Local	Migrant (State)	Migrant (Out of State)	Total	Casual	Contracted (outsourced)	Permanent
Unskilled							
Semi-skilled							
Skilled							
Total							

Status of PPEs on Month Year

Sl. No	PPE	Opening Stock	Distributed	Closing Stock	Ordered
	Helmets – Labourers (Yellow)				
	Helmets – Supervisors (colour)				
	Helmets – Engineers (colour)				
	Helmets – EHS (Green)				
	Helmets – Visitors (colour)				
	Helmets – Others (colour)				
	Gloves				
	Masks				
	Goggles				
	Safety Shoes				
	Gum boots				
	Safety Tackles				
	Safety Jacket – Labourers (colour)				
	Safety Jacket - Engineers (colour)				
	Safety Jacket – Others (colour)				
	Others, please specify				

Details of First Aider as on Month Year

Name	Qualification	Years of Experience	Deployment Date	Employment Status

Details of Hospitals and Doctors Tied Up With

Name	Location	Distance from Site	MoU Number	Date of MoU	Facilities offered	Expiry Date

Details of First Aid Boxes and Fire Extinguishers in Project Site

Location	Size of Box	Date of last Inspection	Inspected by (Name and Designation)	Status of Inspection

Details of Ambulances in Project Site

Location	Vehicle Type	Vehicle Number	Date of last Inspection	Inspected by (Name and Designation)	Status of Inspection	Fitness Certificate Status

{Health and safety monitoring results – summarize the reporting period's health and safety activities and data obtained in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Include the occupational and community trainings/drills/inspections conducted during the reporting period following the sample table below. Include as appendices the training/drill/inspection agenda, attendance sheets, and photos. If no trainings/drills/inspections, please confirm}

Trainings/Drills/ Inspections	Number and Position of Participant/s	Location/s and Date/s	Remarks
Example: Fire Drill	50 Laborers	Construction Camp, 15 Aug 2018	Participants safely evacuated the site…

Health and Safety Statistics to Month End	Total to Date	For Month	Preceding Month (Comparator)
Person-hours worked			
Person-days lost			
Safe person hours			
Fatality			
Non-fatal Injury (Lost Time)			
Non-fatal Injury (Minor)			
Near-miss			
Illness			
Other Incidents e.g., any dangerous occurrences or unsafe acts observed			

{If there was any near-miss or accident, illness, or other occupational or community health and safety related incident during the reporting period (or a previously reported incident with ongoing rectification) report following the sample table below. Include as appendices work safety checklists, incident reports, and other relevant supporting documents. If no incidents, please confirm}

	Number and Position of	Location/s and Date/s of Incident	Detailed Description of Incident	Time-bound Corrective Action

	Person/s Involved			
Fatality				
Non-fatal Injury (Lost Time)				
Non-fatal Injury (Minor)				
Near-miss				
Illness				
Other Incidents e.g., any dangerous occurrences or unsafe acts observed				

Meaningful Consultation and Grievance Redress

{Meaningful consultation – report on any ongoing consultation undertaken, and main issues raised by consultees; detailed consultation records should be included as an Appendix. If no ongoing consultation, please confirm}

Date	Format/Venue	Participants (Occupation, M/F)	Main Issues Raised

Grievances Received		Grievances Status of Month		Total till Date Grievances Status	
In Month	Total till Date	Open	Closed	Open	Closed

{If there was any grievance or complaint, regardless informal or minor, during the reporting period (or previously reported complaint with ongoing rectification) provide the corrective action taken following the sample table below. Detailed grievance records and response reports should be included as an Appendix}

Complainant/s or Affected Persons	Location/s and Date/s of Complaint	Description of Grievance/Complaint	Timeline*	Time-bound Corrective Action

* To be solved within 2 weeks

8.0 Conclusions and Recommendations

{Summarize the contract's environmental performance during the reporting period based on the previous sections and, if any non-compliance identified, provide detailed recommendations including responsibilities, timeliness and budget for the preparation and completion of corrective action}

{If non-compliance is major or not readily addressed then a separate corrective action plan may need to be prepared. For minor and readily addressed non-compliances the corrective action plan can be incorporated into this final section of the environmental monitoring report following the sample table below}

Non-compliance	Corrective Action to be Taken	Responsibility	Timeline	Budget

APPENDICES

Photographs {Include relevant photographs of the project site and project area of influence taken during the reporting period to provide evidence of compliance and/or non-compliance. For each photo, provide a caption with description of what it illustrates, accurate location, and date taken}

Supporting Documents
{E.g., Maps and plans
Sample checklists and reports
Clearances and documentation
Training records
Detailed monitoring data, laboratory results etc.
Calibration and QA certificates
Consultation records
Meeting agendas and attendance records
Grievance records
Environment, health and safety reports}