Electricity Distribution Efficiency Improvement Project (EDEIP)

Environmental and Social Management Plan (ESMP)

for

Extension of 132-kV Grid Stations,
Augmentation of 132-kV Grid Stations,
Installation of Capacitor Banks,
Installation of Transformer Monitoring Systems,
Laying of Aerial Bundled Cables and
Installation of Advanced Metering Infrastructure

Peshawar Electric Supply Company (PESCO)

April, 2026

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Executive Summary

The Peshawar Electric Supply Company (PESCO) is planning to undertake upgrade of its existing 132-kilovolt (kV) grid stations, laying of aerial bundled cables (ABC), installation of transformer monitoring systems and installation of advanced metering infrastructure (**these works will be described as the proposed subproject in this document**). All components of the proposed subproject are located in various districts of the Khyber Pakhtunkhwa (KP) province.

PESCO is undertaking the proposed subproject under the Electricity Distribution Efficiency Improvement Project (EDEIP), with the financial assistance from the World Bank (WB). EDEIP also includes the Hyderabad Electric Supply Company (HESCO) and the Multan Electricity Power Company (MEPCO), in addition to the Power Division of the federal Ministry of Energy.

This Environmental and Social Management Plan (ESMP) has been prepared to address the potential environmental and social (E&S) impacts of the proposed subproject, in compliance with the national/provincial regulatory requirements as well as the WB Environmental and Social Framework (ESF).

EDEIP Overview

The EDEIP has four components: Improving Grid Reliability, Modernizing Operations and Management; Building Capacity and Technical Assistance; and Reform Support. The first component covers the investments for the Secondary Transmission and Grid (STG) and Energy Loss Reduction (ELR) programs. The second component includes modernization of the operations and management functions using latest equipment, technology and information systems. The third component includes improving operations and maintenance, capacity building and training, and EDEIP implementation support. The fourth component aims to support implementation of power sector reforms and improve sector governance.

Subproject Overview

Under the proposed subproject, PESCO intends to undertake various upgrades for the existing 132-kV systems. Specifically, the subproject comprises extension of nine existing 132-kV grid stations, augmentation of nine existing 132-kV grid stations, installation of capacitor banks in 26 existing 132-kV grid stations, installation of 20,723 monitoring systems on 100 kilovolt-amperes (kVA) and 200-kVA distribution transformers, installation of 53,927 smart meters, and laying of 60 ABC feeders.

The 132-kV grid station (GS) extension works include installation of a new power transformer and its transformer bay within the existing 132-kV GS, to reduce overloading on the existing power transformers. The extension of the selected GSs is expected to enhance system reliability for domestic, commercial, and industrial consumers. The key works under GS extension include: transportation and delivery of new transformers to the GSs; excavation and construction of foundations for new power transformers and other transformer bay components; installing transformers on their foundations; installing conservator tanks, radiators, bushings, and cooling fans on the transformers; installation of the transformer bay equipment; installation of control cabinets; cabling; connecting the transformer bay with existing grid network; and finally testing and commissioning.

The GS augmentation involves replacement of the existing power transformers with higher capacity power transformers within the existing 132-kV GSs, to meet the rising demand on the grid stations. The key activities include: disconnecting the existing power transformers from

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the transformer bays, safe removal of the old power transformers; transporting the new power transformers to the GS sites; foundation modifications (if required); installation and connecting the new power transformers with the transformer bays; and finally, testing and commissioning.

Installation of capacitor banks involve construction of concrete foundations, erection of support structure, installation of capacitor banks, connections with the existing systems, wiring of the relays and control panels, and finally, testing and commissioning.

Installation of the monitoring systems on the distribution transformers involve fixing the monitoring device, making the electrical connections, setting up the communication systems, and digital integration.

The ABC laying works involve dismantling the old conductors, pole reinforcement or replacement, installation of pole mounted accessories, stringing of ABC conductors, connection works, jointing and termination works, earthing, and finally testing and commissioning.

Institutional and Legislative Framework for Environmental and Social Management

The key regulatory institution for the management of E&S aspects of the proposed subproject is the KP Environmental Protection Agency (KP-EPA) that has been established under the Pakistan Environmental Protection Act 1997. The key provincial legislation to manage the E&S aspects of the proposed subproject is the KP Environmental Protection Act (Amendment), 2022, which is a comprehensive legislation and provides the legislative framework for protection, conservation, rehabilitation and improvement of the environment in the KP province. Under this Act, PESCO will seek environmental approvals for the proposed subproject from KP-EPA. The subproject will also be required to comply with the National Environmental Quality Standards (NEQS) for air quality, noise and water quality.

In addition to the national/provincial legal requirements, the subproject will also comply with the World Bank's Environmental and Social Framework (ESF) as well as the Environmental and Social Standards (ESSs).

Environmental and Social Management Framework (ESMF)

To address the generic environmental and social impacts associated with the EDEIP and to define principles, assessment criteria and procedures to prepare various E&S documents for various EDEIP subprojects, an Environmental and Social Management Framework (ESMF) has been prepared, in accordance with the WB ESF. The present ESMP has been prepared based upon the principles and criteria described in the ESMF.

Baseline Description

The areas where the proposed subproject will be carried out include districts of Peshawar, Malakand, Mardan, Nowshera, Kohat, Dera Ismail Khan, Upper Dir, Swabi, Charsadda, Banu and Buner. These districts are spread over most parts of the KP province, which exhibits a diverse geography ranging from high mountains to alluvial plains and valleys. The province is multi-ethnic with Pushtun being most dominant group; other groups include Hindkowans, Dards, Chitralis, and Gujars. The literacy rates in the province show greater disparity between genders: 39% for women and 73% for men. The electricity consumption in the province is also quite lower as compared to the national average: the annual per capita electricity consumption

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in the province is about 281 kilowatt-hour (kWh) which is about one-half of the national average (516 kWh).[1]

The GS extension and augmentation works and installation/upgrade of capacitor banks will be carried out inside the existing grid stations that are mostly located within urban and semiurban settings. During the construction of these grid stations, these sites have been levelled and de-vegetated thus modifying the original landform, land-use, natural habitat and flora/fauna. The boundary walls around the grid stations isolate these facilities from the surrounding population. The air quality and noise levels at these grid stations are likely to be within the acceptable limits prescribed by the NEQS.

The installation of transformer monitoring systems, laying of ABC feeders, installation of smart meters, will be carried out within urban and semiurban areas. Some of these components will be installed in/near congested urban areas and business centers. The congested urban areas are likely to have poor air quality and high noise levels.

E&S Scoping

The E&S scoping was carried out during the preparation of this ESMP. The Scoping considered all potential E&S impacts and issues and then considered their relevance with the proposed subproject's nature, activities involved and its environmental and social settings. The E&S issues that were considered to be relevant to the proposed subproject were scoped-in and the ones that were not relevant to the proposed subproject were scoped-out. The aspects that are scoped-in include soil erosion and contamination, air quality deterioration, water contamination, noise generation, occupation health and safety risks, community health and safety risks, blocked roads and routes, waste generation, labor influx, sexual exploitation and abuse (SEA) and sexual harassment (SH), and child labor. The key aspects that have been scoped-out include impacts on biological resources, impacts on cultural heritage sites, land acquisition, damage to existing infrastructure such as roads, public utilities and irrigation network. The aspects that have been scoped-in have been further assessed and their mitigation and control measures have been identified in the ESMP. The aspects that have been scoped-out have not been further discussed in this ESMP.

Potential E&S Impacts

The extension and augmentation work of the existing GSs as well as the installation of capacitor banks will be carried out within the existing GSs, hence their potential E&S impacts will mostly be confined to the GS boundaries. During the construction phase, these impacts will include: dust and noise generation as well as air quality deterioration caused by the excavation activities and operation of construction machinery and movement of vehicles; waste water releases from the construction sites and workers' camps causing soil and water contamination; soil erosion caused by excavation for foundations; occupation health and safety (OHS) risks for construction workers caused by working near moving machinery/vehicles, lifting and hoisting, working at heights, working in confined spaces, fall and trips, and working at/near energized systems/equipment; safety risks for nearby population (mostly in the staff colonies within the GSs) associated with the vehicle movement, construction activities and electrocution; generation of solid waste including hazardous waste; issues related to labor influx (such as SEA/SH); living conditions within workers' camps; and child labor. During the operation and maintenance (O&M) phase, the potential E&S risks associated with these systems will include OHS risks particularly working at heights and

[1] https://www.ceicdata.com/en/pakistan/electricity-generation-and-consumption/electricity-consumption-by-region-khyber-pakhtun-khwa-kpk

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electrocution, safety risks for the communities particularly the residents of staff colony, soil and water contamination in case of transformer oil leakage, release of effluents (particularly, toilet waste) from office/control building and staff colony; and solid waste generation from office, workshop and staff colony.

The installation works for transformer monitoring systems and smart meters will potentially cause E&S impacts mostly limited to OHS risks, community health and safety (CHS) risks, waste generation, and SEA/SH risks.

ABC works during the construction phase will mostly cause impacts quite similar to the ones described earlier for the works inside the GSs, except that no excavation-related impacts are expected. Furthermore, the construction activities in populated areas will pose a greater risk of SEA/SH issues, privacy issues, as well as CHS risks. The E&S risks associated with the O&M phase include OHS risks particularly working at heights and electrocution, and SEA/SH.

Mitigation of Potential Impacts

The risks and impacts described above will be mitigated and controlled mostly with the help of standard mitigation measures. For the construction phase, these measures include water sprinkling to control dust emissions, scheduling construction activities during the daytime to minimize the impact of noise generation, apprising the local communities particularly the staff colony residents about noise generation and safety risks associated with the construction activities, treating the waste effluents released from the site, treating the toilet waste from the workers' camps appropriately (such as through septic tanks), avoiding soil erosion by appropriate techniques such as building dykes and covering the loose soil, disposing non-hazardous waste through the municipality waste handling and disposal system, disposing hazardous waste in accordance with the associated material safety data sheet (MSDS), addressing OHS risks through adopting a stringent OHS management regime that would include employing properly qualified and trained OHS staff at the construction sites, hazard risk assessment and implementing standard operating procedure (SOP) for each construction activity, barricading the construction sites to avoid entry of community members particularly children, awareness raising and training of subproject staff and workers about gender issues particularly SEA/SH, adopting a code of conduct (CoC) covering gender, cultural and SEA/SH issues, to be followed by all site personnel, ensuring proper living conditions within the worker's camps in accordance with the labor laws, ensuring that no child labor is employed at the site and workers' camps.

During the O&M phase, the PESCO's existing OHS management system will be strictly followed to address the OHS risks. The mitigation and control measures for the remaining O&M-related risks will mostly be the same as described above for the construction phase.

Environmental and Social Management

Institutional setup. PESCO has already established the Project Management Unit (PMU) that includes E&S personnel. PESCO has also employed the Project Implementation and Management Support Consultants (PIMSC) that also have E&S specialists to carry out E&S assessments and prepare the associated documents (such as this ESMP) for PESCO's subprojects under the EDEIP, and also ensure compliance of this ESMP and other E&S documents during the construction phase. The construction contractors to be engaged by PESCO will also be required to employ fulltime E&S specialists at the construction site to ensure compliance with the E&S documents including this ESMP.

Mitigation and Monitoring Plan (MMP). The contractor will be required to implement the MMP that has been prepared on the basis of the E&S impact assessment carried out as part

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of this ESMP. The PIMSC will carry out compliance monitoring with the help of this Plan. The PIMSC will also carry out effects monitoring for the key E&S parameters such as noise and dust emissions, OHS and CHS incidents, community complaints, and waste management.

Contractor's ESMP (C-ESMP). The construction contractors will be required to prepare and implement the C-ESMP that will include a number of site- and subproject-specific plans including camp management plan, waste management plan, traffic management plan, OHS management plan, CHS management plan, and site restoration plan. These plans will be prepared on the basis of mitigation and control measures provided in the MMP.

Capacity building. The PMU, PIMSC and contractors will be required to conduct regular training and awareness raising for the subproject personnel including construction workers, on key E&S aspects such as waste management, OHS management, camp management, grievance management, traffic management, gender aspects particularly SEA/SH, and implementation of CoC.

Grievance Redress Mechanism (GRM). For all of its subprojects under EDEIP, PESCO has established a three-tier GRM to receive, evaluate, and facilitate the resolution of concerns, complaints, and grievances of the affected communities about the E&S aspects of the subprojects. The GRM will provide a time-bound, early, transparent and fair resolution for affected persons' and other stakeholders' grievances regarding E&S management of the proposed subproject. Under this GRM, a separate mechanism will be established to address labor-related complaints; similarly, a mechanism will also be established to address the complaints related to gender-based violence (GBV).

Stakeholder Consultations and ESMP Disclosure

A Stakeholder Engagement Plan (SEP) has been prepared for the entire EDEIP to describe objectives, process and outcome of the stakeholder engagement already carried out during the EDEIP preparation and to be carried out during the EDEIP implementation – in accordance with the WB ESS 10. The stakeholder engagement and consultation activities for the proposed subproject have been carried out in accordance with the guidelines provided in the SEP. These consultations were carried out from May 2025 to March 2026. These consultations engaged 542 participants including PESCO GS Staff, PESCO Staff residing inside the GS colony, local community, interested parties, and vulnerable groups. During these sessions, subproject details and their likely E&S impacts were explained to the participants and their views, comments and concerns obtained about the subproject and its impacts. Separate consultations were carried out with the relevant government departments to seek their views and concerns about the proposed subproject and its E&S impacts.

During these consultations, community participants generally welcomed the subproject, appreciating that it would improve the electricity availability and reliability in the area. Their key concerns particularly related to the safety risks, noise generation, presence of construction workers inside/near the residential areas, violation of local norms, blocked accesses and disturbance. They were assured, during the consultations, that PESCO and its contractors would take all necessary precautionary and mitigation measures to ensure safety of the nearby communities, and to address all the subproject-related impacts. They were further informed that this ESMP describe all the mitigation and monitoring measures of the proposed subproject and the contractors would be bound to implement these mitigation measures. They were also informed that the workers' camps would be established away from the residential areas, workers would not be allowed to enter these areas, and contractor would be required to implement strict code of conduct ensuring appropriate behavior being followed by all site personnel.

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The government departments broadly supported the proposed subproject and assured their full support to PESCO and its contractors during the subproject implementation. The KP-EPA official confirmed that the proposed subproject would not need any clearance from the Agency since no new grid station would be constructed and no new transmission line would be installed under the proposed subproject. The official from the Planning and Development Department pointed out that the proposed subproject would be required to comply with the provincial environmental law in addition to the WB E&S requirements. He was assured that the present ESMP has been prepared in compliance with the local legal and WB requirements. The official from the Directorate of Manpower and Labor raised concerns about child labor, unavailability of personal protective equipment (PPE), women harassment, and wage discrimination during the construction phase. He was assured that appropriate mitigation and monitoring measures were included in this ESMP to address all of these important issues.

The present ESMP once finalized and Urdu translation of its executive summary will be disclosed at the PESCO website. The ESMP and its translated executive summary will be made available at the PESCO offices including head-office, the relevant grid stations, contractor's site office and worksites.

Cost of ESMP Implementation

The implementation cost of environmental and social management framework has been estimated to be about **Pakistani Rupees (PKR) 31.25 million**.

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List of Abbreviations

ABC	Ariel Bundle Cable
AMI	Advance Metering Infrastructure
AoI	Area of Influence
AP	Affected Person
APMS	Asset Performance Management System
CEO	Chief Executive Officer
C-ESMP	Contractor's Environmental and Social Management Plan
CFR	Code of Federal Regulations
CHS	Community Health and Safety
CoC	Code of Conduct
CT	Current Transformer
dB	Decibel
DC	Deputy Commissioner
DI Khan	Dera Ismail Khan
DISCO	Distribution Company
E&S	Environment & Social
ECoP	Environmental Code of Practice
EDEIP	Electricity Distribution Efficiency Improvement Project
EIA	Environmental Impact Assessment
ELR	Energy Loss Reduction
EMF	Electromagnetic Field
EPA	Environmental Protection Agency
ESF	Environment and Social Framework (of WB)
ERP	Emergency Response Plan
ESHS	Environmental, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environment and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard (of WB)
ESU	Environmental and Social Unit
GAP	Gender Action Plan
GBV	Gender-based Violence

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GDP	Gross Domestic Product
GoP	Government of Pakistan
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GS	Grid Station
GSS	Grid Sub Station
GSO	Grid Station Operation
ha	Hectare
HESCO	Hyderabad Electric Supply Company
HIV/AIDS	Human immunodeficiency virus / acquired immunodeficiency syndrome
HTLS	High-Temperature Low-Sag
IEE	Initial Environmental Examination
ILO	International Labor Organization
ISO	International Organization for Standardization
KDA	Kohat Development Authority
KP	Khyber Pakhtunkhwa
KP EPA	Khyber Pakhtunkhwa Environmental Protection Agency
kV	Kilo Volt
kVA	kilovolt-ampere
kWh	Kilowatt-hour
LMP	Labor Management Procedures
M&E	Monitoring and Evaluation
m	meter
mm	Millimeter
MEPCO	Multan Electricity Power Company
MMP	Mitigation and Monitoring Plan
MSDS	Material Safety Data Sheet
NEPRA	National Electric Power Regulatory Authority
NEQS	National Environmental Quality Standards
NGO	Non-government Organization
O&M	Operation and Maintenance
OCHS	Occupational and Community Health and Safety
OHS	Occupation Health and Safety
OSHA	Occupational Safety and Health Administration

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PEDO	Pakhtunkhwa Energy Development Organization
PESCO	Peshawar Electric Supply Company
PD	Project Director
PIMSC	Project Implementation and Management Support Consultants
PKR	Pakistani Rupee
PMU	Project Management Unit
PPE	Personal Protective Equipment
PT	Potential transformer
RP	Resettlement Plan
RF	Resettlement Framework
SCADA	Supervisory Control and Data Acquisition
SEA/SH	Sexual Exploitation and Abuse / Sexual Harassment
SEP	Stakeholder Engagement Plan
SOE	State-owned Enterprise
SOP	Standard Operating Procedure
SRSP	Sarhad Rural Support Program
STG	Secondary Transmission and Grid
STI	Sexually Transmitted Infection
TL	Transmission Line
VAC	Violence Against Children
WAPDA	Water and Power Development Authority
WB	World Bank
WBG	World Bank Group
WHO	World Health Organization
WWF	World Wide Fund for Nature

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1 Introduction

The Peshawar Electric Supply Company (PESCO) is planning to undertake upgrade of its existing 132-kilovolt (kV) grid stations, laying of aerial bundled cables (ABC), installation of transformer monitoring systems and installation of advanced metering infrastructure (these works will be described as the proposed subproject in this document). All components of the proposed subproject are located in various districts of the Khyber Pakhtunkhwa (KP) province.

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This Environmental and Social Management Plan (ESMP) has been prepared to address the potential environmental and social (E&S) impacts of the proposed subproject, in compliance with the national/provincial regulatory requirements as well as the WB Environmental and Social Framework (ESF).

1.1 EDEIP Background

Over the past few years Pakistan has struggled to meet its fiscal targets. One of the key fiscal risks is the underperformance of the State-Owned Enterprises (SOEs) dominated by power sector entities. Therefore, improving distribution companies' efficiencies is a prime and core requirement to reduce sector's fiscal burden, lower cost of power supply and attract investments.

Pakistan's electricity sector is in crisis due to high cost of generation, dependent on imported fuels that makes the sector vulnerable to changes in fuel prices and currency exchange rates. Higher cost of electricity supply has exacerbated cost recovery challenges for the distribution companies. This has hampered investments particularly by loss making electricity distribution companies (DISCOs) to strengthen their networks and is resulting in increased outages and interruptions, costing businesses and affecting household welfare. These inefficiencies in the sector are estimated to be costing Pakistan about 6.5 percent of its gross domestic product (GDP), according to a World Bank report[2]. Also, in terms of reliability of electricity supply Pakistan is among the lowest performing countries in the world. It is ranked at 167 out of 190 economies on getting electricity indicator in Ease of Doing Business 2019. Moreover, a significant number of households do not have access to electricity and per capita electricity consumption at 471 kilowatt-hour (kWh) is less than one-fifth of the world average according to the World Development Indicators 2017. While government is adding low-cost generation and plans to shift the generation mix towards renewable sources targeting 20 percent by 2025 and 30 percent by 2030, yet long-term financial viability of the power sector is dependent on DISCOs' efficiency improvement.

1.2 EDEIP Overview

To address some of the problems discussed above, the EDEIP aims to support the targeted DISCOs by providing financial and technical support for investments to modernize their electricity distribution networks and institutional development resulting in improved operational efficiency in the sector and reliable supply to the consumers. It seeks to help in: (i) physical strengthening of distribution networks; (ii) deployment of modern equipment, technology and

[2] https://www.worldbank.org/en/region/sar/publication/in-the-dark-how-much-do-power-sector-distortions-cost-south-asia

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information systems; and (iii) provide technical assistance, studies, consultancies and management support. Under the EDEIP, three DISCOs namely HESCO, MEPCO and PESCO have been selected.

1.2.1 EDEIP Objectives

The project development objectives for EDEIP are to improve electricity supply and operational efficiency in targeted areas of selected distribution companies and strengthen the capacity of power sector institutions to implement reforms.

1.2.2 EDEIP Components

The various components of EDEIP are explained below.

Component 1: Improving Grid Reliability

This component finances investments in Secondary Transmission and Grid (STG) and Energy Loss Reduction (ELR) programs of the DISCOs to improve reliability of electricity supply and reduce technical losses. The subprojects financed under this Component can be divided into following categories:

- New Grid Stations. Construction of new 132-kV grid stations and the associated transmission lines;
- Existing Grid Stations. Augmentation, extension, conversion, upgradation and rehabilitation of the existing grid stations and the associated transmission lines;
- Transmission Lines. Construction, rehabilitation and re-conductoring of 132-kV (and below) transmission lines with low loss conductors e.g. high-tension low sag (HTLS); and
- Energy Loss Reduction. Expansion and rehabilitation of 33-kV and 11-kV feeders.

Component 2: Modernizing Operations and Management

This component supports modernization of the DISCOs' operations and management functions using latest equipment, technology and information systems. Major activities include:

- Automation and Information Systems. This entails upgradation deployment of information systems and emergency response planning solutions. This will help improve planning, grid operations and customer services by providing access to and integrating modern information systems
- Revenue Protection Program. It comprises of installation of Aerial Bundled Cables (ABC), Advanced Metering Infrastructure (AMI), Transformer monitoring System, and other measures to pre-empt theft, reduce losses, improve recoveries, and better service delivery based on access to reliable and timely data.

Component 3: Capacity Building and Technical Assistance

This component helps build capacity of the DISCOs with particular focus on:

- Improving operations and maintenance. This covers procurement of tools, equipment, hardware, software, consulting and non-consulting services for improved operations and maintenance practices e.g., for live-line maintenance, upgrade repair workshops, inventory/asset management etc.;
- Training and capacity building. Conduct studies and assessments including preparation/updating of manuals, procedures and systems in particular for human resource management, inventory management, procurement, financial management,

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customer services and safeguards and assist with their implementation and conduct training programs including workshops, seminars and post graduate degrees in relevant fields;

- Project implementation support. This includes financing of: (a) consulting and other services; (b) individual experts/advisors and any incremental staff positions; (c) equipment and software; (d) financial, operational & technical audits; and (e) operating cost of Project Management Units (PMUs).

Component 4: Reform Support

This component supports the implementation of power sector reforms and seeks to improve sector governance.

1.3 Overview of Proposed Subproject

Under the proposed subproject, PESCO intends to undertake various upgrades for the existing 132-kV system. Specifically, the subproject comprises the following distinct components:

- extension of nine existing 132-kV grid stations,
- augmentation of nine existing 132-kV grid stations,
- installation of capacitor banks in 26 existing 132-kV grid stations,
- installation of 20,723 monitoring systems on 100 kilovolt-amperes (kVA) and 200-kVA distribution transformers,
- installation of 53,927 smart meters,
- laying of 60 ABC feeders.

The above components of the proposed subproject will be located in the following eleven districts of the province: Malakand, Mardan, Nowshera, Peshawar, Kohat, Dera Ismail Khan (DI Khan), Upper Dir, Swabi, Lower Dir, Charsadda and Buner.

1.4 Regulatory Overview

The key regulatory institution for the management of E&S aspects of the proposed subproject is the KP Environmental Protection Agency (KP EPA) that has been established under the Pakistan Environmental Protection Act 1997. The key provincial legislation to manage the E&S aspects of the proposed subproject is the KP Environmental Protection Act (Amendment), 2022, which is a comprehensive legislation and provides the legislative framework for protection, conservation, rehabilitation and improvement of the environment in the KP province. Under this Act, PESCO will seek environmental approvals for the proposed subproject from KP EPA.

In addition to the national/provincial legal requirements, the subproject will also comply with the World Bank's Environmental and Social Framework (ESF) as well as the Environmental and Social Standards (ESSs).

1.5 E&S Scoping

The E&S scoping was carried out during the preparation of this ESMP. The scoping considered all E&S impacts and issues and then considered their relevance with the proposed subproject's nature, activities involved and its environmental and social settings; see **Table 1-1**.

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Table 1-1: E&S Scoping for Proposed Subproject

E&S Aspects	Relevance for Proposed Subproject	Scoping Results
Soil erosion and contamination	Soil erosion is relevant since it may be caused by the excavation activities during the GS extension works. Soil contamination is also relevant since it may be caused by effluent releases from construction sites and workers' camps for all subproject components.	Scoped-in
Air quality deterioration including dust and exhaust emissions	Relevant since it may be caused by excavation for GS extension; vehicle operation during and operation of construction machinery on all components.	Scoped-in
Noise	Relevant since it may be caused by construction machinery operation and vehicle movement.	Scoped-in
Water contamination	Relevant since it may be caused by effluent releases from construction sites and workers' camps for all subproject components	Scoped-in
Damage to crops and built-up structures	Not relevant for GS extension, augmentation components, and capacitor bank installation since these works will be carried out inside the existing GSs; very unlikely during ABC works since there are very few cultivated areas along the right of way (RoW).	Scoped-out
Occupation health and safety (OHS) risks	Relevant since these risks may be caused by construction and operation of all components	Scoped-in
Community health and safety (CHS) risks	Relevant since these risks may be caused by construction and operation of all components	Scoped-in
Impacts on biological resources (flora and fauna, habitat)	Not relevant for all components since subproject area comprises populated and built-up area without any original flora and fauna or any sensitive habitats/species of concern. No wildlife protected area exists within or in the vicinity of the subproject components.	Scoped-out
Blocked roads and routes	Relevant for ABC works since it can block roads and routes particularly in the populated area	Scoped-in
Waste generation	Relevant since it may be caused by construction activities and camp operation for all components	Scoped-in

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E&S Aspects	Relevance for Proposed Subproject	Scoping Results
Labor influx	Relevant for all components of the proposed subproject since it will engage technical and non-technical personnel including construction workers.	Scoped-in
Sexual exploitation and Abuse/Sexual Harassment (SEA/SH)	Relevant since construction and operation and maintenance (O&M) activities will be carried out near communities.	Scoped-in
Child labor	Relevant since the contractors can potentially engage under age worker.	Scoped-in
Physical cultural heritage	Not relevant since no sites are known to exist that are archeologically, historically, culturally significant subprojects in the immediate vicinity of the subproject sites. Chance Find procedures have however been included in the mitigation measures discussed later in the document.	Scoped-out
Land acquisition	No land acquisition is involved since the extension and augmentation components will be carried out within existing GSs. Similarly, ABC works, installation of transformer monitoring systems and smart meters will also be carried out on existing equipment.	Scoped-out
Damage to existing infrastructure and public utilities	Not relevant since the extension and augmentation works will be confined within the existing GSs. Similarly, ABC works, installation of transformer monitoring systems and smart meters will also be carried out on existing equipment where damage to existing infrastructure and public utilities is highly unlikely.	Scoped-out

The E&S aspects that have been scoped-in have been further assessed and their mitigation and control measures have been described later in this ESMP. The aspects that have been scoped-out have not been further discussed in this ESMP.

1.6 Area of Influence (AoI)

The AoI for the grid station extension and augmentation works will be the entire grid station and about 500 meters (m) around their boundary walls. The AoI of the installation of capacitor banks will be the entire GS area. The AoI for the ABC will be a corridor of 100 m wide (50 m either side of the TL/feeder centerline). The potential E&S impacts of the above subproject components are likely to be confined to these AoIs.

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1.7 Environmental and Social Documents for EDEIP

In compliance with the WB ESF, the following specific environmental and social documents have been prepared for the overall EDEIP:

- **Stakeholder Engagement Plan (SEP)** – to describe various modes of stakeholder engagement including consultations and grievance redress mechanism (GRM).
- **Environmental and Social Management Framework (ESMF)** to provide criteria and procedures for environmental and social assessment of various categories of the subprojects under EDEIP.
- **Resettlement Framework (RF)** – to define principles and procedures for resettlement planning and preparation of resettlement plans for subprojects potentially causing resettlement impacts.
- **Labor Management Procedures (LMP)** to describe assessment of potential labor related risks, overview of labor regulation, staff responsibility, policies and procedures.

This ESMP has been carried out in accordance with the guidelines provided in the above-listed ESMF. Similarly, the stakeholder consultations for this ESMP have been carried out following the guidelines provided in above-listed SEP. The LMP will be applicable for all the subproject personnel including construction workers.

1.8 Environmental and Social Management Plan

1.8.1 ESMP Objectives

The present ESMP has been prepared for the proposed subproject since it is unlikely to cause widespread and lasting negative environmental and social impacts. The ESMP has been developed to:

- integrate the environmental and social concerns into the design and implementation of the proposed subproject in order to ensure that it is environmentally and socially sustainable;
- consider in an integrated manner, the environmental and social risks, benefits and impacts of the proposed subproject and identify measures to avoid, minimize and manage risks and impacts while enhancing benefits;
- To specify appropriate roles and responsibilities of all implementing agencies/entities and define the necessary monitoring and reporting procedures for managing environmental and social concerns related to the proposed subproject;
- To determine the training, capacity building and technical assistance needed to successfully implement the provisions of this ESMP.
- To comply with the local regulatory and WB policy requirements.

1.8.2 ESMP Study Methodology

The methodology followed in preparing the present ESMP consists of the following steps:

Review of the Subproject Details

At the onset of the study, the subproject details were obtained from PESCO and studied carefully. Meetings were held with the concerned officials as needed. Attempts were made to obtain as much information as available at this stage on the subprojects.

Review of Relevant Legislation, Policies, and Guidelines

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In order to determine the policy, legal and institutional environment for the subproject, the applicable policies, guidelines and legislations concerning the subproject's environmental and social aspects were reviewed, as listed below.

- Policies and legislations of Government of Pakistan and Government of KP province.
- The World Bank ESF, Environmental and Social Standards (ESSs), Guidelines, Policies and Directives.

During the present study, the above legislations, regulations, and framework were studied in depth to determine their relevance and applicability to the proposed subproject, in addition to determining and specifying actions to be taken by the project proponents / implementing agencies to fulfill the associated requirements.

Review of Secondary Literature

Under this task, relevant published and unpublished reports and documents were identified and reviewed. These include among others similar environmental assessment reports particularly of donor-funded projects, project documents, environmental and social management frameworks, environmental monitoring reports, news articles, and research reports. The primary objective of this task was to determine the potentially negative environmental as well as social impacts of projects similar to the proposed subproject and the associated mitigation/management strategies that were proposed to address those impacts. Secondary data was also collected where applicable to obtain baseline conditions of the subproject area and its surroundings.

E&S Scoping and AoI Determination

During this phase, key information on the subprojects was reviewed and interaction between its activities and key environmental resources charted out. A long list of the potential environmental as well as social issues likely to arise as a result of the project was thus developed. Subsequently, the significant potential impacts were short listed, screening out the non-relevant and or insignificant impacts, based upon their nature and severity. Furthermore, the area of influence of the subproject activities was determined. Thus, the sectorial as well as spatial boundaries of the subproject were determined for the purpose of the environmental and social assessment.

Stakeholder Engagement

The SEP has been prepared for the EDEIP to identify various modes of stakeholder engagement including stakeholder consultations and GRM, as mentioned earlier in **Section 1.7**. During the preparation of this ESMP, stakeholder consultations were carried out with communities in and around the AoIs and also with the institutional stakeholders (government departments), in accordance with the guidelines provided in the SEP.

Collection of Baseline Data

During this phase, environmental and social data was collected and compiled, in order to develop a baseline of the subproject areas' physical and socio-economic environment.

Impact Assessment

Once the baseline data collection was completed, impact assessment was carried out to identify potentially negative impacts of the proposed activities under the subproject. Subsequently, appropriate mitigation measures were identified to address these potential impacts. To the extent possible, the impact assessment and the associated mitigation measures were subproject- and site-specific.

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ESMP Compilation

During this task, the process and outcome of the tasks described above was compiled in the form of the present ESMP. The structure of the ESMP is described in the section below.

1.8.3 ESMP Structure

Executive Summary: This provides a general summary of the ESMP contents and key findings, in a vocabulary that is easily understood by the public at large. It concisely covers all aspects of the document.

Chapter 1: Introduction. This Chapter describes the ESMP purpose, objectives, principles and methodology. This Chapter introduces the subproject proponents and provides other relevant information. The layout of ESMP is also described in it to facilitate its reading.

Chapter 2: Regulatory and Policy Review. This Chapter describes the relevant national/provincial environmental and social legal requirements as indicated in various legislation, regulations and guidelines relevant to the subproject and this ESMP as well as the World Bank's ESSs applicable to the proposed subproject. The Chapter also states how such requirements will be complied during various phases of the subproject.

Chapter 3: Subproject Description. This Chapter provides a simplified description of the proposed subproject. The subproject description includes background and purpose of the subproject and also components of the subproject.

Chapter 4: Environmental and Socio-Economic Baseline Conditions. This Chapter covers the dimensions of the study area and review relevant physical, land-use, and socioeconomic conditions. This Chapter has been compiled on the basis of baseline data collection described earlier in **Section 1.8.2**.

Chapter 5: Environmental and Social Impact Assessment. This Chapter describes the potential impacts that have been assessed during the preparation of this ESMP. Mitigation measures are also described in this Chapter to address these impacts.

Chapter 6: Environmental and Social Management. This Chapter presents the implementation and monitoring mechanisms for the mitigation measures described in **Chapter 5**. This Chapter also includes institutional arrangements, training requirements, reporting requirements and also the GRM.

Chapter 7: Stakeholder Consultations and Information Disclosure. This Chapter describes the stakeholder engagement activities carried out during the preparation of this ESMP. The Chapter also describes the similar activities to be carried out during the subproject implementation. In addition, this chapter defines the disclosure requirements for this ESMP.

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2 Legal and Administrative Review

This section describes the relevant national and provincial environmental and social legal requirements as well as the WB E&S standards applicable to the project and the proposed subproject.

2.1 Applicable Legislation and Conventions

The national as well as provincial legislations, Acts and Regulations relevant to the E&S aspects of the proposed subproject are presented in **Table 2-1** below. **Table 2-2** lists the conventions, applicable to the subproject, issued by the International Labor Organization (ILO).

Table 2-1: Relevant Legislations and Acts

Sr. No.	Legislation / Acts	Applicability for Proposed Subproject
1.	Khyber Pakhtunkhwa Environmental Protection Act (Amendment), 2022	This Act has a direct bearing on the proposed subproject since it may potentially cause E&S impacts and it needs an approval from the KP Environmental Protection Agency. The present ESMP broadly addresses the requirements of this Act. PESCO may need to obtain environmental approval for some of the proposed subproject components.
2.	Khyber Pakhtunkhwa Environmental Assessment Rules, 2021	The provisions of these Rules are applicable for the proposed subproject.
3.	Khyber Pakhtunkhwa Administrative Penalty Rules, 2017	These Rules are applicable for the proposed subproject. The KP EPA may impose penalty in case of any violation in committed.
4.	National Environmental Quality Standards (NEQS), 2012	These standards are applicable to the effluents and emissions released by the proposed subproject.
5.	Guidelines for the Preparation and Review of Environmental Reports, 1997	These guidelines describe the format, practices, and procedures to be employed when carrying out environmental assessment for the proposed subproject.
6.	Pakistan Climate Change Act, 2016	The Act is broadly applicable to the proposed subproject since the subproject areas are prone climate change risks such as flooding and extreme heat.
7.	Khyber Pakhtunkhwa Forest Amendment Act, 2022	Though the subproject does not involve any tree cutting or deforestation, this Act is still relevant to prohibit the construction workers to do any act or activity in violation of this Act.
8.	Khyber Pakhtunkhwa Wildlife Protection, Preservation, Conservation and Management Act, 1975	Although the subproject is not located in any ecological significant area and the proposed activities are not likely to damage biological resources in any manner, this Act is still relevant to

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Sr. No.	Legislation / Acts	Applicability for Proposed Subproject
		prohibit the construction workers to do any act or activity in violation of this Act.
9.	Antiquity Act, 1975	No cultural heritage sites are known to exist in the subproject areas; however, Chance Find procedures have been included in this ESMP.
10.	Khyber Pakhtunkhwa Factories Act, 2013	This Act is applicable for the subproject workers as well as nearby community including men, adults, women, adolescent working in and near the construction area during construction phase.
11.	Khyber Pakhtunkhwa Occupational Safety and Health Act, 2022	This Act is applicable since the construction and O&M activities pose OHS risks.
12.	Electricity Act, 1910	This Act governs the supply and use of electrical energy and extends to whole of Pakistan. This Act is relevant since PESCO supplies and uses electricity.
13.	Khyber Pakhtunkhwa Right to Information Act, 2013	This Act is applicable as the proposed subproject is the public sector initiative and will need be transparent for public.
14.	Pakistan Penal Code, 1860	The provisions of the Penal Code are applicable to the subproject in terms of penalties for effecting human lives and public property. It also addresses the control of noise, air emissions and effluent disposal.
15.	Protection against Harassment of Women at the Workplace Act, 2010	This Act is applicable to the subproject in case of the employment of women workers during the construction and O&M phases.
16.	Employment of Children Act, 1991	This Act prohibits any child employment for construction or O&M activities of the proposed subproject.
17.	Labor Laws as part of Constitution of Pakistan, 1973	The labor laws are relevant as they deal with employment of labor for the construction of proposed subproject.
18.	Khyber Pakhtunkhwa Bonded Labor (Abolition) Act, 2015	This Act prohibits use of any bonded labor in the province.
19.	National Disaster Management Act, 2010	This Act is applicable to the proposed subproject due to its location. The proposed subproject requires special consideration of flood disasters and risk management strategies as per the Act especially during cloud outburst.
20.	Handling, Manufacture, Storage, Import of hazardous waste and	These Rules are applicable to the proposed subproject due to involvement of hazardous waste

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Sr. No.	Legislation / Acts	Applicability for Proposed Subproject
	hazardous substances Rules, 2022	handling, use and disposal during different activities at the construction and O&M stages.
21.	Khyber Pakhtunkhwa Minimum Wages Act, 2013	This Act is applicable to the subproject to ensure that the minimum wages and allowances are given to the labor (skill and unskilled employed for the construction and O&M).
22.	Khyber Pakhtunkhwa Disabled Persons (Employment and Rehabilitation) (Amendment) Act, 2012; Khyber Pakhtunkhwa Rights, Rehabilitation, Accessibility and Empowerment of People with Disabilities Act, 2018	These Acts are applicable as the proposed subproject involves serious occupation health and safety issues during construction phase and may cause serious injury to worker/staff causing permanent disability and differently able.
23.	Khyber Pakhtunkhwa Commission on the Status of Women Act, 2016.	This Act is applicable as the proposed subproject may involve female staff/worker as well as local resident women which may be directly or indirectly linked with subproject activities.
24.	Gender Equality as part of Constitution of Pakistan, 1973	The articles of Constitution of subproject are relevant as it may deal with employment of male and female labor having different religion, political affiliation, sect, color, caste, creed and ethnic background for the construction of proposed Project.

Table 2-2: ILO Conventions

Sr. No	Description	Applicability
1.	Forced Labor Convention, 1930 (No. 29)	The convention ensures that all subproject workers are hired voluntarily, with fair contracts with no coercion.
2.	Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)	The convention allows workers to form or join unions freely without fear of retaliation.
3.	Right to Organize and Collective Bargaining Convention, 1949 (No. 98)	The convention supports workers' right to collective bargaining for fair pay and safe conditions.
4.	Equal Remuneration Convention, 1951 (No. 100)	The convention requires equal pay for men and women doing similar work under the subproject.

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Sr. No	Description	Applicability
5.	Abolition of Forced Labor Convention, 1957 (No. 105)	The convention prohibits forced labor during any subproject activity, including during high pressure phases.
6.	Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	The convention ensures fair and non-discriminatory hiring, training, and promotion practices.
7.	Minimum Age Convention, 1973 (No. 138)	The convention restricts child labor in subproject, especially in hazardous or technical tasks.
8.	Worst Forms of Child Labor Convention, 1999 (No. 182)	The convention prevents children's involvement in dangerous project work or supply chains.

2.2 Environmental Regulatory Authorities

Since the proposed subproject falls in KP province, the KP-EPA is the relevant environmental regulatory authority. The key statutory functions of the KP-EPA are to:

- Administering and implementing the Environmental Protection Act, its rules and regulations.
- Reviewing Initial Environmental Examination (IEE)/ Environmental Impact Assessment (EIA), preparation of procedures and guidelines.
- Prepare, revise and enforce Environmental Quality Standards for industries, municipalities, vehicular emissions.
- Establishing and maintaining laboratories, certification of laboratories for conducting tests and analyses.
- Assisting local councils, authorities and/or government agencies in execution of projects.
- Establishing a system of surveys, monitoring, examination and inspection to combat pollution.
- Conducting training for government staff and industrial company staff.
- Provide information and education to the public on environmental issues.
- Publishing annual “State of the Environment” reports.
- Undertaking surveys and qualitative and quantitative analysis of data on air, soil and water quality, and industrial, municipal and traffic emissions.

2.3 World Bank Environmental and Social Standards

The relevant WB E&S Standards and Guidelines are listed in **Table 2-3**.

Table 2-3: WB E&S Standards and Guidelines

World Bank ESS	Relevance
ESS-1: Assessment and Management of Environmental and Social Risks and Impacts	This Standard is relevant to the proposed subproject since it may cause environmental and social risks and impacts. This ESMP has been prepared in compliance with this Standard.

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World Bank ESS	Relevance
ESS-2: Labor and Working Conditions	The ESS2 is applicable as the subproject will involve direct workers; contracted workers engaged in construction work and consultancy services and primary supply workers. Also, the subproject poses OHS risks to the workers. The LMP has been prepared and appropriate measures have been included in this ESMP in compliance with this Standard.
ESS-3: Resource Efficiency and Pollution Prevention and Management	This standard is relevant since the subproject will potentially cause pollution. The subproject will consume resources such as water, fuel and construction material and their efficient use will be required under this ESS. Appropriate measures have been included in this ESMP in compliance with this Standard.
ESS-4: Community Health and Safety	ESS4 is relevant as the constructions and operations of the subproject activities involve significant community health and safety hazards including SEA/SH risks. Appropriate measures have been included in this ESMP in compliance with this Standard.
ESS-8 Cultural Heritage	No known cultural heritage sites are present in the subproject area. However, Chance Find procedures have been included in this ESMP.
ESS-10 Stakeholder Engagement and Information Disclosure	The ESS10 is applicable as the subproject involves diverse stakeholders. An SEP has been prepared in accordance with this ESS and stakeholder consultations have been carried out as part of this ESMP.
World Bank Group's Environment, Health and Safety Guidelines	These Guidelines are relevant since the proposed subproject will potentially cause environmental, health and safety risks and impacts. These Guidelines have been included in this ESMP.
WB requirements for Disclosure of Documents	PESCO will be required to disclose to the public the E&S documents including this ESMP.

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3 Subproject Description

This chapter describes the overall objectives and provides a simplified description of the proposed subproject and the activities that will be carried out during the construction and O&M phases.

3.1 Need and Purpose of Subproject

Pakistan's power sector facing persistent challenges related to inefficient infrastructure, technical losses, supply-demand imbalances, and voltage instability, particularly in regions served by the PESCO. In KP province, many components of the distribution network—such as transformers, switchgear, and conductors—have aged beyond their service lives, leading to:

- Frequent equipment failures and forced outages.
- Overloaded lines and grid stations.
- Poor voltage profiles and unreliable power supply.
- Elevated technical losses across the distribution system.

These deficiencies have adversely affected residential, commercial, and industrial users, constrained economic growth, and reduced public confidence in power services. To address these issues, PESCO plans to undertake the proposed subproject under EDEIP. By undertaking the priority upgrades, the proposed subproject aims to:

- Improve the reliability and quality of electricity distribution by upgrading and modernizing existing grid stations and associated transmission infrastructure.
- Reduce technical losses through the reconductoring of overloaded and outdated transmission lines.
- Enhance operational safety and energy efficiency by replacing obsolete transformers, and other equipment with modern, efficient systems.

The proposed subproject focuses exclusively on rehabilitation and upgrade of existing assets within PESCO's service area and does not involve the construction of new grid stations or transmission lines. This approach ensures that the subproject is cost-effective, minimally disruptive, and aligned with sustainability goals by leveraging and improving existing infrastructure. See **Table 3-1** for the objectives and rationale of various components of the proposed subproject.

Table 3-1: Objectives of Subproject Components

EDEIP Subprojects	Objectives	Outcome
Grid Station Extension	To add new power transformer bays, feeders, and the associated equipment to an existing substation.	• Expands capacity to serve new or growing areas. • Accommodates new transmission lines • Improves power distribution effectiveness
Grid Station Augmentation	To replace the existing power transformer with the one with a higher capacity.	• Strengthens ability to handle current and future load demand • Ensures a more stable and reliable power supply for the area

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EDEIP Subprojects	Objectives	Outcome
Installation of Capacitor Banks	To improve the power factor and voltage stability of the electrical grid.	• Reduces reactive power losses. • Improves power transmission efficiency. • Allows the system to handle a larger • electrical load.
ABC Works	To replace bare conductors with insulated aerial bundled cables	• Reduces technical losses, • improves reliability, • minimizes electricity theft, and • enhances public safety by replacing bare conductors with bundled insulated conductors.
Transformer Monitoring System	Installing smart monitoring devices on 100-kVA and 200-kVA distribution transformers to collect real-time performance data	• reduces energy losses, • improves load balancing, and • enhances operational decision-making
Smart Meters	Installation of smart meters at the consumers' premises	• provides real time accurate data about electricity consumption • communicates data to PESCO and consumer • eliminates the need for manual meter readings • enables features like remote access, accurate billing, and better energy management

3.2 Subproject Locations

The proposed subproject will be implemented across 11 districts of KP Province (see **Figure 3-1**). The subproject interventions include upgrading existing grid stations and thus all activities will be confined within previously developed and operational sites/corridors. These grid stations are located in urban, peri-urban, and rural areas across KP. Other components of the proposed subproject including ABC works, transformer monitoring systems, smart meters, and will also be implemented on existing systems and equipment that are scattered within the PESCO service areas.

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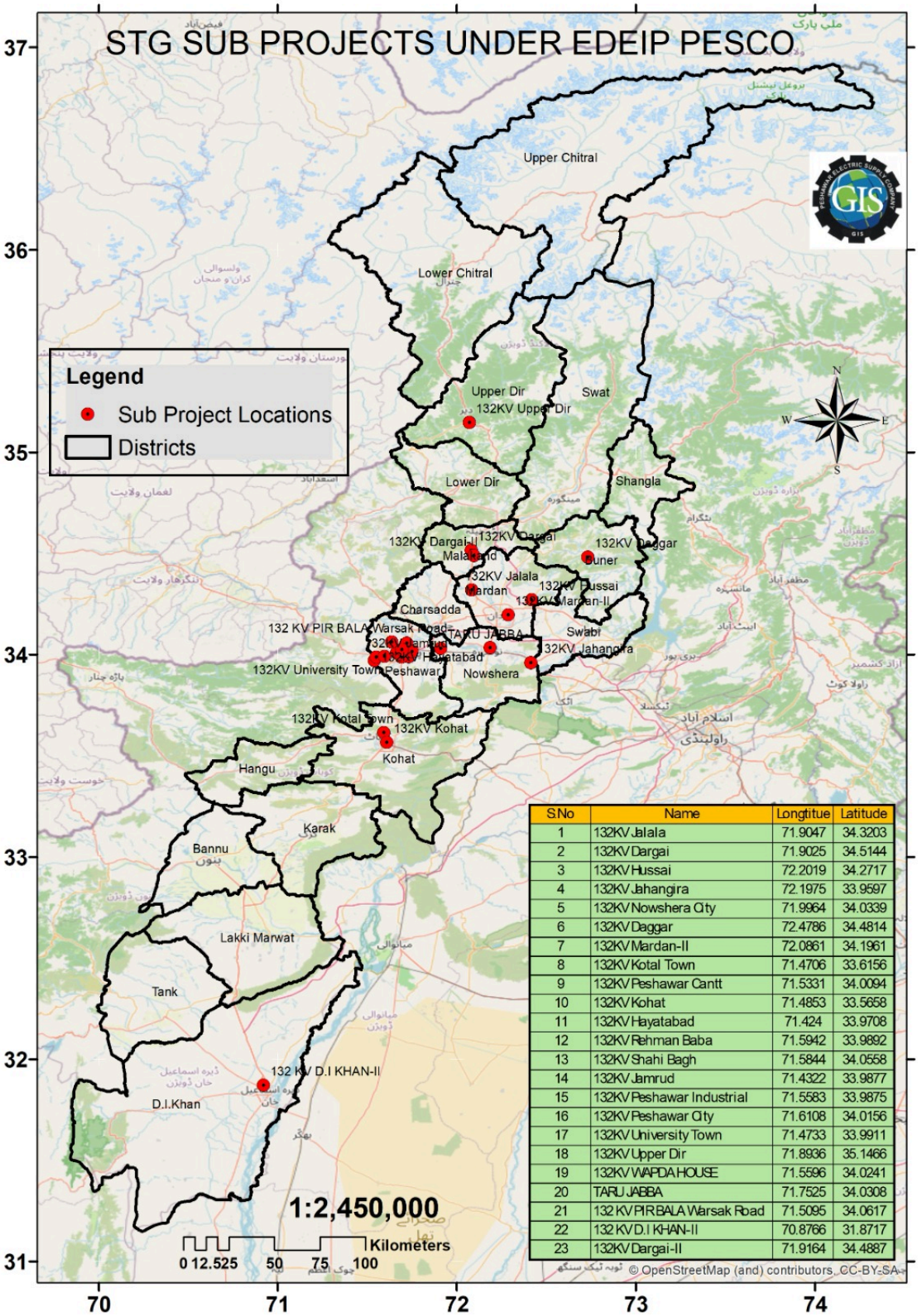

S.No	Name	Longtitue	Latitude
1	132KV Jalala	71.9047	34.3203
2	132KV Dargai	71.9025	34.5144
3	132KV Hussai	72.2019	34.2717
4	132KV Jahangira	72.1975	33.9597
5	132KV Nowshera City	71.9964	34.0339
6	132KV Daggar	72.4786	34.4814
7	132KV Mardan-II	72.0861	34.1961
8	132KV Kotal Town	71.4706	33.6156
9	132KV Peshawar Cantt	71.5331	34.0094
10	132KV Kohat	71.4853	33.5658
11	132KV Hayatabad	71.424	33.9708
12	132KV Rehman Baba	71.5942	33.9892
13	132KV Shahi Bagh	71.5844	34.0558
14	132KV Jamrud	71.4322	33.9877
15	132KV Peshawar Industrial	71.5583	33.9875
16	132KV Peshawar City	71.6108	34.0156
17	132KV University Town	71.4733	33.9911
18	132KV Upper Dir	71.8936	35.1466
19	132KV WAPDA HOUSE	71.5596	34.0241
20	TARU JABBA	71.7525	34.0308
21	132 KV PIR BALA Warsak Road	71.5095	34.0617
22	132 KV D.I KHAN-II	70.8766	31.8717
23	132KV Dargai-II	71.9164	34.4887

Figure 3-1 Subproject Locations

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3.3 Subproject Components

The subproject components are listed in **Table 3-2**. The components that would be carried out at the existing grid stations are listed in **Table 3-3**. These include grid station extensions, grid station augmentations, and installation of capacitor banks. Similarly, the remaining subproject components are listed in **Tables 3-4** to **3-6**.

Table 3-2: Subproject Components

Description	Quantity/Length
Extension of existing 132-kV grid stations	07 Grid Stations (09 Extensions)
Augmentation of existing 132-kV grid stations	08 Grid Stations (09 Augmentations)
Installation of capacitor banks in existing 132-kV grid stations,	17 Grid Stations (26 Capacitors)
Installation of monitoring systems on 100-kilovolt-amperes (kVA) and 200-kVA distribution transformers	20,723
Installation of smart meters	53,927
Laying of ABC feeders.	60

Table 3-3 Subproject Components inside 132-kV Grid Stations

Sr. No.	132-kV Grid Station	Capacitor Bank Installation	Grid Station Extension	Grid Station Augmentation
1.	132 KV DI Khan-II GS (Kohat)	✔	✔	-
2.	132 KV Kohat Development Authority (KDA) Kohat GS (Kohat)	✔	-	✔
3.	132 KV Kohat GS (Mardan)	✔	✔	-
4.	132 KV Dargai GS (Malakand)	✔	-	-
5.	132 KV Dargai-II GS (Malakand)	✔	✔	
6.	132 KV Jalala GS (Mardan)	✔	-	-
7.	132 KV Mardan II GS (Mardan)	✔	✔	-
8.	132 KV Taru Jabba GS (Peshawar)	-	-	✔
9.	132 KV Nowshehra City GS (Peshawar)	✔	-	-

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Sr. No.	132-kV Grid Station	Capacitor Bank Installation	Grid Station Extension	Grid Station Augmentation
10.	132 kV Jehangira GS (Nowshera)	✔	-	✔
11.	132 KV Peshawar University GS (Peshawar)	✔	-	-
12.	132 KV Peshawar City GS (Peshawar)	✔	✔	-
13.	132-kV Peshawar Cantonment GS (Peshawar)	-	-	✔
14.	1323-kV WAPDA House GS (Peshawar)	-	-	✔
15.	132 KV Warsak Road GS (Peshawar)	✔	✔	-
16.	132-kV Hayatabad GS (Peshawar)	✔	-	-
17.	132-kV Jamrud GS (Peshawar)	✔	-	-
18.	132 KV Rehman Baba GS (Peshawar)	✔	-	-
19.	132 kV Hussai GS (Mardan)	-	-	✔
20.	132 kV Daggar GS (Buner)	-	-	✔
21.	132-kV Chukyatan GS (Upper Dir)	-	-	✔
22.	132-KV Shahi Bagh GS (Peshawar)	✔	✔	-
23.	132-kV Peshawar Industrial GS (Peshawar)	✔	-	-

Table 3-4 Installation of Monitoring System at Distribution Transformers

Sr. No.	Description	200-kVA Transformers	100-kVA Transformers	Total
1.	Peshawar Circle	2,231	4,240	6,471
2.	Khyber Circle	1,650	3,292	4,942

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Sr. No.	Description	200-kVA Transformers	100-kVA Transformers	Total
3.	Mardan Circle	630	2,016	2,646
4.	Swat Circle	1,133	2,116	3,249
5.	Bannu Circle	207	755	962
6.	Swabi Circle	404	961	1365
7.	DI Khan Circle	372	716	1088
	Total	**6,627**	**14,096**	**20,723**

Table 3-5: Installation of Smart Meters

Sr. No.	Description	Smart Meters to be Installed
1.	Peshawar Circle	16,928
2.	Khyber Circle	34,219
3.	Mardan Circle	5,273
4.	Swat Circle	6,846
5.	Bannu Circle	8,104
6.	Swabi Circle	3,085
	Sub-total	85,528
	To be procured by PESCO directly	(25,000)
	New connection and defective meters replacement	4,472
	To be procured and installed under EDEIP	**53,927**

Table 3-6: List of ABC Works

Sr. No.	Division/District	Subdivision	Feeder Code	Feeder Name	ABC Length (km)
1.	Peshawar City Rural	Nishtarabad	034417	Islamabad	13.79
2.		Nishtarabad	034423	Nishtarabad-2	7.07
3.		Faqirabad	034415	Zaryab	10.14
4.		Rahman baba	087613	Phando baba	15.93
5.		Rahman baba	034408	Baghbanan	16.24
6.		Lala	086502	Wadpaga-1	21.91
7.		Lala	086506	Wadpagga-2	20.89
8.		Lala	034403	Lala	9.59
9.		Sethi town	086505	Pakha ghulam	18.68
10.		Sethi town	086509	New Gul Abad	14.14
11.		Sethi town	034420	Sethi Town	11.04
12.		Sethi town	019313	Sarbiland Pura	18.01
13.		Sethi town	019301	Dalazak	14.72

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Sr. No.	Division/District	Subdivision	Feeder Code	Feeder Name	ABC Length (km)
14.	Peshawar City	Rashid Ghari	087608	Rashid Ghari	18.30
15.		Phandu	087614	Chairman Daftar	9.62
16.	Peshawar Cantonment	University-I	051424	Malkandher	15.62
17.		University-II	051411	G.abad	9.18
18.		University-II	051404	Rahatabad	5.28
19.		Kohat road	016211	Kohat Road	4.59
20.		Kohat road	016222	New Kohat road	12.18
21.	Charsadda	Charsadda	002619	Charsadda-IV	15.89
22.		Charsadda	002601	Charsadda-1	30.58
23.		Charsadda	002615	Charsadda-3	23.69
24.		Sardheri	002612	Dargai	65.83
25.		Sardheri	002604	Sardheri	50.57
26.		Utmanzai	002609	Rajjar	38.15
27.		Nisatta (Rural)	002603	Prang	22.72
28.	Shabqadar	Tangi	056705	Barazai	38.18
29.		Tangi	056715	Tangi Nusratzai	31.06
30.		Matta	036523	Katozai-2	17.18
31.		Matta	036504	Moran Koruna	21.54
32.		Doaba	036512	Pir Qilla	8.95
33.		Shabqadar	036505	Shabqadar Fort	6.01
34.	Rural	Warsak-I	091003	Mathra-I	30.27
35.		Daud zai	081901	Nishat-I	25.01
36.		Daud zai	019318	Nishat-II	11.89
37.		Gulbela	019302	Daud zai-I	25.50
38.		Gulbela	019319	Khazana-2	26.73
39.		Gulbela	094202	Khazana	21.96
40.		Warsak-II	081910	Kaniza	17.56
41.		Warsak-II	051412	Regi	27.75
42.		Warsak-II	081902	Pajagi	15.47
43.		Naguman	019312	Daudzai-II	24.32
44.	Khyber	Deh Bahadar	067106	Sheikhan	16.94
45.	NSR City No. 2	Pabbi-III	034009	P.S.O	32.33
46.		Pabbi-III	034018	Taru Jabba	27.06
47.		Pabbi-III	034015	Akbar Pura	37.37
48.		Pabbi-III	034006	Tarnab	38.51
49.		Pabbi-III	034004	Scarp-I	23.90
50.	Kohat	Kotal Town	105410	Eid Gah Kohat	7.06
51.	Kohat Rural	Rural	105406	Hangu Road	31.79
52.		Rural	011116	Alizai-1	26.811
53.		Rural	105403	Alizai-2	13.88
54.		Rural	011117	Barh	46.456
55.		Rural	011111	O.T.S	22.44
56.		Rural	105402	Gamgol Sharif	9.15
57.		Kohat Urban-II	011124	City-4	16.81
58.		Kohat Urban-II	011112	S. Factory	23.174
59.		Kohat Urban-II	011126	Tappi	17.246
60.		Kohat Urban-II	011123	Jarma	43.568

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Sr. No.	Division/District	Subdivision	Feeder Code	Feeder Name	ABC Length (km)
					1298.2

3.4 Construction/Installation Works

The simplified description of the construction and installation activities of various subproject components is provided in the following sections.

3.4.1 Grid Station Extension Works

The key activities to be carried out for the grid station extension works are described in **Table 3-7**.

Table 3-7: Construction Activities involved in Grid Station Extension

Construction Activities	Description
Contractor Mobilization	Mobilization of the contractor to the grid station. Setting up of temporary facilities
Site preparation and clearance	Removal of any debris, vegetation, or obstructions in the designated extension area; leveling and compacting of ground
Equipment transportation	Transporting power transformer and other equipment to the grid station.
Excavation	Digging for new transformer foundations, cable trenches. Approximately 25 cubic meters of soil will be excavated, about 3-meters deep for the bay foundation, most of the excavated material will be used for backfilling and rest for ground leveling.
Steel reinforcement fabrication	Cutting and fixing steel bars for foundation structures
Concreting works	Pouring concrete for transformer bay and equipment foundations. About 30 cubic meters concrete will be required for each transformer bay and equipment foundation.
Transformer foundation casting	Base slab and walls for transformers and circuit breakers
Transformer installation	Positioning the power transformer on the foundation. Assembling bushings, radiators, conservator tank, and other accessories on transformer, filling transformer oil under vacuum.
Cable trenching and ducting	Construction of underground trenches for control and power cables
Earthing pits and conductors	Installing grounding systems for electrical safety
Steel structure erection	Gantry and equipment support structures
Equipment installation	Mounting of new circuit breakers, isolators and other transformer bay equipment.
Cabling	Laying of control and power cables in the trenches.

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Construction Activities	Description
Electrical connections	Connecting bushings to bus bars, surge arresters, current transformer (CT); potential transformer (PT), cable terminations; earthing connections.
System integration	Protection and control system integration including installing and wiring of protection relays, control panels, Supervisory Control and Data Acquisition (SCADA) system connections, and communication lines.
Testing and Commissioning	Electrical and functional testing of transformers, breakers, isolators, relays, and cables before energization. Includes insulation resistance tests, ratio tests, CT/ PT calibration, and trial operation.
Contractor demobilization	Site restoration and demobilization of contractor.

3.4.2 Grid Station Augmentation Works

The key activities to be carried out for the grid station augmentation works are described in **Table 3-8**.

Table 3-8: Construction Activities involved in Grid Station Augmentation

Construction Activities	Description
Contractor Mobilization	Mobilization of the contractor to the grid station. Setting up of temporary facilities
Equipment transportation	Transporting power transformer and other equipment to the grid stations
Removal of existing power transformer	Disconnecting the existing power transformer and removing it from its foundation in a safe manner (bushings, radiators, conservator tank, and other accessories of the transformer will be removed if needed for safe handling of the transformer).
Concreting works	Pouring concrete for transformer and equipment foundations (in case the existing foundations have to be modified).
Transformer foundation casting	Base slab and walls for transformers and circuit breakers (in case the existing foundations have to be modified).
Transformer installation	Positioning the new power transformers on the foundations. Assembling bushings, radiators, conservator tank, and other accessories on transformer, filling transformer oil under vacuum.
Cable trenching and ducting	Construction/modifying (if needed) of underground trenches for control and power cables
Steel structure erection	Gantry and equipment support structures (if any modification is needed)
Equipment installation	Mounting of new circuit breakers, isolators and other transformer bay equipment (if needed).
Cabling	Laying of control and power cables in the trenches.
Electrical connections	Connecting bushings to bus bars, surge arresters, CT; PT, cable terminations; earthing connections.

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Construction Activities	Description
System integration	Protection and control system integration including installing and wiring of protection relays, control panels, SCADA system connections, and communication lines.
Testing and Commissioning	Electrical and functional testing of transformers, breakers, isolators, relays, and cables before energization. Includes insulation resistance tests, ratio tests, CT/ PT calibration, and trial operation.
Contractor demobilization	Site restoration and demobilization of contractor.

3.4.3 Installation of Capacitor Bank

The key activities to be carried out for the installation of capacitor banks are described in **Table 3-9**.

Table 3-9: Activities involved in Capacitor Bank Installation

Activity	Description
Contractor Mobilization	Mobilization of the contractor to the grid station. Setting up of temporary facilities
Equipment transportation	Transporting capacitor banks and other equipment to the grid stations
Construction of capacitor foundations	Civil foundation for capacitor banks and isolators
Erection of support structures	Steel frameworks to support busbars and capacitors
Installation of capacitor units	Mounting of capacitor banks in specified configuration
Interfacing with existing system	Connecting capacitor to busbars via isolators and breakers
System integration	Integration with system Relay and control panel wiring
Testing and Commissioning	Testing busbar connections for continuity, insulation resistance, and load flow. Capacitor bank commissioning includes capacitance test, insulation resistance, and system integration with SCADA.
Contractor demobilization	Site restoration and demobilization of contractor.

3.4.4 Installation of Transformer Monitoring System

The key activities to be carried out for the installation of transformer monitoring system (also called Asset performance Monitoring System – APMS) are described in **Table 3-10**.

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Table 3-10: Activities involved in Installation of Transformer Monitoring System

Activity	Description
Contractor Mobilization	Mobilization of the contractor to the grid station. Setting up of temporary facilities
Site Identification and Preparation	Selection and mapping of eligible 100kVA/200kVA transformers
Equipment transportation	Transporting the field equipment to the installation sites.
Meter Mounting	Physical installation of APMS meter on the transformer body or nearby structure
Electrical Connection	Connecting input/output leads to the transformer terminals
Communication Setup	Configuration of APMS modules for remote data transfer
Testing and Calibration	Verification of reading accuracy and connectivity
Integration with Central System	Uploading meter identity and data stream to the central APMS platform
Training of Local Teams	On-field and back-office staff orientation
Testing and Commissioning	Testing the APMS module and communication system. Commissioning the APMS.
Contractor demobilization	Disposing of waste material, and restoring ground conditions to pre-work state.

3.4.5 Installation of Aerial Bundled Cables (ABC)

The key activities to be carried out for the laying of ABC are described in **Table 3-11**.

Table 3-11: Activities involved in Laying of ABC

Activity	Description
Contractor Mobilization	Mobilization of the contractor to the grid station. Setting up of temporary facilities
Site preparation and access arrangement	Identification of routes, clearance of alignment, marking of poles, arranging temporary access for machinery and crew.
De-energizing the existing feeders/conductors	De-energizing the feeders/conductors, obtaining work permits from PESCO
Dismantling of old conductors	Removal of existing bare conductors and associated fittings. Transporting the old conductor to PESCO stores
Pole/tower reinforcement or replacement	Replacement or strengthening of existing poles where load capacity is inadequate.
Equipment/material transportation	Transporting ABC and its accessories to the site

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Activity	Description
Installation of pole-mounted accessories	Fixing of brackets, insulator assemblies, anchoring clamps, suspension clamps, and tension fittings for ABC stringing.
Stringing of ABC conductors	Controlled uncoiling and stringing of ABC along poles using pulleys, ensuring insulation integrity.
Sagging and tensioning of ABC	Adjusting sag levels and securing ABC bundles to clamps in accordance with design standards.
Service connection works	Connecting consumer service drops from ABC to meter boards, ensuring insulated connections.
Jointing and termination works	Proper installation of joints, dead-ends, and mid-span joints with insulation sealing.
Earthing and safety bonding	Earthing of ABC system at intervals and bonding to pole mounted equipment for safety.
Vegetation clearance	Trimming trees and branches near the ABC alignment to maintain safe clearance.
Testing and commissioning	Inspection of sag, tension, connections, insulation integrity, followed by energization.
Contractor demobilization	Disposing of waste material, and restoring ground conditions to pre-work state.

3.4.6 Installation of Smart Meters

The key activities to be carried out for the installation of Smart Maters include taking the smart meter to the premises where the smart meter has to be installed; disconnecting and removing the existing meter, installing the smart meter, making the electrical connections, and checking/testing its functionality including communication link.

3.4.7 Construction Machinery

A tentative list of the construction equipment needed for the proposed subproject is provided below (the contractor will determine the actual need as per the construction methodology and contractual requirements).

- Excavator,
- Bulldozer
- Dump truck
- Crane
- Concrete mixer
- Vibrator
- Rebar cutter/bender
- Compactor
- Cable pulling winch

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- Testing kits
- Hydraulic tensioner-puller
- Winches
- Scaffolding
- Generators
- Vehicles.

3.4.8 Waste Generation

During the implementation of the proposed subproject, various types of wastes will be generated at different stages of construction, equipment installation, and operation. As the subproject focuses on rehabilitation of existing infrastructure**,** waste generation is expected to be moderate and site-specific. The key types of wastes generated during the construction phase of the proposed subproject include packing material including wooden crates and cardboards, metal scraps from the site workshop, leftover construction material and debris including sand, aggregate (stones), bricks, transformer oil, broken parts, empty cable drums (reels), and empty drums for oils, lubricants and chemicals, domestic solid wastes from workers' camps and site offices, waste water from kitchen and washing areas, and sewage from toilets.

3.4.9 Manpower Requirements

While the actual manpower needs will be determined by the construction contractors based upon the construction schedule and sequence of activities, some estimates have been carried out based upon similar works for other projects. The tentative manpower requirement for each grid station extension works has been estimated to be about 8-10 workers in addition to site supervisors and engineer. Similarly, the tentative manpower requirement for each grid station augmentation works and installation of capacitor banks has been estimated to be about 6-8 workers in addition to site supervisors and engineer. For each ABC works, the tentative manpower requirement has been estimated to be about 12-15 workers in addition to site supervisors and engineer. Similarly, for the installation of each transformer monitoring system and smart meter, a crew of two persons would be needed.

3.4.10 Temporary Facilities

The contractor may establish temporary facilities for the construction works under the proposed subproject. For each component under the proposed subproject, these facilities may include site office, workshop and living arrangements for the workers (workers' camp) and security post as requires. These facilities will most likely be established within the related grid station. The exact location, size, and other details will be determined based upon the site needs and contractual requirements.

3.5 Operation and Maintenance (O&M)

3.5.1 O&M of Grid Stations

A simplified description of the O&M activities related to the grid stations is provided below.

- Operation Activities
  - The grid stations are manned round the clock and important parameters (such as voltage, load and power factor) are regularly monitored. Daily log sheets are filled, recording the key data.

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- Regular inspection and monitoring of transformers, switchgear, circuit breakers, relays, earthing systems, and control panels.
- Any abnormality such as electrical faults in the system is recorded and concerned departments informed for taking remedial measures.
- Emergency maintenance, location of faults, repairs and replacement of faulty equipment/material.
- Tightening bolts, cleaning insulators, applying anti-corrosion coatings, replacing worn-out fittings, and maintaining grounding systems.
- Responding to faults or damage caused by storms, accidents, or equipment failure; isolating faulty sections and carrying out urgent repairs.

- Scheduled Maintenance
  - Checking/testing of transformers (further discussed below)
  - Testing of breakers
  - Testing of protection system
  - Washing/replacement of insulators
  - Carrying out repairs or replacements, as needed
  - Restoring the system to the normal operating conditions.

3.5.2 Maintenance of Transformers

Power transformer repairs: The minor repairs for the power transformers are carried out at the grid stations, however for the major repairs, the transformers are transported to the Water and Power Development Authority's (WAPDA's) Power Transformer Reclamation Workshop at Kot Lakhpat, Lahore.

Transformer oil testing: The dielectric strength of the transformer oil filled in the power transformers is tested every year at the gird stations. For this purpose, a simple device called the oil testing set is used. Oil sample is taken out of the transformer and test performed. A record is maintained for these yearly tests. No action is taken if the test results are within the prescribed limits. However, if the dielectric strength of the transformer oil is found to be less than the allowable limits, the oil is replaced.

After every five years, a more comprehensive test is carried out for the transformer oil. Three oil samples are taken from each transformer and sent to the WAPDA's High Voltage and Research Laboratory in Faisalabad. At the Laboratory, the following tests are carried out:

- Flash point
- Viscosity
- Moisture
- Gas contents
- Dielectric strength.

3.5.3 Waste Generation during O&M Phase

During the O&M phase, the typical types of wastes generated would include used transformer oil, broken/faulty equipment and parts, used batteries, domestic solid wastes from offices and staff colonies, and waste water including sewage from staff colonies.

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3.5.4 Manpower Requirements during O&M Phase

A crew of 4-5 persons is deputed at each grid station for its operation in each 8-hour shift. In addition, a maintenance crew of 10-15 persons is also required on a reginal basis. However, all of these staff already exist and the proposed subproject will not require any additional staff except for the APMS operations.

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4 Environmental and Socioeconomic Baseline Conditions

This chapter provides an overview of the E&S baseline conditions of the proposed subproject areas.

4.1 Overview of Subproject Area

As mentioned in **Sections 1.3** and **3.2**, the areas where the proposed subproject will be implemented include districts of Malakand, Mardan, Nowshera, Peshawar, Kohat, DI Khan, Upper Dir, Swabi, Lower Dir, Charsadda and Buner. These districts are spread over most parts of the province (see **Figure 3-1**) therefore the baseline conditions of entire province are briefly described below.

KP is the third largest province of Pakistan by population and the smallest province by area. The total area of KP province is 101, 741 square kilometers. The geographical location of KP is 34.0000^{o} North latitude and 71.3200^{o} East longitude[3]. It borders with Afghanistan in the north-west, Balochistan in the south, Punjab in the south-east, Gilgit Baltistan in the north-east and Azad Kashmir in the east. The total number of districts in KP are 35 and Peshawar is the capital of the province.

The terrain of the province is dominated by mountains. It is surrounded by the Hindukush Mountain range in the north-west. The Himalayas surround the province in the north-east. The east-west tending Safed Koh Cherat range forms its southern boundary. Tirich Mir rising 7690 meters above the sea level is the highest point in the province. The Peshawar Valley is enclosed by the Malakand range on its northern side and by the Khyber hills on its western sides. The Kurram range encloses the Bannu basin in its north and the mountains cover the basin along the eastern and southern boundaries. The Dera Ismail Khan basin in the south of the province is separated from the Bannu basin by the Bhittani mountain range.

The relatively flat alluvial plains, with the best groundwater resources, are the hub of economic activity, mostly in the form of agriculture. Some parts of these plains are irrigated by one or more rivers crossing most of the plains. The whole province drains into the Indus River, with the exception of the Kunhar River which flows down the Kaghan Valley into the Jhelum River. The Indus River flows between the Swat and Mardan districts on the right bank and the districts of Kohistan, Mansehra and Abbottabad on the left bank. It flows through Tarbela Dam. Most of the irrigation water in Khyber Pakhtunkhwa is supplied by the Kabul River (Warsak Dam) and Tarbela Dam, both of which are located in the province. Chashma Right Bank Canal also makes a significant contribution in terms of irrigation water supply.

The Khyber Pakhtunkhwa Province is located in the extreme northwest of the Indo-Pakistani subcontinent where it merges with the Eurasian continent. This merging is the consequence of the collision of two tectonic plates: the Laurasian plate and the Greater Indian plate. The province can be subdivided into four broad geological units (i) Metamorphic and igneous rocks of the northern mountains; (ii) Mesozoic rocks of the southern and southwestern part;(iii) Tertiary rocks of the central and south-eastern part; and (iv) Upper Tertiary and Quaternary fill of the intermontane basins[4].

[3] http://kp.gov.pk/page/quickviewofkhyberpakhtunkhwa

[4] Hydrogeology and groundwater resources of north West Frontier Province Pakistan, 1988

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According to the seismic map of Pakistan, the central and southern parts of the province mostly lie in zone 2B (minor to moderate damage) of the Earthquake Zones Classification of the Uniform Building Code of Pakistan[5].

The climatic profile of the Khyber Pakhtunkhwa province is extremely diverse due to various altitudes and vegetation cover, mountain barriers and topography. Its climate varies from the dry and hot rocky zones in south to the cool and lavish green forests in the north. Six types of climatic profiles are recognized for the KP province.

Semi-arid subtropical continental lowland: The features included large plains, characterized by great annual and daily variations in temperature; maximum temperature about 41°C; minimum temperature from 4.5 °C; a few frosty days, generally low humidity; mainly late summer monsoon rains and rainfall between 80 and 500 millimeters (mm). The areas under this zone are Western zone of the Peshawar Valley, Bannu basin, Dera Ismail Khan basin

Sub-humid subtropical continental lowland: The features included rainfall of 500 to 1000 mm, increasing sharply towards the hills. At least two months per year are humid; winters are distinctly colder and summers cooler than climatic region above (semi-arid subtropical continental lowland). The areas under this zone are Buner area in Swat district, Talash and Adinzai Valleys in Dir district, part of Abbottabad district, and Nizampur area as well as the eastern part of the Peshawar Valley.

Humid subtropical continental highland: The features included mountainous areas, including the narrow intervening valleys. The maximum temperature occurs in June or July and is less than 38 °C; winters are cold, snowy and foggy; rainfall exceeds 1250 mm; late winter and summer rains are common. The areas included spurs of the outer Himalayas extending into Mansehra district.

Sub-humid subtropical continental highland: Does not greatly differ from the above region (humid subtropical continental highland), except for the rainfall, which ranges from 500 to 1250 millimeters (mm). The areas included hills of Swat, Dir, Kohistan, Kohat and Karak districts.

Semi-arid subtropical continental highland: Similar to sub-humid subtropical continental highland, but the rainfall is less: 200 to 500 mm. The areas included Northern part of Swat and southern part of Chitral, as well as Kohat, Karak, Waziristan, Bajaur, Khyber districts.

Arid subtropical continental highland: Similar to the other subtropical continental highland regions except for the rainfall, which is less than 200 mm. The area included northern part of Chitral District.

Khyber Pakhtunkhwa has complicated and diverse hydrological conditions and different situations of water resources and water availability in different parts. In the south (Dera Ismail Khan, Tank, Lakki Marwat and Bannu) there is shortage of water, whereas the north, including Chitral, Upper Dir, Lower Dir, Swat, Shangla, and Kohistan, has abundant water resources. There are three sources of freshwater: precipitation; streams and rivers; and groundwater.

Air pollution is a rapidly growing environmental problem in Khyber Pakhtunkhwa, as in the rest of Pakistan. The major causes of worsening air quality in the urban areas are: increasing domestic and industrial power consumption which is met by coal; highly inefficient energy use; exponential growth in the number vehicles; increasing industrial activities by marble factories, brick kilns, sugar mills, and cement factories without adequate air emission control; and open air burning of solid waste, including plastic. The data presented in a study[6] shows very high

[5] Building Code of Pakistan 2007

[6] Cleaning Pakistan's Air Policy Options to Address the Cost of Outdoor Air Pollution, 2014

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concentrations of air pollutants in Peshawar; the levels of fine particle matter ($PM_{2.5}$), sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) are respectively three times, two times and one and a half times higher than the World Health Organization (WHO) guidelines, while ozone (O_3) and carbon monoxide (CO) are within the guidelines.[7]

Noise pollution in the urban areas of the KP Province is a rapidly growing environmental hazard. Higher levels of noise pollution can have a range of health effects, including stress related mental health issues, heart disease, insomnia, cognitive impairment among children and annoyance. According to survey of Environmental Protection Agency of Khyber Pakhtunkhwa at various traffic junctions in Peshawar shows a very high noise level with an average value of 90 decibel (dB) to 100 dB which is well above the upper limit of 85 dB prescribed the WHO. The main sources of this urban noise pollution are: vehicles horns; and defective silencers of the two-stroke auto rickshaws.[8]

The total population[9] of Khyber Pakhtunkhwa was estimated to be 37.15 million in 2018-19, which is 17.1% of the national population. The province had an annual growth rate of 2.9% as compared to the national rate of 2.4% in 2017.The average household size in Khyber Pakhtunkhwa is 7.6 and 8.1 in urban and rural areas, respectively.

The main ethnic group in KP is the Pashtun, but the province is multiethnic. Other significant groups include Hindkowans, Dards, Chitralis, and Gujars.

In 2017-18, the national literacy rates were 52% and 73% for women and men, respectively. The literacy rates in the province show greater disparity between genders: 39% for women and 73% for men. The rate is the second lowest in Khyber Pakhtunkhwa among the provinces. The Pakistan Education Statistics 2016-2017 estimated that among 51.53 million children in Pakistan between the ages of 5 and 16 years, 22.84 million children did not attend school. In primary to higher secondary level, 49% of girls are out of school as compared to 40% of the boys. In Khyber Pakhtunkhwa, 1.8 million children are out of school; considering that the population of the province is about 15% of national, proportionately more children appear to be schooled in the province. Among those out of school in Khyber Pakhtunkhwa, 64% of were girls and 36% boys. Some of the factors responsible for the slow progress in education include: (i) shortage of schools especially for girls and also in remote and far-flung areas; (ii) shortage and absenteeism of teachers; (iii) lack of qualified and trained teachers; (iv) missing facilities such as water, toilets and boundary walls; (v) weak supervision; and (vi) out-of-school factors such as conservative and tribal culture, insecurity and lawlessness, and poverty.

The health facilities are available to the people in the province. In 2018[10], 283 hospitals, 988 dispensaries, 100 rural health centers, 937 basic health units and 23 sub health centers were providing services to the people of KP.

Despite having substantial potential of hydroelectric generation, KP suffers from low electricity consumption. The annual per capita electricity consumption in the province was about 281 kilowatt-hour (kWh) which is about one-half of the national average (516 kWh).[11]

[7] Site specific information/data on air quality will be included in the subproject ESIAs/ESMPs as appropriate.
[8] Site specific information/data on noise will be included in the subproject ESIAs/ESMPs as appropriate.
[9] Bureau of Statistics, KP in Figures 2019
[10] Bureau of Statistics, KP in Figures 2019
[11] https://www.ceicdata.com/en/pakistan/electricity-generation-and-consumption/electricity-consumption-by-region-khyber-pakhtun-khwa-kpk

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The major crops in the province are wheat, maize, rice, sugarcane, gram, tobacco and barley. In 2018-19[12], the area under cultivation of wheat was 724000 hectares (ha), maize 468000 ha, rice 62000 ha, sugarcane 111000 ha, gram 29000 ha, tobacco 25000 ha and barley 21000 ha.

The livestock of KP included cattle, buffalos, sheep and goats. According to 2019 estimation, the population of cattle in the province was 6.67 million, buffalos were 2.67 million, sheep were 2 million and goats were 9.21 million.

The civilian labor force in the province was 7.72 million in 2017-18 which included 6.45 million male and 1.27 million female. Out of total reported labor force, 7.17 million is employed and 0.55 million labor force was unemployed.

4.2 Site Specific Conditions

The site-specific conditions of the key subproject components are covered in the subsection below.

4.2.1 Extension of Grid Stations

The extension works will be carried out at the seven existing grid stations under the proposed subproject, as listed in **Table 3-2**. These include 132-kV Kohat GS, 132-kV Mardan-II GS, 132-kV Peshawar City GS, 132-kV Dargai-II GS, 132-kV Warsak Road GS, 132-kV Shahibagh GS, 132-kV DI Khan-II GS. The 132-kV Kohat GS and 132-kV Shahibagh GS; while in Shahibagh and Kohat have proposed double extensions as listed in **Table 3-2**. The baseline conditions within and in the vicinity of these grid stations are shown in **Figures 4-1** to **4-7**.

[12] Bureau of Statistics, KP in Figures 2019

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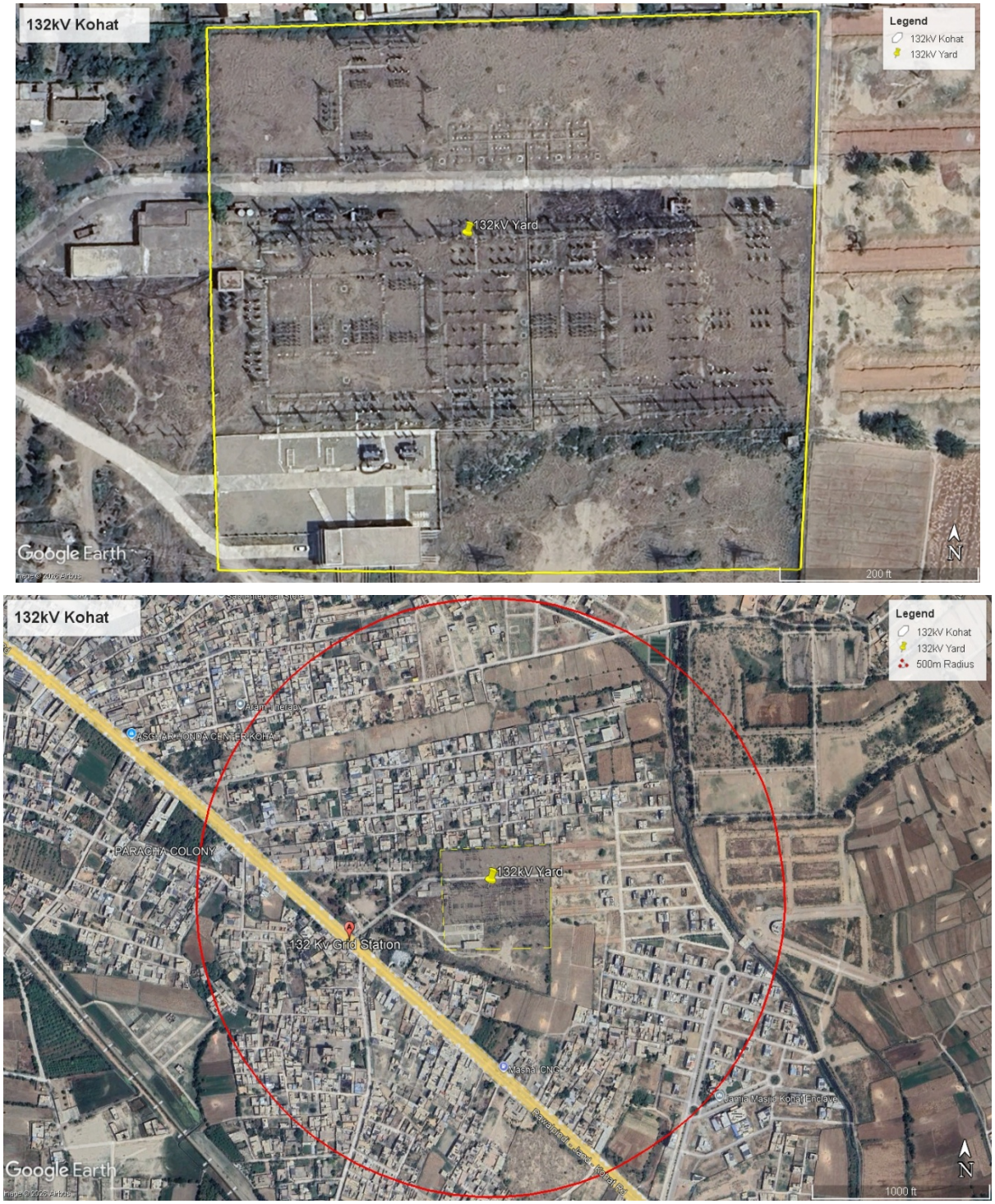

Figure 4-1: 132-kV Kohat Grid Station

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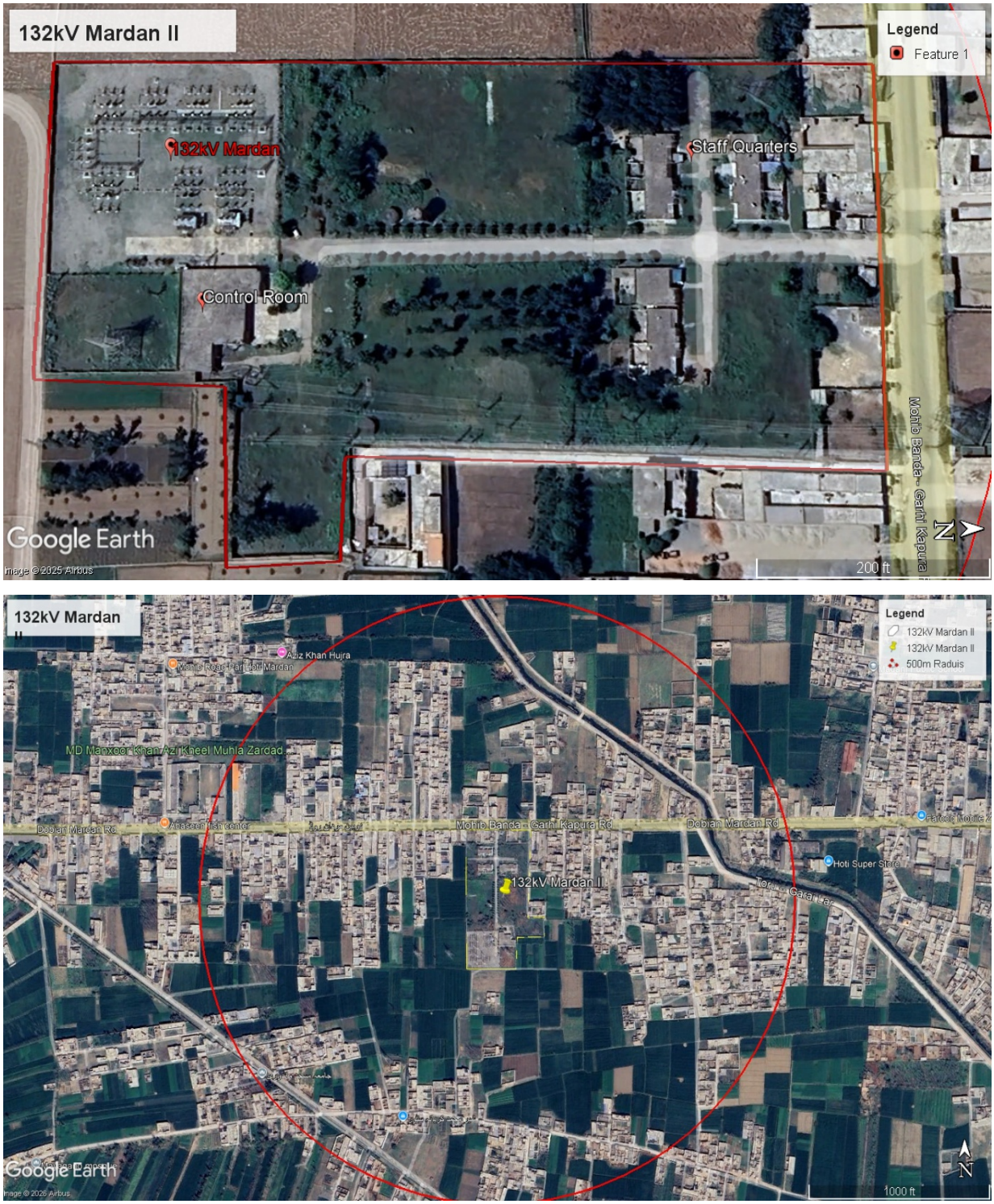

Figure 4-2: 132-kV Mardan-II Grid Station

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Figure 4-3 132-kV Shahibagh Grid Station

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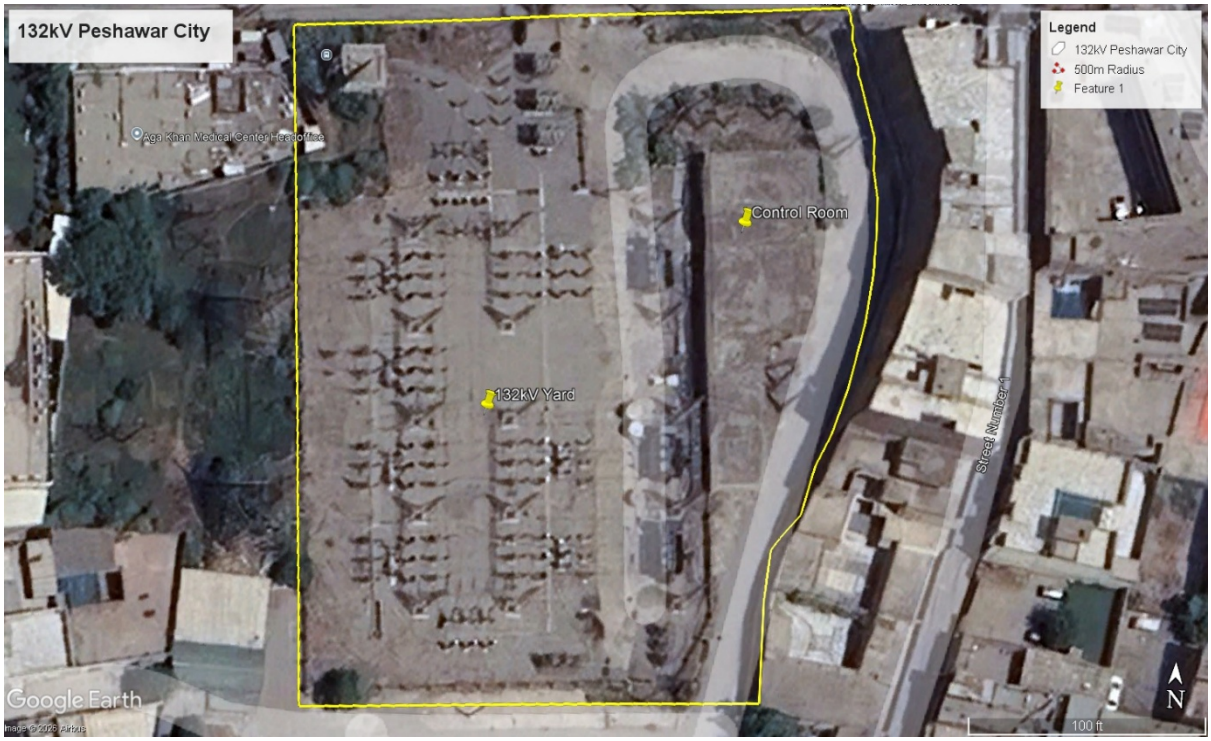

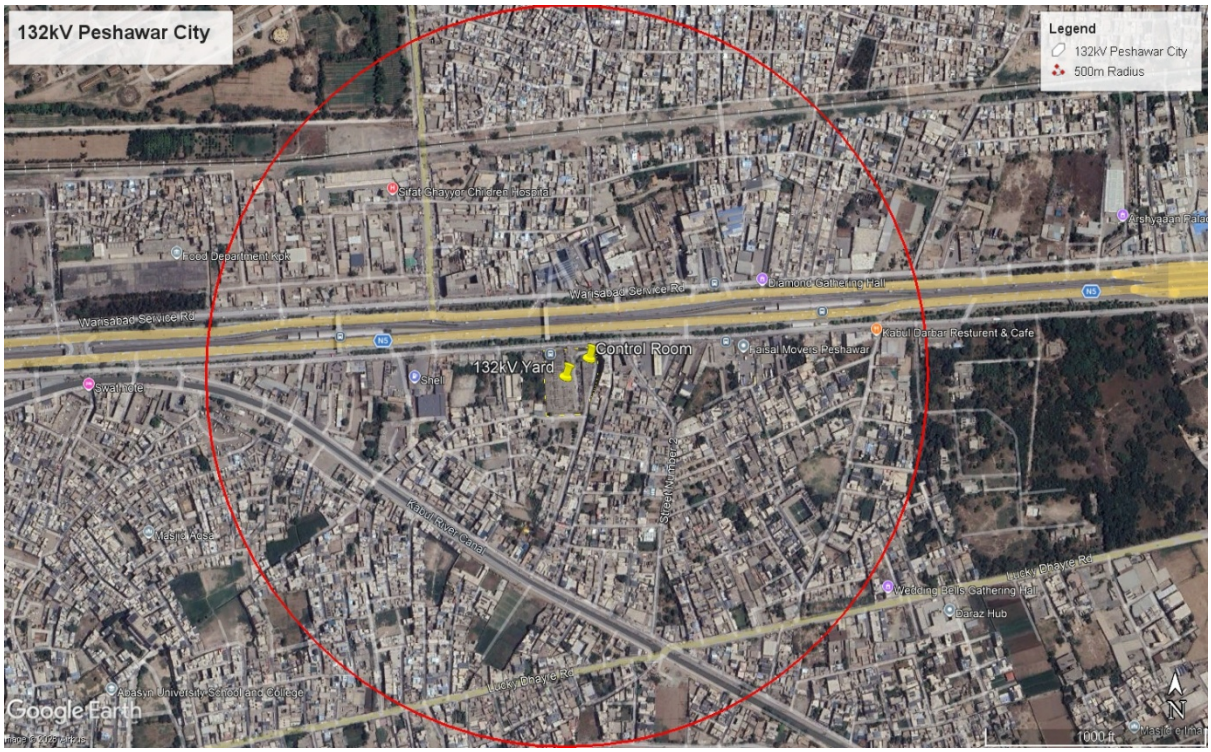

Figure 4-4 132-kV Peshawar City Grid Station

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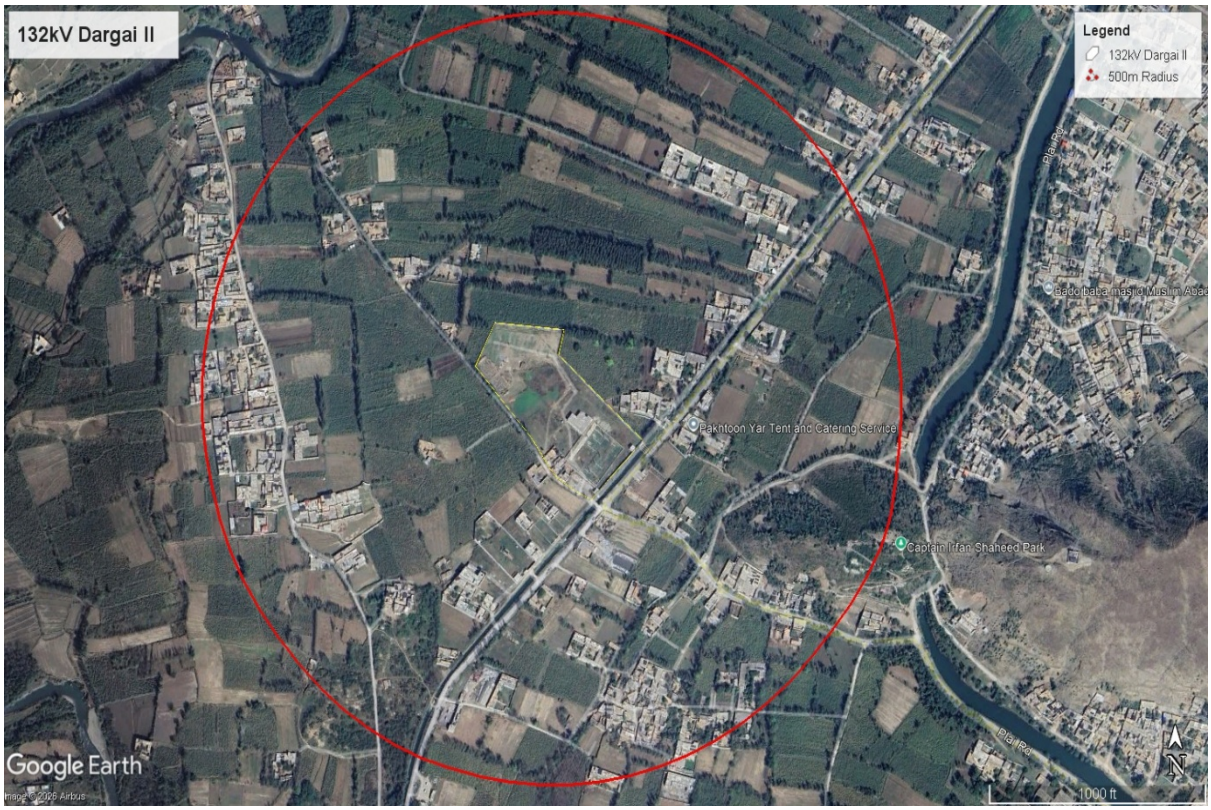

Figure 4-5 132-kV Dargai - II Grid Station

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Figure 4-6 132-kV Pir Bala Grid Station

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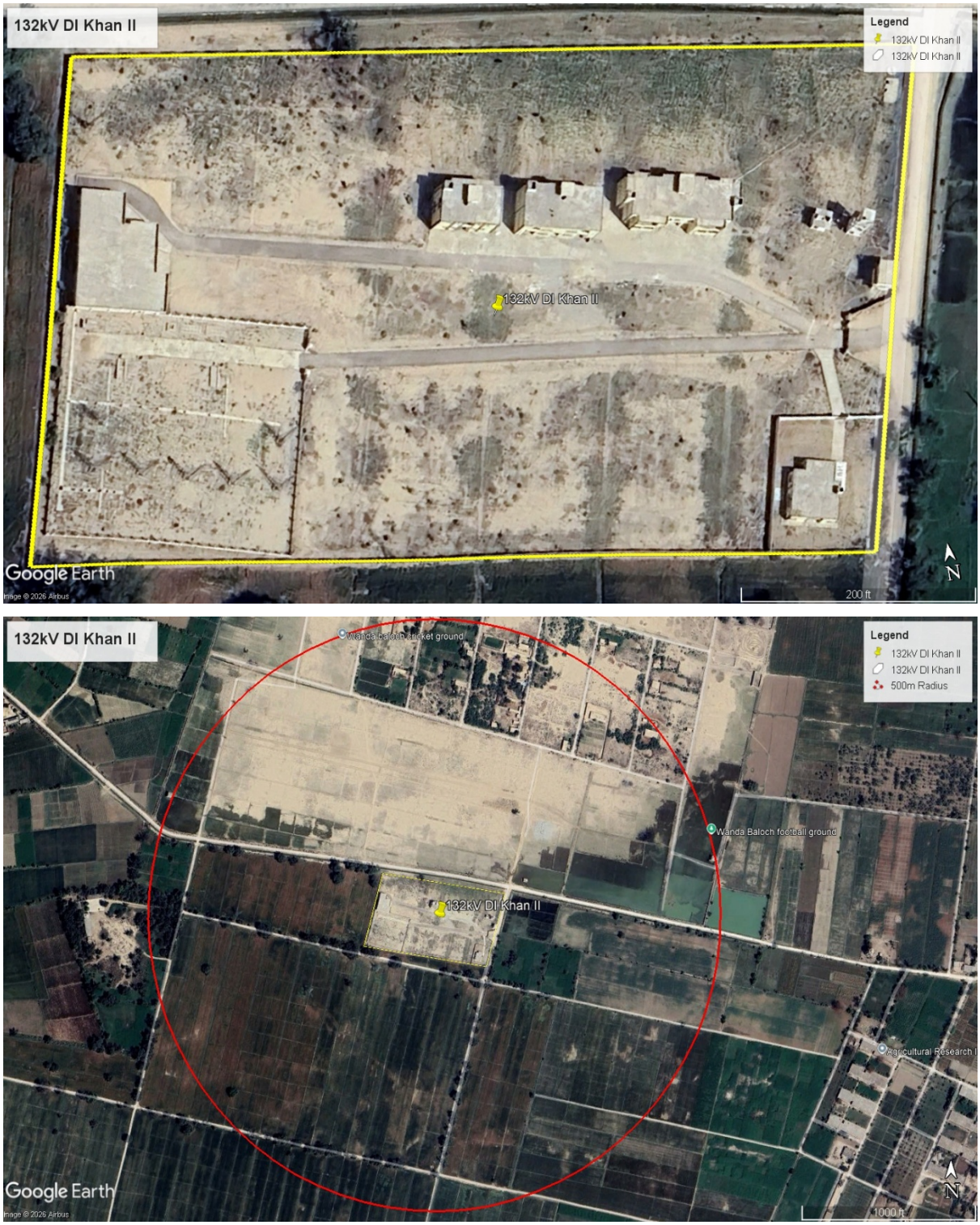

Figure 4-7 132-kV DI Khan - II Grid Station

4.2.2 Augmentation of Grid Stations

The augmentation works will be carried out at the eight existing grid stations under the proposed subproject, as listed in **Table 3-2**. These include 132 kV KDA Kohat GS, 132 kV Jehangira GS, 132 kV Peshawar Cantt GS, 132 kV WAPDA House GS, 132 kV Hussai GS (Mardan), 132 kV Daggar GS (Buner), 132 kV Upper Dir GS, and 132 kV Taru Jabba GS. The total number of augmentation of transformers is nine in eight grid stations, 132 kV Taru Jabba with two

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augmentations. The baseline conditions within and in the vicinity of these grid stations are shown in **Figures 4-8** to **4-15**.

Figure 4-8 132-kV Kohat KDA Grid Station

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Figure 4-9 132-kV Jehangira Grid Station

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Figure 4-10 132-kV Peshawar Cantt Grid Station

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Figure 4-11 132-kV Wapda House Grid Station

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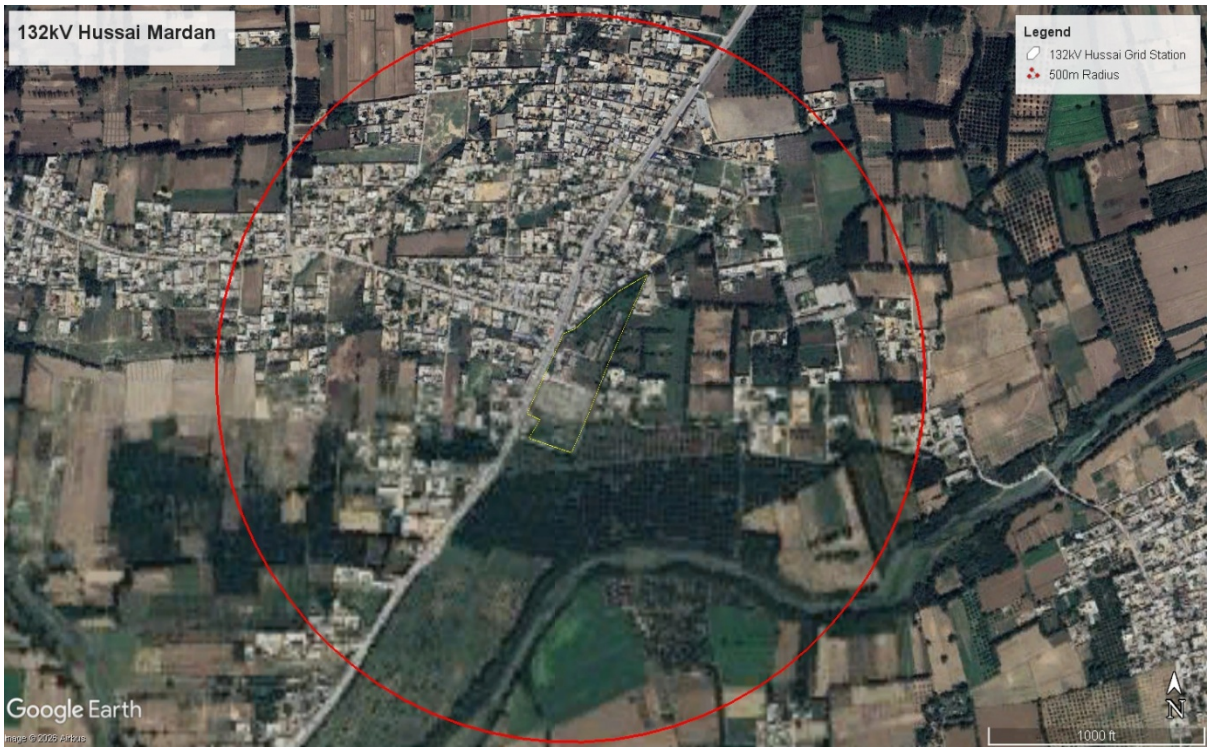

Figure 4-12 132-kV Husai Grid Station

Figure 4-13 132-kV Dagar Grid Station

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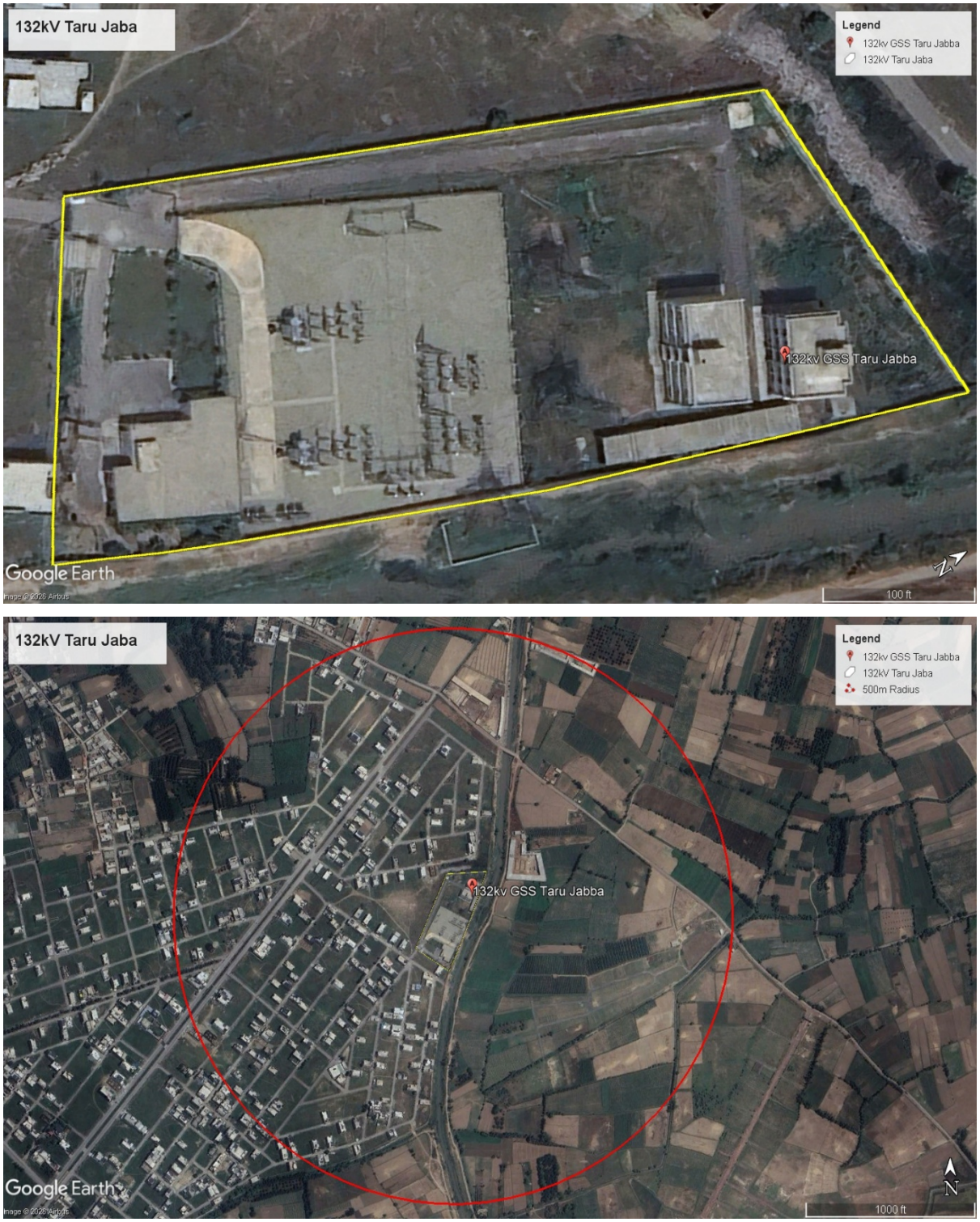

Figure 4-14 132-kV Taru Jaba Grid Station

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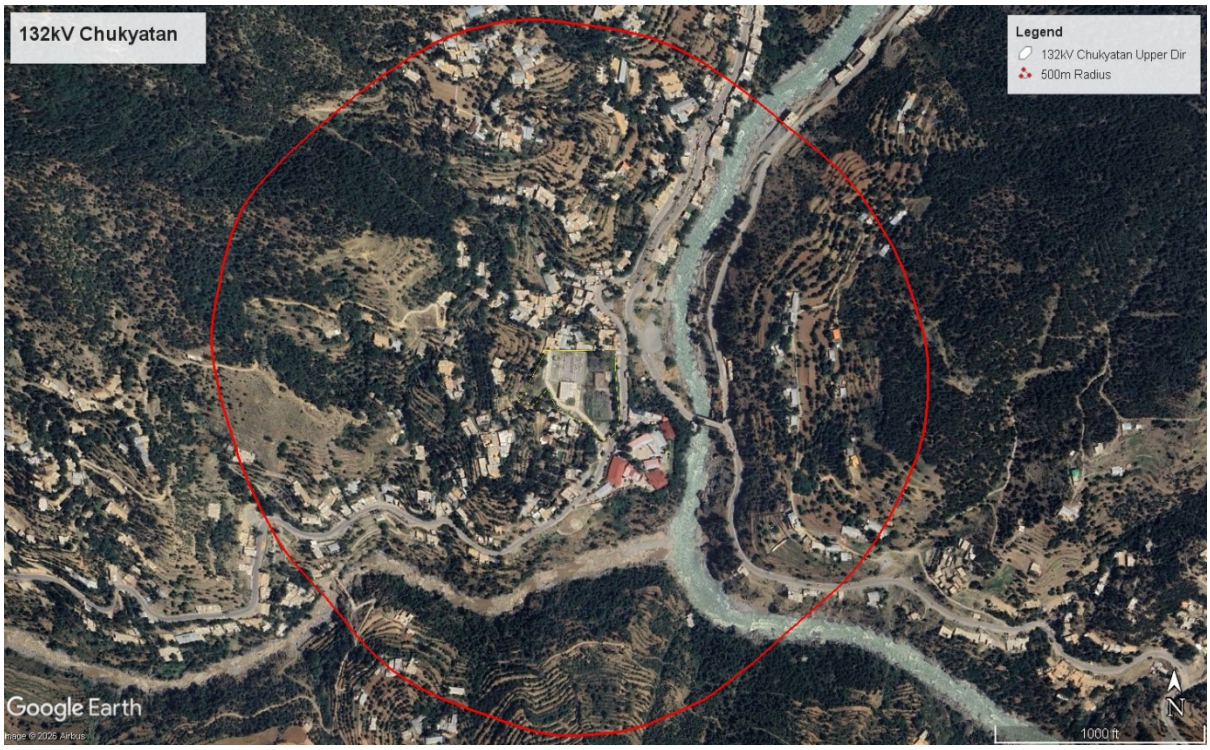

Figure 4-15 132-kV Chukyatan Grid Station

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4.2.3 Installation of Capacitor Banks

The installation of capacitor banks will be carried out at the 17 existing grid stations with a total number of 26 capacitor banks to be installed under the proposed subproject, as listed in **Table 3-2.** The baseline conditions within and in the vicinity of these grid stations are shown in **Figures 4-16** to **4-32**.

Figure 4-16 132-kV DI Khan-II Grid Station

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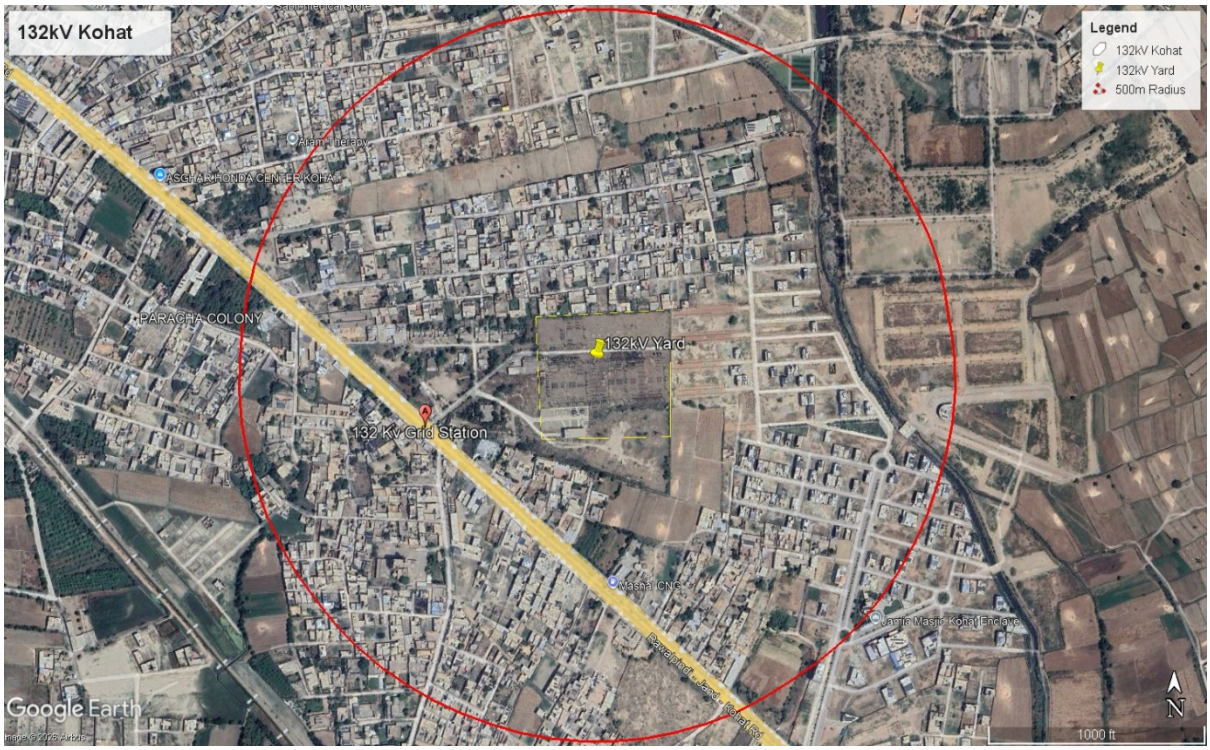

Figure 4-17 132-kV Kohat Grid Station

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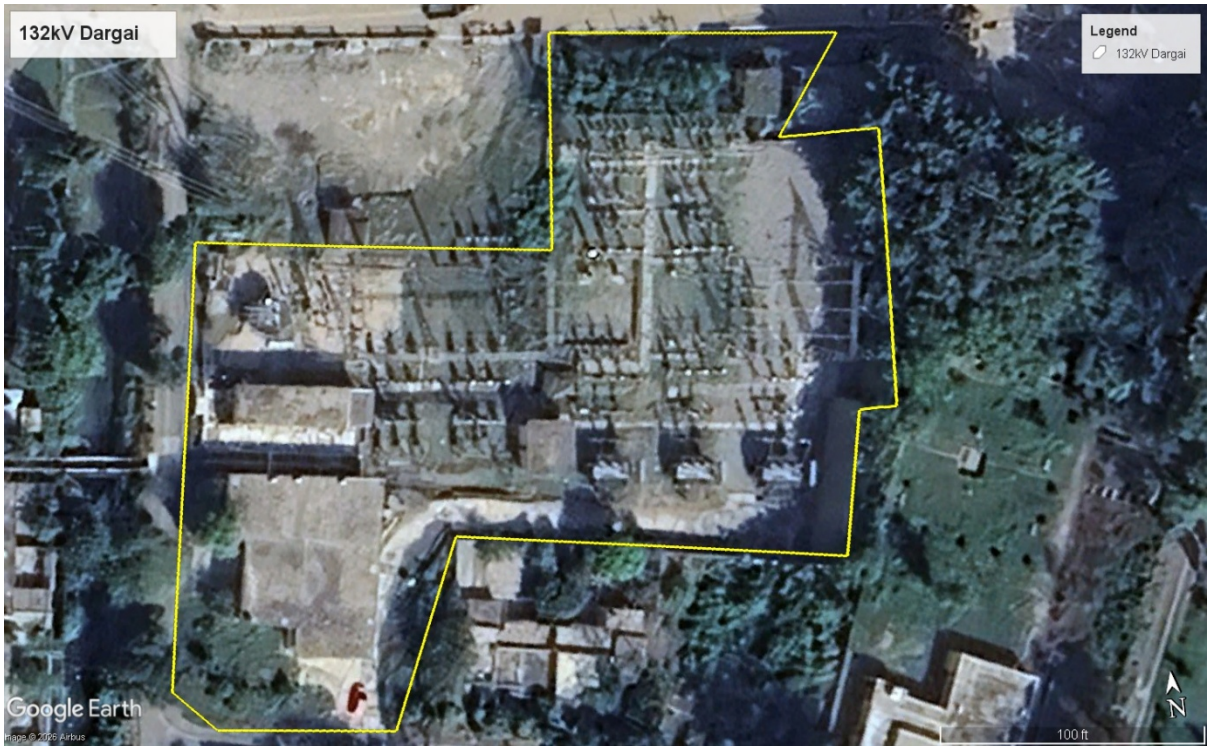

Figure 4-18 132-kV Dargai Grid Station

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Figure 4-19 132-kV Dargai-II Grid Station

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Figure 4-20 132-kV Jalala Grid Station

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Figure 4-21 132-kV Mardan-II Grid Station

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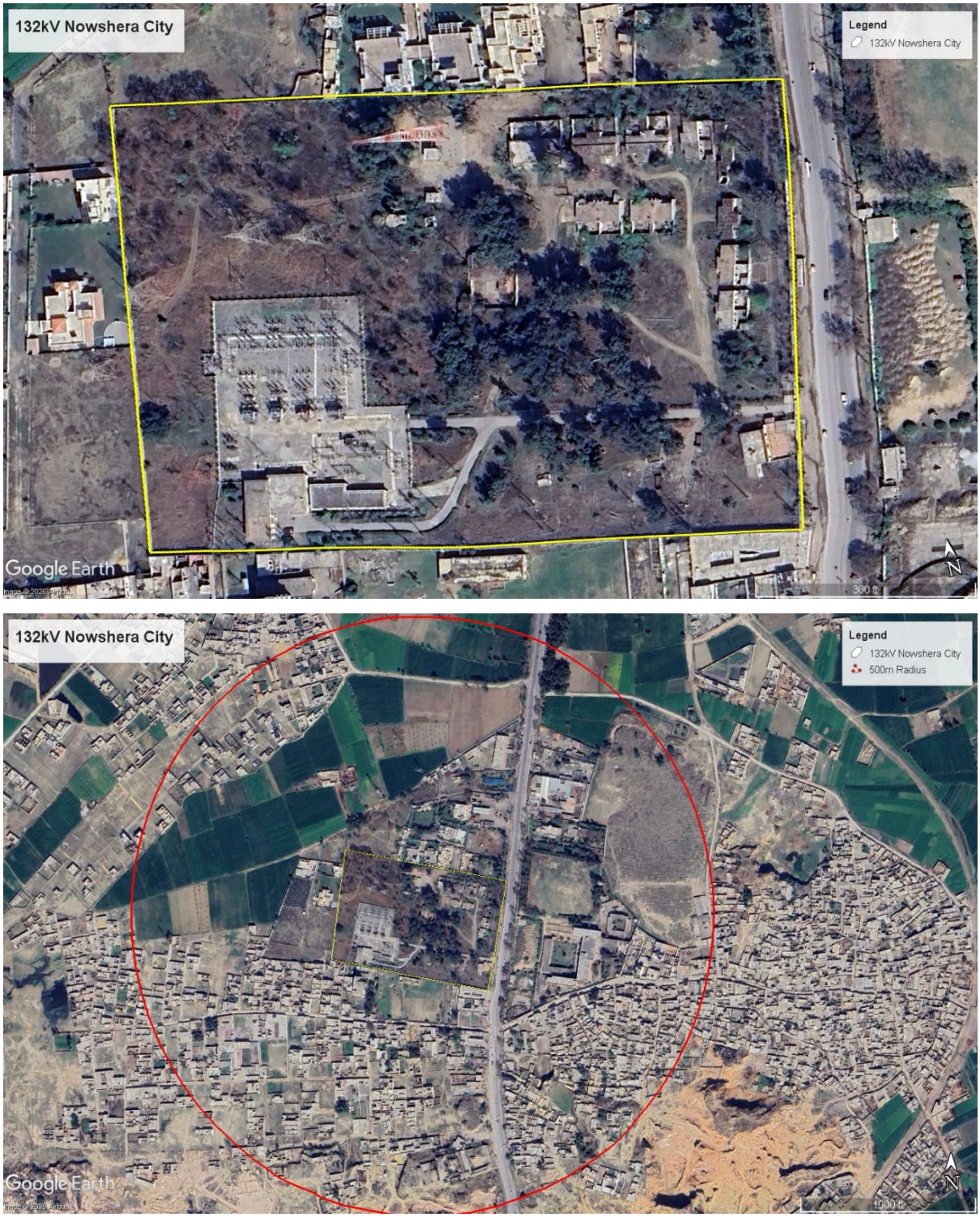

Figure 4-22 132-kV Nowshera City Grid Station

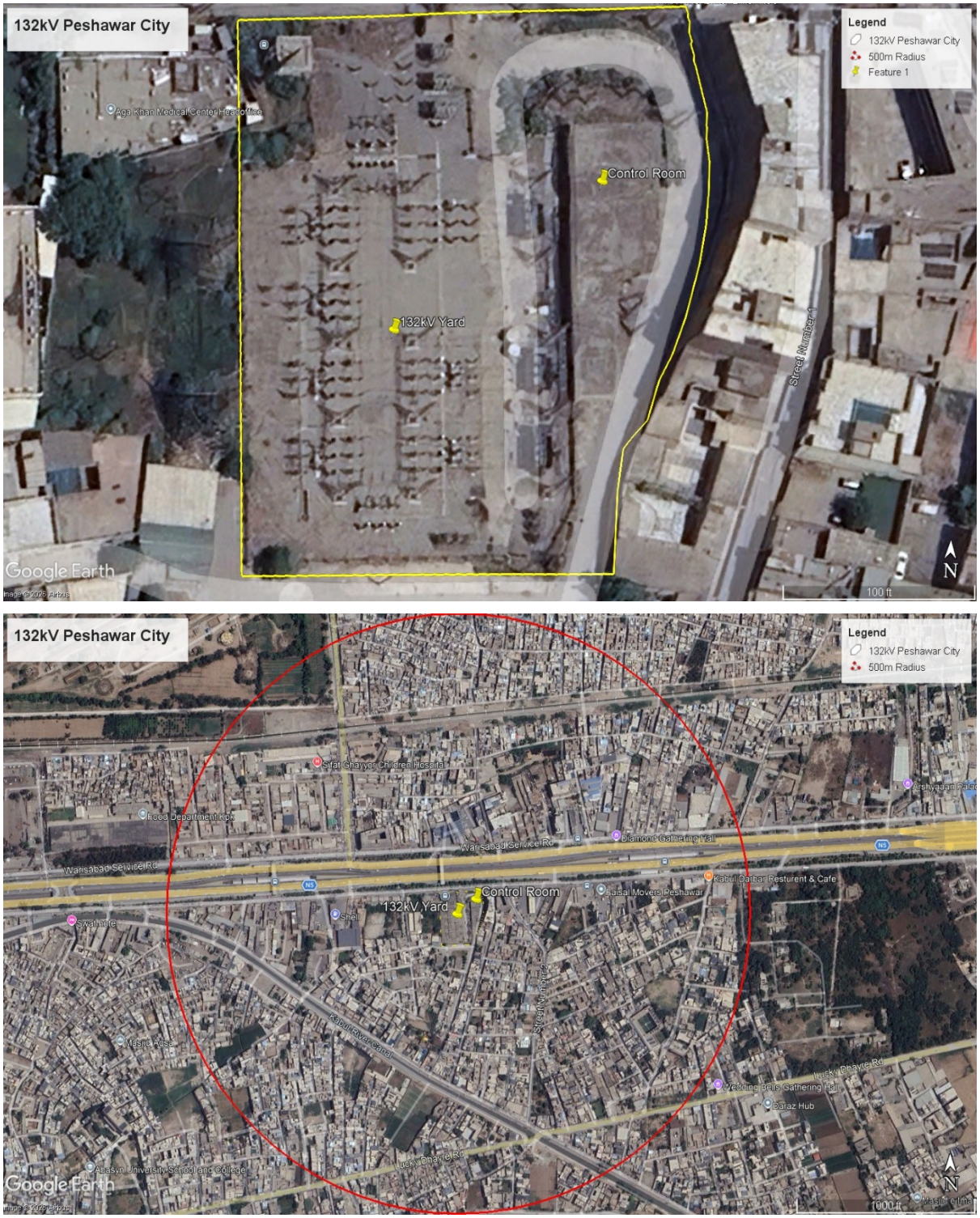

Figure 4-23 132-kV Peshawar City Grid Station

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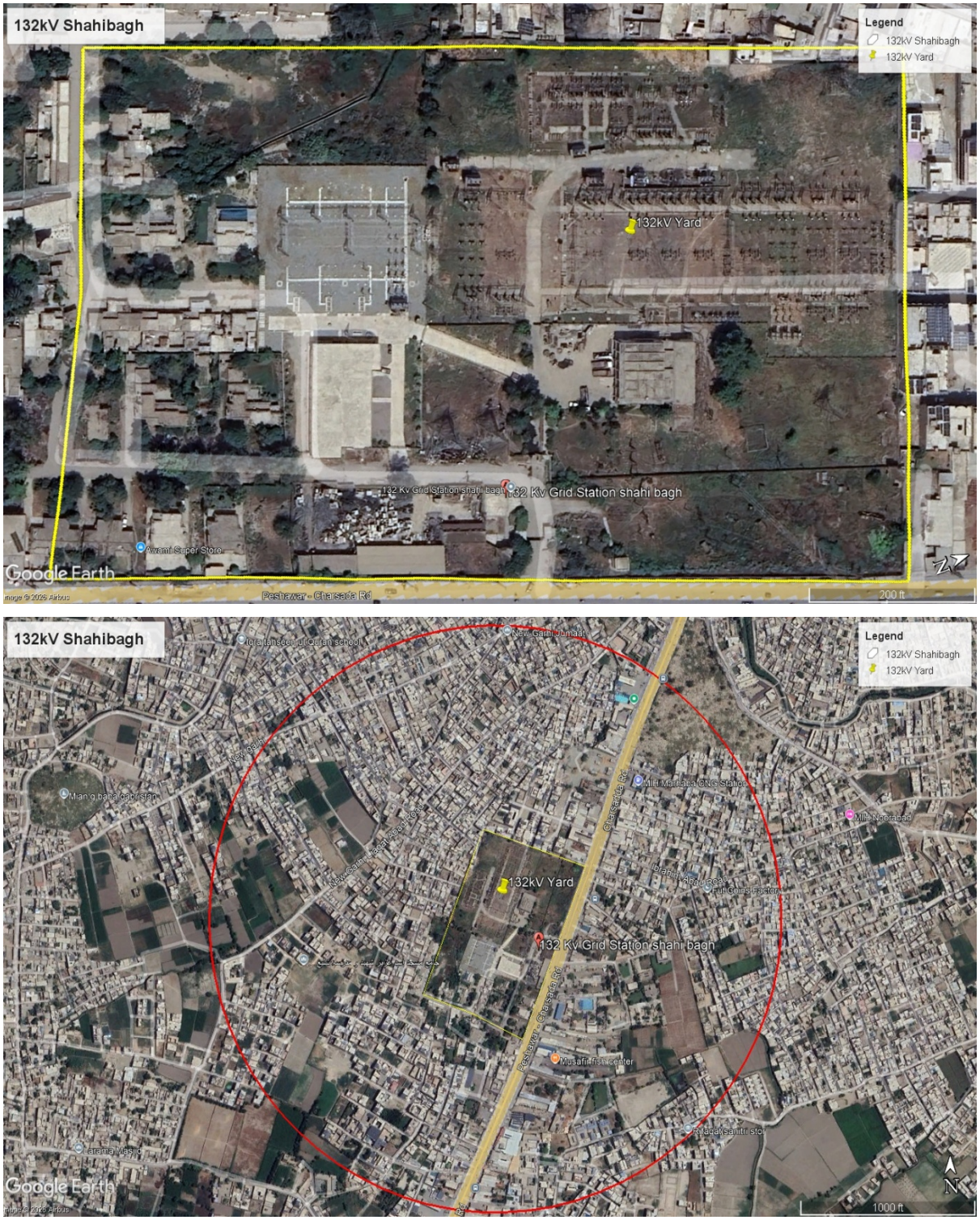

Figure 4-24 132-kV Bagh Grid Station

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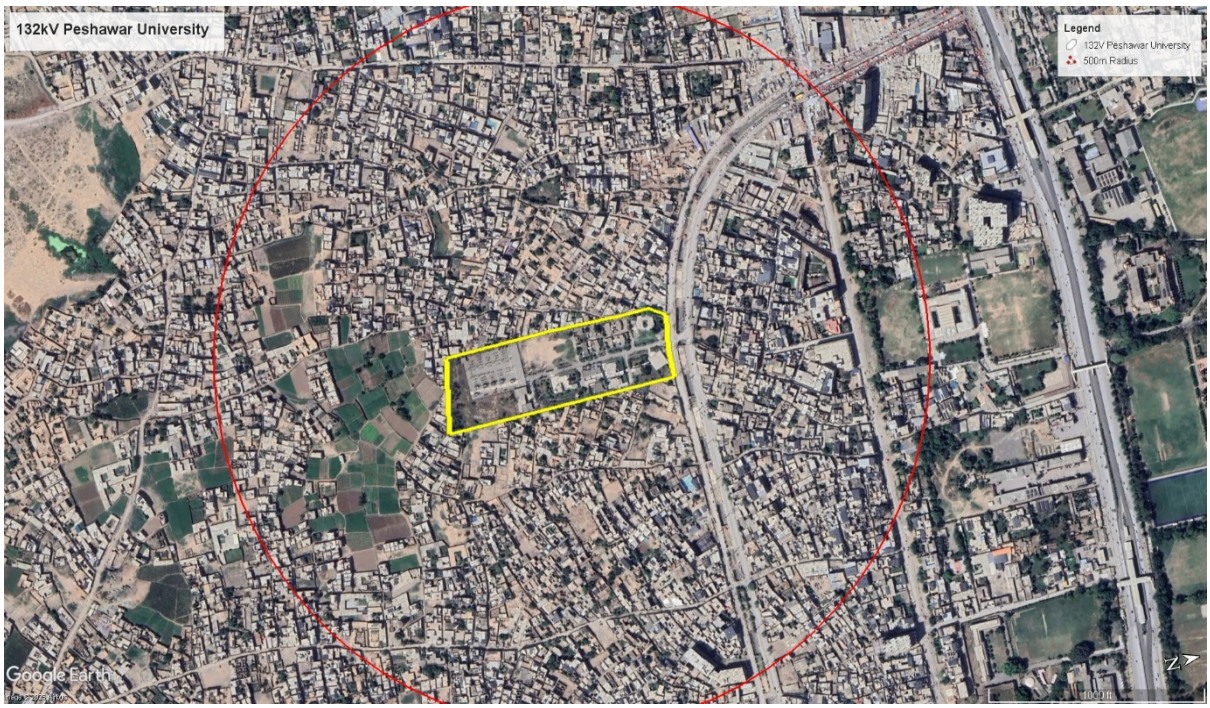

Figure 4-25 132-kV Peshawar University Grid Station

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Figure 4-26 132-kV Peer Bala (Warsak Road) Grid Station

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Figure 4-27 132-kV Jehangira Grid Station

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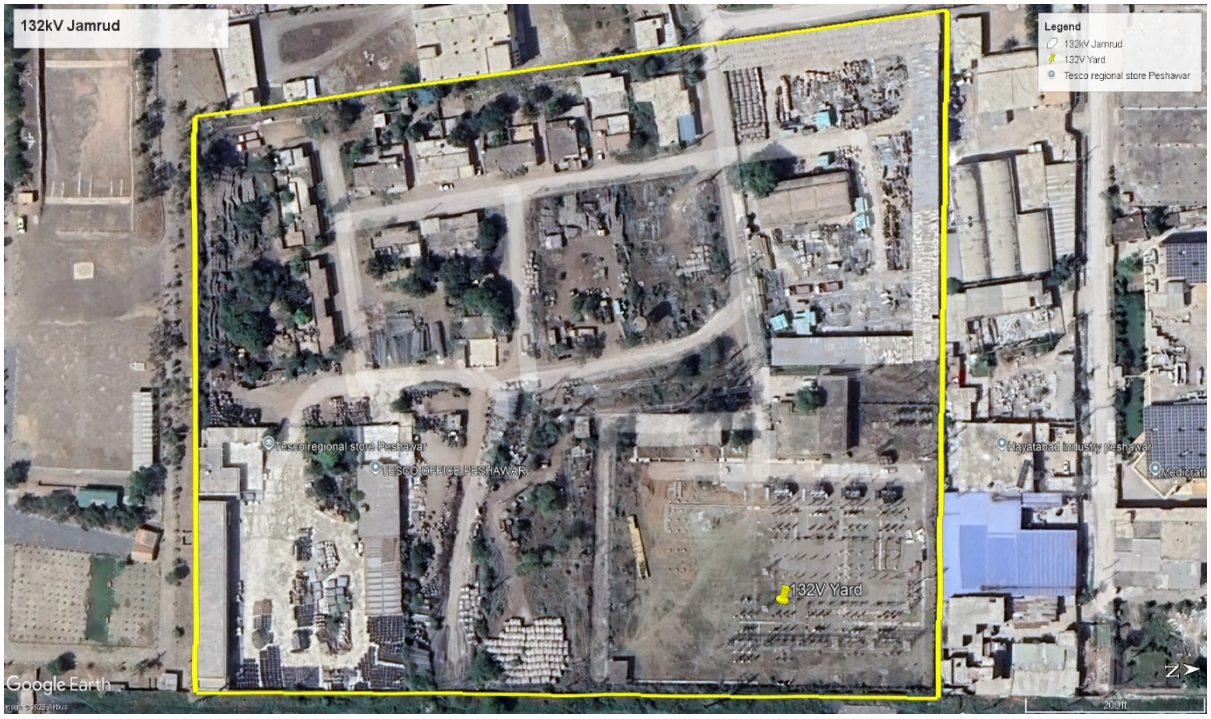

Figure 4-28 132-kV Jamrud Grid Station

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Figure 4-29 132-kV Peshawar Industrial Grid Station

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Figure 4-30 132-kV Rehman Baba Grid Station

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Figure 4-31 132-kV KDA Kohat Grid Station

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Figure 4-32 132-kV Hayatabad Grid Station

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5 Environmental and Social Impact Assessment

This Chapter assesses the potentially adverse environmental and social impacts of the proposed subproject. Also provided in the Chapter are the recommended mitigation measures to minimize if not eliminate the potentially adverse impacts.

5.1 Potential Impacts of Proposed Subproject

The E&S impact assessment, the most important element of this ESMP, was carried out after conducting the E&S Scoping, discussed in **Section 1.5**. These impacts along with the mitigation measures are presented in **Table 5-1**.

Table 5-1: Summary of Potential Impacts and Mitigation Measures

Impacts	Likely Causes for Proposed Subproject	Mitigation Measures
Construction Phase		
Soil Erosion and Degradation	Excavation and construction activities, running of vehicles on unpaved roads	• Construction camp will be located in a stable and flat area, requiring minimal de-vegetation and leveling. The contractor(s) will obtain approval from the Project Implementation and Management Support Consultants (PIMSC) for this purpose. • Embankments and excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken per the design (eg, stone pitching). • Vehicular traffic on unpaved roads will be avoided as far as possible. Operation of vehicles and machinery close to the water channels, water reservoir will be minimized. • After the completion of the construction works, the work sites, the transmission line routes campsites will be completely restored. No debris, surplus construction material or any garbage will be left behind. • Photographic record will be maintained for pre-project, during-construction and post-construction condition of the sites (grid station, transmission line, camps). • Vehicles and equipment will not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination. • The domestic sewage from the construction camps will be connected to the city sewerage system. If such system is not available, appropriate treatment and disposal system, such as septic tanks and soaking pits, will be constructed having adequate capacity. The contractor(s) will submit to the PMISC the plans for the camp layout and waste disposal system, and obtain approval. • Waste oils will be collected in drums and sold to the recycling contractors. • The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) will be sold to recycling contractors. The hazardous waste will be kept separate and handled according to the nature of the waste. • Domestic solid waste from the construction camp will be disposed in a manner that does not cause soil contamination. The

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Impacts	Likely Causes for Proposed Subproject	Mitigation Measures
		waste disposal plan submitted by the contractor(s) will also address the solid waste.
Air quality deterioration	Operation of construction machinery and vehicles	■ Construction camps will be established at least 500 m from communities (except when such camps are established inside the grid stations, in which case a safe distance will be maintained between the residential colony and the construction vamps and other contractor's facilities). The contractor(s) will obtain PMISC's approval for this purpose, as mentioned earlier. ■ Construction machinery, generators and vehicles will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions. ■ Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil, where required and appropriate. The waste water from kitchen and washing area of the construction camp may be used for water spraying. ■ Project vehicles will avoid passing through the communities and cultivation fields as far as possible. If unavoidable, speed will be reduced to 15 km per hour to avoid excessive dust emissions. ■ While working within the communities for transmission line works, coordination with the communities will be maintained to minimize any detrimental impacts on the crops and settlements. ■ Ambient air quality analysis will be carried out at the grid station sites during the construction phase. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.
Surface Water and Groundwater Contamination	Release of contaminated water/effluents from construction sites and camps	■ The mitigation measures for soil contamination described earlier will also address surface water and groundwater contamination. ■ The contractor(s) will submit to the PMISC the plans for the camp layout and waste disposal system, and obtain approval. ■ Construction debris or any other solid wastes or untreated waste effluents will not be disposed-off in water bodies.
Blocked Access	Off-road movement of vehicles	■ Efforts will be made to avoid any impacts on the local roads, routs, and accesses. ■ In case of the blockage of the existing routes, alternate routes will be identified in consultation with the affected communities. ■ The contractor will prepare and implement a traffic management plan to minimize impacts on the local routes, where needed. ■ Community liaison will be maintained throughout the construction phase. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.
Noise and Vibration	Operation of construction machinery and vehicles	■ It will be ensured that the noise levels measured at the communities near the project sites are kept within the acceptable limits (70 dB(A) for industrial zones day and night; 45 dB(A) night and 55 dB(A) daytime for residential areas). ■ Noise levels will be measured at the key locations such as at the Staff Colony in grid stations and sensitive receptors. If

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Impacts	Likely Causes for Proposed Subproject	Mitigation Measures
		the noise levels are found to be more than the prescribed limits, appropriate measures will be undertaken by the construction team such as rescheduling the works, using quieter equipment and/or erecting barriers to protect the communities from excessive noise. ■ Vehicular traffic through the communities will be avoided as far as possible. Project routes will be authorized by the PIMSC. ■ Vehicle speeds will be kept low, and horns will not be used while passing through or near the communities. ■ Vehicles will have exhaust silencers to minimize noise generation. ■ Nighttime traffic will be avoided near the communities, as far as possible. ■ Movement of all project vehicles and personnel will be restricted to within work areas, to avoid noise disturbance. ■ Working hours for construction activities will be limited to between 8 am and 6 pm (between 6 am and 8 pm during the summers). ■ Liaison with the community will be maintained. Grievance redressal mechanism will be put in place to address the community complaints. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.
OHS Hazards	Risks associated with construction works, construction machinery, working at heights and confined spaces, electrocution risk.	■ The contractor will prepare and implement occupational and community health and safety (OCHS) plan, in accordance with the WB ESF, World Bank Group's Environment, Health and Safety Guidelines as well as World Health Organization (WHO) Guidelines, ILO Code of Practice and any internationally recognized OHS standard such as ISO 45001 or US OSHA 29 CFR 1926 or any standard specifically mentioned in the bidding documents. The Plans will include organization hierarchy/change of command for OHS management, applicable safety standards and protocols, requirements of job hazard analysis, training requirements, documentation and reporting mechanism. ■ All construction works will be executed in accordance with the OCHS management plan and appropriate safety standards. Adequate monitoring and equipment will be available as needed. ■ Contractor will be required to depute adequate number of OHS supervisors and inspectors at the site on fulltime basis. ■ The construction sites will have protective fencing to avoid any unauthorized entry. ■ The project drivers will be trained for defensive driving skills. ■ Vehicular speeds near/within communities will be kept low to minimize safety hazards. ■ Firefighting equipment will be made available at the camps and at worksites. ■ The camp staff will be provided OCHS training. ■ All safety precautions will be taken to transport, handle and store hazardous substances, such as fuel.

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Impacts	Likely Causes for Proposed Subproject	Mitigation Measures
		■ Liaison with the community will be maintained. In particular, the nearby communities will be informed before commencing the testing commissioning of the system. Awareness raising program will be implemented to educate the communities regarding the hazards associated with the transmission lines, feeders and other electrical systems/equipment. Warning signs will be used at the appropriate locations. ■ Contractor will provide and maintain adequate hygienic kitchens which are sheltered and separated from the living quarters. Kitchens will include raised and washable surfaces suitable for food preparation. ■ Contractor will maintain hygienic and comfortable living conditions in accordance with the relevant labor laws and ILO conventions. ■ Contractor will ensure the provision of first aid facility at construction site and camps through hiring medics and establishing a dispensary at the campsite. ■ Reasonable number of first aid kits will be made available on construction sites and within contractor camps. ■ Site personnel will be provided appropriate type of personal protective equipment (PPE). Contractor will ensure consistent use of PPE by all site personnel. ■ Adequate and reliable supply of safe drinking water will be made available at readily accessible and suitable places including at all camps.
Community health and safety issues	Risks associated with construction works, construction machinery, electrocution risk, vehicular traffic hazards, improper waste disposal, exhaust emissions.	■ OCHS Management Plan will be strictly implemented ■ The construction area will be barricaded to prevent unauthorized access ■ Warning signs will be placed where appropriate ■ The construction camps will have septic tanks and soaking pits of adequate size, if appropriate/required. ■ The construction camps will have appropriate solid waste disposal mechanism ■ The construction camps and site offices will have first-aid kits. ■ The construction crew will be medically screened and provided awareness for the transmissible diseases (such as human immunodeficiency virus - HIV/ acquired immunodeficiency syndrome - AIDS, hepatitis B and C). ■ Guidelines for SEA/SH, gender-based violence (GBV) and violence against children (VAC) will be implemented ■ Liaison with the community will be maintained. In particular, the nearby communities will be informed before commencing the construction works and testing commissioning of the system. Awareness raising program will be implemented to educate the communities regarding the hazards associated with the transmission lines, feeders and other electrical systems/equipment. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.

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Impacts	Likely Causes for Proposed Subproject	Mitigation Measures
Influx of Labor	Risks associated with influx of labor from other parts of the country	■ Code of conduct (CoC) for workers and employees will be enforced for the protection of local communities, gender-based violence, other social issues, flora and fauna and a ban on tree cutting and hunting. Any violation of the CoC would lead to strict punishment including termination of employment; ■ Awareness among workers will be created on proper sanitation and hygiene practices to ensure proper health; ■ Good housekeeping practices will be maintained at project site(s); ■ Adequate personal hygiene facilities will be provided in good condition with adequate supply of clean water; ■ Arrangements will be made to treat the affected workers on time to control the movement of vectors diseases; ■ Workers and surrounding communities will be sensitized on awareness and prevention of HIV/AIDS and sexually transmitted infections (STIs) through training, awareness campaigns and workshops; ■ Free HIV/AIDS and STI screening and provided for site workers ■ Counselling sessions will be held to made the workers award of the risks of HIV/AIDs and STI; ■ Any employees, who continues misconduct or lack of care, carry out duties amateurishly or inattentively, fail to conform to provisions of the contract, or persist in any conduct which is harmful to safety, health, or the protection of the environment, will be terminated; ■ The use of drugs and alcohol will not be allowed at the work/construction site; ■ Carrying weapons into the workplace premises will be prohibited; ■ Appropriate site security arrangements will be made at all construction sites and temporary facilities; appropriate fencing, security check points, gates and security guards will be provided at the construction sites to ensure the security of equipment, machinery and materials, as well as to secure the safety of site staff; ■ Contractor will create awareness of construction crew to sensitize them about security situation in subproject area; ■ Contractor will ensure that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft; ■ To avoid conflicts with local people on employment matters, it is recommended to the contractor to employ the locals in skilled, semi-skilled, and unskilled work. This will reduce pressure on resources such as residential and health facilities; ■ The contractor will proactively manage the potential impacts from labor influx and potential cultural conflicts between local communities and workers, which include following:

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Impacts	Likely Causes for Proposed Subproject	Mitigation Measures
		■ The Contractor's regular training program will cover topics related to respectful attitude while interacting with the local communities; ■ Inclusion of CoC obligations and the applicable legislation will be ensured in the contracts of all employees and workers with the provision of sanctions and penalties in case of violations; ■ World Bank Guidelines on Influx of labor[13] will be used for further guidance.
Gender Issues	Presence of migrant labor	■ PESCO will prepare and implement a Gender Action Plan (GAP). ■ The routes/places used by the women of the surrounding areas will be avoided as far as possible. If unavoidable, alternate routes to be identified for the communities, if required, especially along routes frequented by women folk, such as route to the local well or water source. ■ Construction crew will avoid in entering villages and settlements. ■ Communities will be informed and consulted before commencing works inside or near the communities. ■ Strict code of conduct will be maintained by the construction crew. Local norms will be respected. ■ WB guidelines on GBV and Influx of Labor will be implemented. ■ PIMSC will identify additional mitigation measures for the sensitive receptors as needed.
Child labor	Employment of below age workers	■ the provisions of the Child Labor Act will still be made part of the construction contracts ■ It will be ensured that no child labor is employed at any of the work site or camp site.
Resistance from Community	ABC and Smart Meter (AMI) installation works	■ Stakeholder consultation and engagement to be carried out on an on-going basis ■ GRM to be established ■ Community awareness to be enhanced for project activities such as ABC and AMI works and their importance ■ Community liaison to be maintained throughout the various phases of the subproject ■ The trade associations/local representatives will be involved to convince the local communities.
O&M Phase		
Soil and water Contamination	Maintenance activities, disposal of transformer oils and other wastes	■ The grid stations will have appropriate solid waste collection and disposal arrangements. ■ The grid stations will have appropriate sewage handling system. The grid stations' sewage collection system will be connected to the Municipality operated sewerage system, if available. Otherwise, grid stations will have their own septic tanks and soakage pits. ■ Waste oils and chemicals will be disposed in accordance with their respective Material Safety Data Sheet (MSDS).

[13] http://pubdocs.worldbank.org/en/863471511809509053/ESS2-FactSheet-WB-ESF.pdf

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Impacts	Likely Causes for Proposed Subproject	Mitigation Measures
		MSDS will be made available at the grid stations and maintenance workshops. ■ Non-toxic recyclable waste (such as cardboard) will be given away for recycling. ■ Toxic waste will be stored separately, and provided to the Municipality for safe and appropriate disposal. ■ Grid stations will have channels and drainage pits to collect any leaked oil from the transformers in the grid stations. This oil will be sent back to the workshop for recycling. ■ Any soil contaminated by the oil/chemical spillage will be removed and disposed-off appropriately in accordance with the MSDS of the spilled oil/chemical.
OHS hazards	O&M activities on live equipment, working at heights	■ PESCO will implement the Safety Code prepared by the National Electric Power Regulatory Authority (NEPRA) and its own OHS Management System. ■ O&M staff will be provided essential protective gears and equipment. ■ O&M staff will be provided regular safety training. Refresher courses will be arranged on regular basis. ■ Firefighting equipment will be made available at the grid stations. ■ The Emergency Response Plan (ERP), prepared by PESCO, will be made available at each grid station. Its salient points will be displayed at prominent places within each grid station. The O&M staff will be given training on the ERP. The E&S team will review the ERP and with respect to the environmental and social considerations, and recommend changes if needed. The ERP will include procedure to inform the nearby communities in case of fire in the grid stations. ■ The communities near the grid stations and transmission lines will be educated on the risk of electrocution, and how to avoid accidents. ■ Appropriate signage on safety precautions will be installed at the key locations. ■ The trees under the transmission lines will be regularly trimmed in order to maintain 8 m clearance.
Public Health Concerns	Electrocution risk; EMF radiation; health concerns for nearby population	■ Separation of live parts and pubic property/other structures/trees will be maintained ■ Community liaison will be maintained to raise the public awareness about electrocution risks ■ Solid waste and waste effluents from the grid stations will be treated/ managed appropriately.
Gender Mainstreaming	Gender mainstreaming needs to be carried out in PESCO	■ Gender mainstreaming will be encouraged in PESCO. Employment opportunities will be created for women. Women friendly work environment will be established within PESCO facilities (e.g., separate toilets, system to address sexual harassment).

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6 Environmental and Social Management

This Chapter describes the mechanism for implementing the mitigation measures discussed in **Chapter 5**. The Chapter includes the institutional arrangements, monitoring requirements, documentation and reporting requirements and also a training plan.

6.1 Institutional Arrangements

PESCO will be responsible for the overall management, supervision, and execution of the project through the Project Management Unit (PMU). A full-time Project Director (PD) has been appointed to head the PMU.

The overall responsibility of E&S performance, including ESMP implementation, will rest with the PMU. PESCO has an existing Environmental and Social Unit (ESU), which needs to be fully staffed for the E&S management of the proposed subproject.

Details of environmental and social staff associated with various consultants and contractors that may be engaged under the project are summarized below.

- **Environmental and Social Staff in PMU.** The ESU of PMU needs to include the following staff:
  - A Manager, Environmental and Social
  - two Assistant Managers (one environment, and one social)
  - An OHS specialist
  - A gender specialist
- **PIMSC**: The PIMSC will be responsible for (i) carrying out detailed engineering designs of the subprojects under EDEIP; (ii) construction supervision of these subprojects; (iii) preparation of E&S documents for EDEIP subprojects including this ESMP; (iv) implementation supervision of this ESMP (and other E&S documents/plans). The consultants will have adequate environmental, social, health and safety specialists to carry out the above tasks.
- **Contractors:** Construction contractors will also have adequate environmental, health and safety specialists to implement this ESMP.

The roles and responsibilities of PMU's E&S staff and consultants for E&S management of the Project are given in **Table 6-1**.

Table 6-1: Roles and Responsibilities for E&S Management

Organizations	Responsibilities
PMU	• Ensure that all project activities are well-managed and coordinated. • Procurement of works and goods. • Payment of compensation to the project affected households • Overall E&S management of the subprojects under EDEIP (including the proposed subproject)
E&S Staff within PMU	• Reviewing consultants' deliverables related to E&S assessment, reviewing bid documents for inclusion of ESMP measures, supervising construction activities, producing periodic monitoring reports, • Supervising PIMSC for the implementation of ESMP including mitigation measures

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Organizations	Responsibilities
	• Carry out direct monitoring of key aspects such as OCHS and GRM • Closely coordinate with other concerned agencies including EPA, local governments, and communities to support the implementation of ESMP.
PIMSC	• Prepare detailed engineering designs for subprojects • Supervise civil works, ensuring compliance with all design parameters including quality requirements • Prepare ESMP, and other E&S documents • Ensuring inclusion of ESMP in bidding documents • Supervise ESMP implementation during construction • Prepare monthly E&S reports and submit to PMU • Support the E&S staff of PMU in carrying out their responsibilities • Providing training on ESMP principles and requirements to contractors, field staff, and others as needed to ensure effective implementation of ESMP • PIMSC will have dedicated environmental and social staff.
Contractor	• Prepare Contractor-ESMP (C-ESMP) with site-specific mitigation measures. • implementation of mitigation and monitoring measures proposed in the ESMP • Each contractor will depute adequate number of Environmental, Health, and Safety personnel fulltime at the site, who will be responsible for implementing the contractors' environmental, health and safety responsibilities, and liaising with government agencies.

6.2 Inclusion of ESMP in Contract Documents

PESCO will include the following Environmental, Social, Health and Safety (ESHS) conditions in the bidding documents to ensure all the mitigation measures proposed in the ESMPs are effectively implemented:

- Past performance of the Contractor on ESHS aspects including sexual exploitation and abuse and gender-based violence;
- ESHS Staff with the Contractor;
- Mitigation measures to address construction impacts (as given in ESIA/ESMP);
- Payments for implementation of ESHS measures;
- Preparation of C-ESMP before site mobilization and its implementation during construction to manage the ESHS risks;
- Code of Conduct of Contractor's personnel.

6.3 Environmental and Social Management During Construction

6.3.1 Environmental Code of Practices (ECoP)

The ECoPs provide guidelines for E&S matters to be followed by the contractors for sustainable management of all E&S issues. These ECoPs have been prepared based on the experiences in the construction of projects, including World Bank-funded projects in Pakistan and also in conformity with the World Bank Group's (WBG's) Environment, Health and Safety Guidelines and also Good International Industry Practice. The ECoPs are presented in **Annex A** and will be included in the bidding documents to ensure their implementation.

The list of ECoPs prepared for the subproject is given below.

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- ECoP 1: Waste Management
- ECoP 2: Fuels and Hazardous Goods Management
- ECoP 3: Water Resources Management
- ECoP 4: Soil Quality Management
- ECoP 5: Erosion and Sediment Control
- ECoP 6: Air Quality Management
- ECoP 7: Noise and Vibration Management
- ECoP 8: Road Transport and Road Traffic Management
- ECoP 9: Labor Influx Management and Construction Camp Management
- ECoP 10: Cultural and Religious Issues
- ECoP 11: Workers Health and Safety

6.3.2 Construction Stage Mitigation and Monitoring Plan

The mitigation and monitoring plan (MMP) for the construction stage impacts have been prepared on the basis of the impact assessment covered under **Chapter 5.** The MMP is presented in **Table 6-2**. This plan is subproject-specific, and to the extent possible, site-specific, however, contractors will be required to carry out further detailing of the key aspects, to prepare site-specific management plans as part of C-ESMP before commencing the construction activities.

6.3.3 Contractor's ESMP (C-ESMP)

The contractor will be required to prepare, obtain approval from PIMSC and then implement the C-ESMP (separately for each component of the proposed subproject) during the construction phase. The C-ESMP will be prepared on the basis of construction stage MMP and ECoPs, and will consist of subplans on the key E&S aspects including camp management, traffic management, OHS management, CHS management, pollution management, air quality and noise management, water resource management, spills and leakages, waste management, hazardous substance management and others. The C-ESMP will be site- and subproject-specific and will be prepared on the basis of the prevailing conditions at the construction sites and their surroundings, contractor's plans and construction methodology.

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Table 6-2: Mitigation and Monitoring Plan for Construction and O&M Phases

Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
Construction Phase Impact				
Soil Erosion and Degradation	Excavation and construction activities, running of vehicles on unpaved roads or tracks	• Construction camp will be located in a stable and flat area, requiring minimal de-vegetation and leveling. The contractor(s) will obtain approval from the PIMSC for this purpose. • Embankments and excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken per the design (eg, stone pitching). • Vehicular traffic on unpaved roads will be avoided as far as possible. Operation of vehicles and machinery close to the water channels, water reservoir will be minimized. • After the completion of the construction works, the transmission line routes, campsites and other construction sites will be completely restored. No debris, surplus construction material or any garbage will be left behind. • Photographic record will be maintained for pre-project, during-construction and post-construction condition of the sites (grid station, transmission line/feeder routes, camps and access roads). • Vehicles and equipment will not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination. • The domestic sewage from the construction camps will be connected to the city sewerage system. If such system is not available, appropriate treatment and disposal system, such as septic tanks and soaking pits, will be constructed having adequate capacity. The contractor(s) will submit to the PIMSC the plans for the camp layout and waste disposal system, and obtain approval. • Waste oils will be collected in drums and sold to the recycling contractors. • The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) will be sold to recycling contractors. The hazardous waste will be kept separate and handled according to the nature of the waste.	Contractor	PIMSC, PMU

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		■ Domestic solid waste from the construction camp will be disposed in a manner that does not cause soil contamination. The waste disposal plan submitted by the contractor(s) will also address the solid waste. ■ PIMSC will identify sensitive receptors before the mobilization of the contractors and will identify additional mitigation measures for these sensitive receptors as needed.		
Air quality deterioration	Operation of construction machinery and vehicles	■ Construction camps will be established at least 500 m from communities (except when such camps are established inside the grid stations, in which case a safe distance will be maintained between the residential colony and the construction vamps and other contractor's facilities). The contractor(s) will obtain PIMSC approval for this purpose, as mentioned earlier. ■ Construction machinery, generators and vehicles will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions. ■ Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil, where required and appropriate. The waste water from kitchen and washing area of the construction camp may be used for water spraying. ■ Stockpiled soil and sand will be slightly wetted before loading, particularly in windy conditions. Such stockpiles will be covered when necessary. ■ Vehicles transporting soil, sand and other construction materials will be covered with tarpaulin ■ Stack height of generators will be at least 3 meters above the ground. ■ Project vehicles will avoid passing through the communities and cultivation fields as far as possible. If unavoidable, speed will be reduced to 15 km per hour to avoid excessive dust emissions. ■ Ambient air quality analysis will be carried out at the grid station extension and augmentation sites before the mobilization of the contractors to establish the baseline conditions. These analyses will be carried out during the construction phase also.	Contractor	PIMSC, PMU

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		■ PIMSC will identify sensitive receptors before the mobilization of the contractors and will identify additional mitigation measures for these sensitive receptors as needed.		
Surface Water and Groundwater Contamination	Release of contaminated water/effluents from construction sites and camps	■ The contractor(s) will submit to the PMISC the plans for the camp layout and waste disposal system, and obtain approval. ■ Construction debris or any other solid wastes or untreated waste effluents will not be disposed-off in water bodies. ■ Groundwater analysis will be carried out at the grid station extension and augmentation sites before the mobilization of the contractors to establish the baseline conditions. These analyses will be carried out during the construction phase also. ■ PIMSC will identify sensitive receptors before the mobilization of the contractors and will identify additional mitigation measures for these sensitive receptors as needed.	Contractor	PIMSC, PMU
Blocked Access	Construction activities, and, off-road movement of vehicles	■ Efforts will be made to avoid any impacts on the local roads, routs, and accesses. ■ In case of the blockage of the existing routes, alternate routes will be identified in consultation with the affected communities. ■ The contractor will prepare and implement a traffic management plan to minimize impacts on the local routes. ■ Community liaison will be maintained throughout the construction phase ■ PIMSC will identify sensitive receptors before the mobilization of the contractors and will identify additional mitigation measures for these sensitive receptors as needed. ■ Local community will be informed of any heavy equipment transportation beforehand.	Contractor	PIMSC, PMU
Noise and Vibration	Operation of construction machinery and vehicles	■ It will be ensured that the noise levels measured at the communities near the project sites are kept within the acceptable limits (70 dB(A) for industrial zones day and night; 45 dB(A) night and 55 dB(A) daytime for residential areas).	Contractor	PIMSC, PMU

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		■ Noise levels will be measured at the grid stations and along the TL routes before the mobilization of contractors to establish baseline conditions. ■ Noise levels will be measured at the key locations such as at the Staff Colony in grid stations and sensitive receptors. If the noise levels are found to be more than the prescribed limits, appropriate measures will be undertaken by the construction team such as rescheduling the works, using quieter equipment and/or erecting barriers to protect the communities from excessive noise. ■ Vehicular traffic through the communities will be avoided as far as possible. Project routes will be authorized by the PIMSC. ■ Vehicle speeds will be kept low, and horns will not be used while passing through or near the communities. ■ Vehicles will have exhaust silencers to minimize noise generation. ■ Nighttime traffic will be avoided near the communities, as far as possible. ■ Movement of all project vehicles and personnel will be restricted to within work areas, to avoid noise disturbance. ■ Working hours for construction activities within the communities will be limited to between 8 am and 6 pm (between 6 am and 8 pm during the summers). ■ Liaison with the community will be maintained. Grievance redressal mechanism will be put in place to address the community complaints. ■ PIMSC will identify sensitive receptors before the mobilization of the contractors and will identify additional mitigation measures for these sensitive receptors as needed.		
OHS Hazards	Risks associated with construction works, construction machinery, working at	■ The contractor will prepare and implement occupational and community health and safety (OCHS) plan, in accordance with the WB ESF, World Bank Group's Environment, Health and Safety Guidelines as well as World Health Organization (WHO) Guidelines, ILO Code of Practice and any internationally recognized OHS standard such as ISO 45001 or US OSHA 29 CFR 1926 or any standard specifically mentioned in the bidding	Contractor	PIMSC, PMU

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
	heights and confined spaces, electrocution risk.	documents. The Plans will include applicable safety standards and protocols, requirements of job hazard analysis, training requirements, documentation and reporting mechanism. ■ All construction works will be executed in accordance with the OCHS management plan and appropriate safety standards. Adequate monitoring and equipment will be available as needed. ■ Risk assessment will be carried out for the overall construction activities and then for each activity/task particularly high-risk activities such as working at heights, works at/near energized systems, hoisting and lifting, and others. ■ Contractor will be required to depute adequate number of OHS supervisors and inspectors at the site on fulltime basis. ■ The construction sites will have protective fencing to avoid any unauthorized entry. ■ The project drivers will be trained for defensive driving skills. ■ Vehicular speeds near/within communities will be kept low to minimize safety hazards. ■ Firefighting equipment will be made available at the camps. ■ The camp staff will be provided OCHS training. ■ The Contractor will submit to the Engineer of PIMSC for approval an emergency evacuation plan and practice the procedure annually. ■ All safety precautions will be taken to transport, handle and store hazardous substances, such as fuel. ■ Fire extinguishers will be provided throughout camps and work sites. Fire extinguishers will be inspected monthly and maintained as necessary. ■ An adequate and reliable supply of safe drinking water will be made available at readily accessible and suitable places including at all camps. ■ The Contractor will take samples from each supply of drinking water and arrange for analysis of these samples at EPA certified laboratory prior to its use by the Contractor's staff. The results of these tests for each supply must be submitted to the Engineer of		

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		PIMSC and must demonstrate that each water supply meets national and World Health Organization (WHO) standards for drinking water. ■ The Contractor will provide and maintain adequate hygienic kitchens which are sheltered and separated from the living quarters. Kitchens will include raised and washable surfaces suitable for food preparation. ■ The Contractor will provide and maintain adequate hygienic dining areas for staff. Work places and camps will be provided with both natural& artificial light. Artificial lighting will be powered by generator in the event of power cuts. ■ Public sensitization training will be provided to workers to avoid social conflicts between residents and the construction contractor, Occurrence of any such impacts can be avoided by community sensitive project planning and implementation and through effective involvement of local administration. ■ Contractor must ensure the provision of first aid facility at construction site and camps through hiring medics and establishing a dispensary at the campsite. ■ Reasonable number of first aid kits will be available on construction sites and within contractor camps. ■ Site personnel will be provided appropriate type of personal protective equipment (PPE). Contractor will ensure consistent use of PPE.		
Public health and safety issues	Risks associated with construction works, construction machinery, electrocution risk, vehicular traffic hazards, improper waste disposal,	■ OCHS Management Plan will be strictly implemented ■ The construction area will be barricaded to prevent unauthorized access ■ Warning signs will be placed where appropriate ■ The construction camps will have septic tanks and soaking pits of adequate size if appropriate/required. ■ The construction camps will have appropriate solid waste disposal mechanism ■ The construction camps and site offices will have first-aid kits.	Contractor	PIMSC, PMU

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
	exhaust emissions.	■ The construction crew will be provided awareness for the transmissible diseases (such as HIV/AIDS, hepatitis B and C). ■ Guidelines for SEA/SH, gender-based violence (GBV) and violence against children (VAC) will be implemented ■ Liaison with the community will be maintained. In particular, the nearby communities will be informed before commencing the testing commissioning of the system. Protective fencing will be used where appropriate/possible. Awareness raising program will be implemented to educate the communities regarding the hazards associated with the transmission lines, feeders and other electrical systems/equipment. Warning signs will be used at the appropriate locations. ■ PIMSC will identify sensitive receptors before the mobilization of the contractors and will identify additional mitigation measures for these sensitive receptors as needed.		
Influx of Labor	Risks associated with influx of labor from other parts of the country, including SEA/SH risks	■ Limit the siting of any temporary facilities within the boundaries of the worksites as far as possible; ■ Code of conduct (CoC) for workers and employees will be enforced for the protection of local communities, gender-based violence, other social issues, flora and fauna and a ban on tree cutting and hunting. Any violation of the CoC would lead to strict punishment including termination of employment; ■ Awareness among workers will be created on proper sanitation and hygiene practices, SEA/SH issues, privacy of women, and cultural appropriateness; ■ GRM will have a separate mechanism (GRC) to handle SEA/SH cases; ■ A GBV service provider will be identified in the subproject area; ■ Accountability and response framework will be prepared and implemented for SEA/SH cases; ■ Safe spaces will be established/arranged for women in all temporary and permanent facilities;	Contractor	PIMSC, PMU

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		■ SEA/SH awareness will be considered during the recruitment of staff; ■ Good housekeeping practices will be maintained at project site(s); ■ Adequate personal hygiene facilities will be provided in good condition with adequate supply of clean water; ■ Arrangements will be made to treat the affected workers on time to control the movement of vectors diseases; ■ Workers and surrounding communities will be sensitized on awareness and prevention of HIV/AIDS and STI through training, awareness campaigns and workshops; ■ Free HIV/AIDS and STI screening and provided for site workers ■ Counselling sessions will be held to made the workers award of the risks of HIV/AIDs and STI; ■ Any employees, who continues misconduct or lack of care, carry out duties amateurishly or inattentively, fail to conform to provisions of the contract, or persist in any conduct which is harmful to safety, health, or the protection of the environment, will be terminated; ■ The use of drugs and alcohol will not be allowed at the work/construction site; ■ Carrying weapons into the workplace premises will be prohibited; ■ Appropriate site security arrangements will be made at all construction sites and temporary facilities; appropriate fencing, security check points, gates and security guards will be provided at the construction sites to ensure the security of equipment, machinery and materials, as well as to secure the safety of site staff; ■ The contractor will create awareness of construction crew to sensitize them about security situation in the subproject area; ■ The Contractor will ensure that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft;		

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		■ To avoid conflicts with local people on employment matters, it is recommended to the contractor to employ the locals in skilled, semi-skilled, and unskilled work. This will reduce pressure on resources such as residential and health facilities; ■ The contractor will proactively manage the potential impacts from labor influx and potential cultural conflicts between local communities and workers, which include following: ■ The Contractor's regular training program will cover topics related to respectful attitude while interacting with the local communities; ■ Inclusion of CoC obligations and the applicable legislation will be ensured in the contracts of all employees and workers with the provision of sanctions and penalties in case of violations; ■ World Bank Guidelines on Influx of labor14 will be used for further guidance.		
Gender Issues including SEA/SH risks	Presence of migrant labor	■ PESCO will prepare and implement a Gender Action Plan (GAP) for the proposed subproject. ■ Awareness among workers will be created on proper sanitation and hygiene practices, SEA/SH issues, privacy of women, and cultural appropriateness; ■ GRM will have a separate mechanism (GRC) to handle SEA/SH cases; ■ A GBV service provider will be identified in the subproject area; ■ Accountability and response framework will be prepared and implemented for SEA/SH cases; ■ Safe spaces will be established/arranged for women in all temporary and permanent facilities; ■ SEA/SH awareness will be considered during the recruitment of staff; ■ The routes/places used by the women will be avoided as far as possible. If unavoidable, alternate routes to be identified for the	Contractor	PIMSC, PMU

[14] http://pubdocs.worldbank.org/en/863471511809509053/ESS2-FactSheet-WB-ESF.pdf

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		communities, if required, especially along routes frequented by women folk, such as route to the local well or water source. ■ Construction crew will avoid entering villages and settlements. ■ Communities will be informed and consulted before commencing works inside or near the communities. ■ Strict code of conduct will be maintained by the construction crew. Local norms will be respected. ■ WB guidelines on GBV and Influx of Labor will be implemented.		
Child labor	Employment of below age workers	■ the provisions of the Child Labor Act will still be made part of the construction contracts ■ It will be ensured that no child labor is employed at any of the work site or camp site.	Contractor	PIMSC, PMU
Resistance from Community	During ABC laying and Smart Meters installation	■ Stakeholder consultation and engagement to be carried out on an on-going basis ■ GRM to be kept operational throughout the construction phase and made easily available to the affected persons. ■ Community awareness to be enhanced for subproject activities, such as laying of ABC and installation of smart meters, and their importance ■ Community liaison to be maintained throughout the various phases of the subproject ■ The trade associations/local representatives will be involved to convince the local communities.	Contractor	PIMSC, PMU
Impacts on Sites of Historical, Cultural, Archeological or Religious Significance	Construction activities	■ In case of discovery of any sites or artifacts of historical, cultural, archeological or religious significance, the work will be stopped at that site. ■ The provincial and federal archeological departments will be notified immediately, and their advice will be sought before resumption of the construction activities at such sites. ■ The existing graveyards will not be damaged. The construction work close to the graveyards will be carried out after informing/consulting the relevant communities.	Contractor; PIMSC; PMU	PIMSC, PMU

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		■ Chance-find procedures which will be used during this Project are as follows: • Stop the construction activities in the area of the chance find; • Delineate the discovered site or area; • Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a nightguard will be present until the responsible local authorities and relevant Department of Archaeology take over; • Notify the supervisory Engineer who in turn will notify the responsible local authorities and relevant Department of Archaeology immediately (within 24 hours or less); • Responsible local authorities and relevant Department of Archaeology would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archaeologists (within 72 hours). The significance and importance of the findings will be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historical, scientific or research, social and economic values; • Decisions on how to handle the finding will be taken by the local authorities and the relevant Department of Archaeology. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration, and salvage; • Implementation for the authority decision concerning the management of the finding will be communicated in writing by the relevant Department of Archaeology; and • Construction work could resume only after permission is given from the local authorities and relevant Department of Archaeology concerning the safeguard of the heritage.		
O&M Phase Impacts				
Soil and water Contamination	Maintenance activities,	• The grid stations will have appropriate solid waste collection and disposal arrangements.	Grid Station Operation (GSO)	ESU

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
	disposal of transformer oils and other wastes	• The grid stations will have appropriate sewage handling system. The grid stations' sewage collection system will be connected to the Municipality operated sewerage system, if available. Otherwise, grid stations will have their own septic tanks and soakage pits. • Waste oils and chemicals will be disposed in accordance with their respective Material Safety Data Sheet (MSDS). MSDS will be made available at the grid stations and maintenance workshops. • Non-toxic recyclable waste (such as cardboard) will be given away for recycling. • Toxic waste will be stored separately,, and provided to the Municipality for safe and appropriate disposal. • Grid stations will have channels and drainage pits to collect any leaked oil from the transformers in the grid stations. This oil will be sent back to the workshop for recycling. • Any soil contaminated by the oil/chemical spillage will be removed and disposed-off appropriately in accordance with the MSDS of the spilled oil/chemical.		
OHS hazards	O&M activities on live equipment, working at heights	• PESCO will implement the Safety Code prepared by NEPRA and its own OHS Management System. • O&M staff will be provided essential protective gears and equipment. • O&M staff will be provided regular safety training. Refresher courses will be arranged on regular basis. • Firefighting equipment will be made available at the grid stations. • The Emergency Response Plan (ERP), prepared by PESCO, will be made available at each grid station. Its salient points will be displayed at prominent places within each grid station. The O&M staff will be given training on the ERP. The E&S team will review the ERP and with respect to the environmental and social considerations, and recommend changes if needed. The ERP will include procedure to inform the nearby communities in case of fire in the grid stations. • The communities near the grid stations and transmission lines will be educated on the risk of electrocution, and how to avoid accidents.	GSO	ESU

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Impacts	Likely Causes for Proposed Project	Mitigation Measures	Responsibility	
			Implementation	Supervision / Monitoring
		• Appropriate signage on safety precautions will be installed at the key locations. • The trees under the transmission lines will be regularly trimmed in order to maintain 8 m clearance.		
Public Health Concerns	Electrocution risk; EMF radiation; health concerns for nearby population	• Separation of live parts and pubic property/other structures/trees will be maintained • Community liaison will be maintained to raise the public awareness about electrocution risks • Solid waste and waste effluents from the grid stations will be treated/ managed appropriately.	GSO	ESU
Gender Mainstreaming	Gender mainstreaming needs to be carried out in PESCO	• Gender mainstreaming will be encouraged in PESCO. Employment opportunities will be created for women. Women friendly work environment will be established within PESCO facilities (e.g., separate toilets, system to address sexual harassment).	Human Resource (HR) Department	ESU

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6.4 E&S Monitoring

6.4.1 Compliance Monitoring

The Environmental and Social staff of the Contractor will be responsible for implementing this ESMP, while the environmental and social specialists of the PIMSC and PMU will be responsible for the overall monitoring of the EMSP throughout the subproject implementation.

Compliance monitoring comprises of on-site inspection of the construction activities to verify that measures identified in this ESMP (particularly, the MMP given in **Table 6-2**) and the ones that are included in the clauses for contractors are being implemented. The contractor will prepare E&S Checklists on the basis of MMP given in **Table 6-2** for this purpose and fill these checklists on a daily basis. A summary of these checklists will be included in the regular reports prepared by the contractors and will be shared with the PIMSC.

6.4.2 Effects Monitoring

A tentative monitoring plan to be implemented during the construction stage of the subproject to ensure effectiveness of the mitigation measures is given in **Table 6-3,** along with the monitoring indicators and frequency. The PIMSC will finalize/revise it before the commencement of construction works.

Table 6-3: Effects Monitoring Plan During Construction

Parameter	Means of Monitoring	Location	Frequency	Responsibility	
				Implementation	Supervision
Erosion	Visual inspection of erosion prevention measures and the occurrence of erosion	All sites involving construction and/or excavation	Monthly	Contractor	PIMSC, PMU
Wastewater discharges at worksites and campsites	Spot measurement for pH Visual inspection to ensure clear water leaving the site	All sites particularly near sensitive receptors	Weekly	Contractor	PIMSC, PMU
	Sampling and analysis of wastewater discharges for the parameters given in NEQS	All sites (including worksites, camp discharges)	Monthly	Contractor	PIMSC, PMU
Air Quality (dust)	Visual inspection	All sites particularly near sensitive receptors	Daily	Contractor	PIMSC, PMU
Ambient Air Quality	Air quality monitoring for 24 hours for the parameters	At all sites particularly near sensitive receptors	Monthly	Contractor	PIMSC, PMU

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Parameter	Means of Monitoring	Location	Frequency	Responsibility	
				Implementation	Supervision
	specified in NEQS				
Noise and vibration	24-hour noise monitoring (at/near construction sites, campsites, offices, colony, communities, transportation routes)	At all sites, particularly near sensitive receptors	Monthly	Contractor	PIMSC, PMU
Emissions from plant and equipment	Visual Inspection	All vehicles / equipment	Daily	Contractor	PIMSC, PMU
Waste Management	Visual inspection on spoil disposal	At disposal sites	Daily	Contractor	PIMSC, PMU
	Visual inspection for availability of dust bins at worksites and camp	At camp and work sites	Daily	Contractor	PIMSC, PMU
	Visual inspection for collection and treatment of organic waste	At campsite	Daily	Contractor	PIMSC, PMU
	Visual inspection for collection and treatment of recyclable and hazardous waste by the waste management contractor	At camp and work sites	Daily	Contractor	PIMSC, PMU
Spills from hydrocarbon and chemical storage	Visual inspection to check whether fuels are stored in contained facilities Availability of spill kits at the site Visual Inspection for leaks and spills	At fuel storage sites	Daily	Contractor	PIMSC, PMU
Traffic Safety	Visual inspection for placement of traffic signs and traffic control personnel	Near the construction sites particularly near sensitive receptors	Daily	Contractor	PIMSC, PMU,

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Parameter	Means of Monitoring	Location	Frequency	Responsibility	
				Implementation	Supervision
Local Roads	Visual inspection to ensure local roads are not damaged	local roads	Daily	Contractor	PIMSC, PMU,
Cultural/religious and Sites	Visual observation for cultural sites	Along the local roads	Weekly	Contractor	PIMSC, PMU,
Drinking water and sanitation	Water quality analysis for drinking water parameters specified in NEQS	At the work sites and campsites	Monthly	Contractor	PIMSC, PMU,
Safety of workers	Usage of Personal Protective equipment; accident / incident record.	All worksites	On a regular basis	Contractor	PIMSC, PMU,
Labor engagement and GBV risks	Interaction with labors and review of GRM	All work sites	Monthly	Contractor	PIMSC, PMU
Reinstatement of Work Sites	Visual Inspection	All worksites	After completion of all works	Contractor	PIMSC, PMU,

6.5 Gender Action Plan Outline

An outline of the Gender Action Plan (GAP) for the subproject is given in **Table 6-4**; it will be finalized before the mobilization of the contractor**.**

Table 6-4: Gender Action Plan Outline

Sr. No	Activities	Targets	Responsibility
1	Conduct public awareness campaigns on subproject benefits and potential impacts particularly on women and children	• EDEIP brochure in Urdu to be disseminated in villages/communities of the subproject area of influence and within one month of the start of the subproject and orientation to women in face-to-face meetings.	PMU; PIMSC
2	Socially and gender-inclusive consultations	• Broad-based socially and gender-inclusive participatory consultation workshop(s) for relevant stakeholders on GAP objectives, one for male and one for female. • At least 25% of participants of stakeholder consultation activities should be women. • Representation of women in consultation, participation and decision-making forums to	PMU, Project Director (PD), Social and Gender Staff of PMU; PIMSC

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Sr. No	Activities	Targets	Responsibility
		voice their opinions, needs and preferences at a location and time that increases the possibility of women's participation, 20% of participants are women's representatives.	
3	Enhance the capacity of PESCO and PMU to include a gender perspective into EDEIP subprojects	• Evidence that equal employment opportunity policy and practices are implemented, at least 10% of female staff in PMU with equal salaries by following the Government of Pakistan (GoP) fixed minimum quota for women employment; • Evidence of the type of incentives designed to recruit women, increase their capacity, and provide career development; • Social and Gender Specialist and female staff deployed in PMU and PIMSC to assist in GAP implementation and monitoring; • PMU and PESCO staff trained in job-related skills of which 10% are women; • Gender awareness and social inclusion training provided to 100% PMU and 50% management staff of PESCO for clarity in gender mainstreaming and social inclusion concepts, orientation on GAP targets, roles, and responsibilities, better planning, communication, coordination, implementation, documentation, monitoring and evaluation;	PMU, Project Director, Social and Gender Staff of PMU; PIMSC
4	Include gender-disaggregated data in monitoring and evaluation and EDEIP progress reports.	• Develop a set of quantitative and qualitative sub-indicators of key indicators, and develop a system to consistently collect, retrieve and analyze the gender-disaggregated data of level of participation, immediate results of activities, benefits, and outcomes, of the EDEIP on women, men, boys, and girls (disaggregated by gender, income, marginalized and vulnerable groups)	PMU, Project Director, Social and Gender Staff of PMU (PIMSC for monitoring)

6.6 Capacity Building and Training

A tentative training plan is given in **Table 6-5**; PIMSC will finalize it before the start of construction works and may revise it as needed. At the construction sites, PIMSC will take the lead in implementing the capacity building plan, though the contractors will also be responsible for conducting training for their own staff and workers. The various aspects that are covered under the capacity building will include general environmental and social awareness, key environmental and social sensitivities of the area, key environmental and social impacts of the project, ESMP requirements, OHS aspects, and waste disposal.

Table 6-5: Environmental and Social Training Plan

Contents	Participants	Trainer	Schedule
Environmental and social impacts of the subproject and ESMP requirements of the Contractor;	All the technical Staff of PMU, ESU, and relevant technical staff of PESCO who are involved in the management of environmental and social	ESHS staff of the PIMSC; and an external training agency who	During the initial stages of the subproject implementation. The training will be repeated every three

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Contents	Participants	Trainer	Schedule
WBG Environmental Health and Safety Guidelines.	issues associated with the proposed subproject. Site Engineers of the Engineer.	has a thorough knowledge of the WB ESSs and guidelines	months, as appropriate.
Environmental and Social issues associated with the ongoing construction works; workers' health and safety; ESMP implementation.	Site Engineers and supervisors of the Contractor, PMU, and the PIMSC; E&S staff of contractor	E&S staff of the PIMSC	On a monthly basis
Code of Conduct; Occupational Health and Safety	Construction crew	Contractors ESHS Staff	Prior to the start of the construction activities and during the construction activities (To be repeated as needed.)

6.7 Grievance Redress Mechanism

6.7.1 Project GRM

PESCO has established an EDEIP-specific grievance redress mechanism (GRM) to receive, evaluate, and facilitate the resolution of affected parties' concerns, complaints, and grievances about the environmental and social performance of the EDEIP. This GRM will be applicable to the proposed subproject as well.

A three-tier GRM has been designed to provide a time-bound, early, transparent and fair resolution of the grievances raised by affected persons (APs) and other stakeholder regarding E&S management of the EDEIP subprojects. All complaints received verbally or in writing will be properly documented and recorded in the Complaint Management Register(s). The GRM will be linked with the PESCO's existing complaint handling system. The GRM for the EDEIP is outlined below and consists of three levels with time-bound schedules for addressing grievances.

First Tier of GRM. The PMU's project site office will be the first tier of GRM, which will offer the fastest and most accessible mechanism for resolution of grievances at the local level. A local level Grievance Redress Committee (GRC) will be formed for this purpose headed by the Project Director (PD) with the membership of ESU, contractors' representatives, consultants' representatives, representatives of other relevant departments, and two members from communities if applicable. At this tier, the designated E&S staff of PMU site office will make attempt to resolve the complaints within two to 10 working days, depending on the nature of grievance. The PD (or his/her representative) will convene the meetings of local GRC and conduct proceedings informally to reach an amicable settlement between the parties within 10 days of receiving a complaint (verbally or in writing) from an affected person or their representative. The report of the GRM meetings will be recorded in writing, and copies will be provided to the parties involved. Grievances will be documented with personal details (name, address, date of complaint, nature of the complaint, etc.) will be included unless anonymity is requested. A tracking number will be assigned to each complaint/grievance. Should the

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grievance remain unresolved or the AP not satisfied with the decision, the grievance can be lodged with the Program level grievance redress committee, led by the head of PMU.

Second Tier of GRM. The E&S staff in PMU will refer to the unresolved issues or grievances (with written documentation) to the second tier of GRM, the PMU-level Grievance Redress Committee (GRC). The PMU GRC will be established by PESCO and will consist of the following persons: (i) a PESCO's representative from senior management; (ii) the head of PMU will act as secretary of the GRC; (iii) Project Director of respective subproject; (iv) representative of Deputy Commissioned (DC) office (if applicable); (v) representative of PIMSC; (vi) Chief Resident Engineer of the Consultants (on-call); (vii) representative of relevant government offices (on-call); (viii) two to three representative of respective project-affected people (on-call). A hearing can be called with the GRC, if necessary, where the AP(s) can present details of his/her/their concern/grievance. The GRC will meet as necessary when there are grievances to be addressed. The GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within 25 working days, depending on the nature of the grievance. If complainant is still unsatisfied with the decision, the existence of the GRC will not impede the complainant's access to the government's administrative or judicial remedies.

Third Tier of GRM: In the event that a grievance cannot be resolved directly by the second tier GRC or if complainant is dissatisfied with the decision of GRC, the affected people can seek alternative redress through the Chief Executive Officer (CEO) or Board of Directors of PESCO, district administration, the Secretary Energy and Power Department or higher-level administrative authorities, the Pakistan Citizen Portal or the court of law, as appropriate.

PESCO will establish a separate GRC to handle SEA/SH cases. Appropriate handing of such cases will be carried out to ensure complete privacy of the complainants, details of the complaint/grievance, and the corrective actions proposed, and corrective actions taken.

Monitoring and reporting. The monitoring reports of ESMP implementation will include the following aspects pertaining to progress on grievances: (i) number of cases registered, level of jurisdiction (first, second, third tiers), number of hearings held, decisions made, status of pending cases; and (ii) lists of cases in process and already decided upon, may be prepared with details such as name with copy of National Identity Card, complaint number, date of application, date of hearing, decisions, remarks, actions taken to resolve issue(s), and status of grievance (i.e., open, pending, closed).

6.7.2 GRM for Construction Workers

The GRM described above addresses the grievances/complaints lodged by the project affected persons and other local stakeholders. But according to the lessons learned in various project contexts, there is also a need to establish a separate GRM to deal exclusively with those complaints that involve workers employed by the contractors for construction activities. Such grievances may involve wage rates and unpaid overtime works; irregular and partial payments; lack / inadequacy of living accommodations; lack of clean drinking water and sanitation facilities; lack of medical care in emergencies; and lack of protection against GBV by labor suppliers, supervisors.

The dealing with labor grievances / complaints will have members who are directly and indirectly associated with the construction works. The GRC will include a PMU official who is in charge at the worksite as the convener, resident engineer of the PIMSC, a worker's representative, and the contractor's representative. The convener will designate an official to

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receive the complaints and ensure the complainant does not lose his job and is not intimidated into withdrawing the complaint before the formal hearing.

To ensure impartiality and transparency, hearings on complaints will be held in a non-threatening environment and will remain open to all other workers on the site. The GRC will record the (i) details of the complaints; (ii) reasons that led to acceptance or rejection of the individual cases, as well as the number of accepted and rejected cases; and (iii) decisions agreed with the complainants. PMU will keep records of all resolved and unresolved complaints and grievances and make them available for review as and when asked for by the World Bank and other interested entities/persons.

6.8 ESMP Reporting

PESCO, PIMSC and contractors will prepare periodic reports on the status of ESMP implementation and will share these reports with World Bank for their review and feedback. Details of these reports and their content are given in **Table 6-6**.

Table 6-6: ESMP Monitoring and Compliance Reports

Sr. No	Title of the Report	Contents of the Report	Frequency of Report Preparation	Report to be prepared by
1	ESHS Monitoring Report	The compliance status of the subproject with environmental and social mitigation and monitoring measures. Besides, the report also covers: • environmental incidents; • health and safety incidents, • health and safety supervision: • Usage of PPE by workers • worker accommodations • Training conducted and workers participated • Workers' grievances • Community grievances • Chance-find (if any)	Monthly	Contractor
2	ESMP Monitoring Report	The compliance status of overall subproject with ESMP requirements; non-compliances; Effects Monitoring Report; training provided; GRM data; summary of ESHS monthly reports; corrective actions determined; corrective actions taken; availability of E&S personnel at site.	Quarterly	PIMSC
3	Incident Reports	Incident investigation reports for all major incidents covering details of the incident, root cause analysis, and actions taken to address the future recurrence of this event	Initial investigation report within 24 hours Detailed Investigation Report within ten days	Contractor; PIMSC

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6.9 ESMP Implementation Cost

The total cost of the ESMP implementation is estimated to be about **PKR 31.25 million** (see **Table 6-7**).

Table 6-7: Cost Estimates for ESMP Implementation

Sr. No.	Description of Item	Unit	Item Total (PKR)
A	**Contractors Budget**		
1.	Contractors' preparation of C-ESMP including OHS Plans		Included in construction cost
2	Contractors ESHS Staff		Included in construction cost
3.	Waste Management (procurement and operation of composters, bailers, and waste management contractors)		Included in construction cost
4	Dust Management (procurement and operation of sprinklers)		Included in construction cost
5	Site/OHS facilities for workers (PPE)		Included in construction cost
6	Training of Workers on Code of Conduct (including GBV/SEA/SH/AIDS)		Included in construction cost
7	Health facilities at the camp including a fully equipped ambulance, doctor and nurses		Included in construction cost
8	Wastewater treatment facilities (including mobile toilets at worksites)		Included in construction cost
9	Compensation for crop damage		Included in construction cost
10	Environmental Monitoring during construction by a third party (wastewater quality, air quality, and noise) (PKR 1m for each grid station extension and augmentation and for each transmission line reconductoring. Four extensions; 12 augmentations; and four TLs: 20 x 1m = PKR 20 m). To be paid to the contractors on the basis of actual expenses.	LS	20,000,000
B.	**Consultants' Budget**		
1	ESHS Staff for the PIMSC	LS	Included in project management cost
C.	**PESCO's Budget**		

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Sr. No.	Description of Item	Unit	Item Total (PKR)
2	Capacity building of PMU E&S staff	LS	5,000,000
	Subtotal		**25,000,000**
D.	**Contingency**		
	Contingency (25% of A+B+C)		6,250,000
	Total (PKR)		**31,250,000**

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7 Stakeholder Consultations and Information Disclosure

This Chapter describes the stakeholder consultations carried out during the ESMP preparation. It also provides the consultations framework for future projects. In addition, the Chapter also provides the disclosure requirements.

7.1 SEP

As described in **Section 1.7**, an SEP has been prepared for the entire EDEIP to describe objectives, process and outcome of the stakeholder engagement already carried out during the EDEIP preparation and to be carried out during the EDEIP implementation – in accordance with the WB ESS 10. The key aspects of the SEP are summarized below.

ESS10 requires that borrowers engage with stakeholders throughout the project life cycle, commencing such engagement as early as possible in the project development process and in a timeframe that enables meaningful consultations with stakeholders on project design. The nature, scope and frequency of stakeholder engagement have to be proportionate to the nature and scale of the project and its potential risks and impacts.

The overall objective of the SEP is to define a program for stakeholder engagement, including public information disclosure and consultation, throughout the entire project cycle. The SEP outlines the ways in which the project team will communicate with stakeholders and includes a mechanism by which people can raise concerns, provide feedback, or make complaints about the project and any activities related to the project. The involvement of the local population is essential to the success of the project in order to ensure smooth collaboration between project staff and local communities and to minimize and mitigate environmental and social risks related to the proposed activities.

The stakeholder engagement and consultation activities for the proposed subproject have been carried out in accordance with the guidelines provided in the SEP. These activities are described in the following sections.

7.2 Purpose and Objective of Consultations

The objective of stakeholder consultations carried out for the proposed subproject have been to provide to the stakeholder timely and accessible information on the subproject's scope, potential E&S impacts, and proposed mitigation measures, while obtaining their views, concerns and recommendations.

This process helps build trust, strengthen community ownership, and ensure that the ESMP reflects the needs and priorities of affected communities and other stakeholders.

7.3 Methodology

The stakeholder consultations and information disclosure for the proposed subproject have been conducted in accordance with the SEP and WB ESS10, as well as the national/provincial regulatory requirements. The process involved:

- Identification and mapping of key stakeholders, including affected communities and government departments.
- Preparation of consultation materials.
- Organization of focus group discussions, key informant interviews, and community meetings at accessible locations and convenient times.

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- Provision of subproject information to the stakeholders and obtaining their feedback.
- Systematic documentation of stakeholder feedback, concerns, and suggestions.

7.4 Stakeholder Identification and Analysis

The SEP prepared for the EDEIP defines three groups of stakeholders: i) affected parties, ii) interested parties; and iii) vulnerable groups. The affected parties for the proposed subproject include individuals, groups or other entities within the subproject's AoI, who are impacted or likely to be impacted directly or indirectly, positively or adversely, by the proposed subproject activities. The interested parties are the individuals / groups who may have an interest in the subproject. They include individuals or groups whose interests may be affected by the subproject and who have the potential to influence the subproject's outcomes in any way. Vulnerable groups include people who may be disproportionately impacted by the subproject or further disadvantaged as compared with any other groups due to their vulnerable status and that may require special engagement efforts to ensure their equal representation in the consultation and decision-making process associated with the subproject. This group may include elderly citizens, disabled citizens, women, ethnic and religious minorities, and poor.

Table 7-1 identifies various categories of stakeholders for the proposed subproject. Consultations have been carried out with these categories of the stakeholders of the proposed subproject.

Table 7-1: Stakeholder Categories for Proposed Subproject

Subproject Component	Affected Parties	Interested Parties	Vulnerable Groups
Grid Station Extension and Augmentation works; capacitor bank installation and other works inside existing grid stations	Nearby communities, GS staff and their families living inside the GS; communities living inside the AoI and in the immediate vicinity/adjacent to the GS.	• Relevant government departments; • KP-EPA; • Non-government Organizations (NGOs); • Academia	Children, women, elderly and poor households residing within the AoI of the GSs.
ABC laying; installation of transformer monitoring systems and Smart Meters	Communities living inside the AoI	• Relevant government departments; • KP-EPA; • NGOs; • Academia	Children, women, elderly and poor households residing within the AoI of ABC.

7.5 Consultation Process

A series of meetings were carried out with the identified stakeholders by the environment and social team from May 2025 to March 2026. These consultations involved individuals working and residing within the grid stations included in the proposed subproject where STG works are proposed, members of the surrounding local communities, and representatives from relevant government departments.

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Consultation sessions were held with affected stakeholders, including PESCO grid station staff, employees, and their families residing within the grid colony. Similar consultations were also carried out in the surrounding communities. During these sessions, all subproject activities were clearly presented, and stakeholders' concerns, suggestions, and feedback were systematically recorded. A total of 542 members were participated in these consultation sessions, including 211 PESCO Staff, 320 community members (232 male and 88 female), 11 interested parties, as described in **Table 7-2**.

Table 7-2: Consultations with Stakeholders

Sr. No.	Venue	Number of Participants			Total
		PESCO Staff	Community Members		
			Male	Female	
1.	132-kV Dargai Grid Station, Malakand	12	14	11	37
2.	132-kV Dargai-II Grid Station, Malakand	4	15	05	24
3.	132-kV Jalala Grid Station, Mardan	5	11	0	16
4.	132-kV Nowshera City Grid Station, Nowshera	8	6	0	14
5.	132-kV Pir Bala Grid Station Peshawar	14	18	0	32
6.	132-kV Jamrud Grid Station, Peshawar	7	11	13	31
7.	132-kV Kohat KDA Grid Station, Kohat	10	12	0	22
8.	132-kV Kohat Grid Station, Kohat	9	8	11	28
9.	132-kV Shahi Bagh Grid Station, Peshawar	11	17	14	42
10.	132-kV Rehman Baba Grid Station, Peshawar	6	8	0	14
11.	132-kV Hayatabad Grid Station, Peshawar	10	7	0	17
12.	132-kV Peshawar City Grid Station, Peshawar	7	6	10	23
13.	132-kV Peshawar Industrial Grid Station, Peshawar	7	0	0	7
14.	132-kV Jehangira Grid Station, Nowshera	4	5	0	9
15.	132-kV Mardan-II Grid Station, Mardan	8	11	8	27
16.	132-kV DI Khan-II Grid Station, DI Khan	4	6	0	10
17.	132-kV Peshawar Cantt Grid Station, Peshawar	16	13	16	45
18.	132-kV Hussai Grid Station, Mardan	8	13	0	21
19.	132-kV Dagar Grid Station, Buner	6	10	0	16

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Sr. No.	Venue	Number of Participants			Total
		PESCO Staff	Community Members		
			Male	Female	
20.	132-kV Peshawar University Grid Station, Peshawar	8	14	0	22
21.	132-kV Taru Jabba Grid Station, Nowshera	5	27	0	32
22.	132-kV WAPDA House Grid Station, Peshawar	30	0	0	30
23.			232	88	
	Sub-Total	211	320		531
23.	**Interested Parties**				11
	Total				**542**

7.6 Consultations with Affected Parties

The participants of the consultation meetings raised concerns regarding public safety, privacy, damage to access roads and the need to restore the construction site after the subproject completion. Most of the participants also complained about power outages and overloading of feeders. They showed their eagerness for the implementation of the subproject so that they could receive better and un-interrupted electricity supply.

Most participants identified the primary benefit of the subproject as the provision of reliable and stable electricity. They also expressed confidence that, once implemented, the subproject would improve their living conditions and also create significant economic opportunities for the local population. The summary of the views and concerns raised by the participants and their responses is provided in **Table 7-3.**

Table 7-3: Summary of Views/Concerns and Responses

Sr. No.	Venue	Views / Concerns Raised	PESCO's Response
1.	132-kV Dargai Grid Station	Narrow bridges and roads will affect equipment movement; community faces forced load shedding in summer.	PESCO will manage transportation of equipment with close coordination with the residents to address their concerns. The subproject will enhance power reliability and reduce load shedding.
2.	132-kV Dargai-II Grid Station	Community asked for engagement of local workforce/labors.	PESCO assured that non-technical and technical (subject to availability) local workers will be hired.
3.	132-kV Jalala Grid Station	Community members emphasized to enhance the capacity of the grid station to reduce the load shedding and to resolve the issue of low voltage.	PESCO assured that upon the completion of the subproject the issues related to the load shedding and low voltage would be resolved.

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Sr. No.	Venue	Views / Concerns Raised	PESCO's Response
4.	132-kV Nowshera City Grid Station	Trees near transmission lines cause sparking and fire hazards, while the community members also raised concern about overbilling.	PESCO confirmed that tree trimming will be carried out to ensure safe separation from the live wires. For the overbilling issue, the participants were encouraged to use the PESCO's complaint cell.
5.	132-kV Nowshera Industrial Grid	Community members raised concerns regarding workers' camps. They also raised concerns regarding transportation of heavy equipment, causing disturbance to the local community.	The participants were assured that appropriate mitigation measures related to the workers' camps have been included in the ESMP; each project staff and worker will be bound to follow the strict code of conduct. The contractor will prepare a traffic management plan in consultation with the relevant community. In addition, the GRM will also be available to the communities to register their complaints regarding the subproject works including traffic issues.
6.	132-kV Pir Bala Grid Station (Warsak Road)	Community appreciated the project as there are mostly marble industries and they need regular power supply. Community raised concerns regarding power outages and billing.	PESCO assured that the subproject will reduce power interruptions. For the billing issues, the participants were encouraged to use the PESCO's complaint cell.
7.	132-kV Jamrud Grid Station	The participants raised concerns regarding overloaded feeders; dust pollution due to heavy vehicle movement.	PESCO assured that the proposed subproject will increase load capacity. For dust control, appropriate mitigation measures have been included in this ESMP.
8.	132-kV KDA Grid Station	Community showed concerns about late working hours, and community safety due to transportation of materials.	The construction works will normally be carried out during the daytime. For any nighttime works, community consultation will be carried out and appropriate mitigation measures will be taken to reduce the disturbance to the community. Appropriate measures are included in this ESMP to address the community safety issues.

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Sr. No.	Venue	Views / Concerns Raised	PESCO's Response
9.	132-kV Kohat Grid Station	Community members complained about prolonged outages affecting markets.	The participants were assured the proposed subproject will increase the electricity reliability and will reduce power outages.
10.	132-kV Old Shahi Bagh Grid Station	The participants raised concerns about frequent tripping and mob incidents due to long power outages. Community showed concerns about the U-turn in front of the grid station gate causing risk of traffic accidents/hazard.	PESCO confirmed that the subproject will enhance electricity reliability and reduce power outages. PESCO assured that appropriate mitigation measures (including implementing the traffic management plan and deputing a flagman) will be undertaken during the construction phase, as detailed in this ESMP.
11.	132-kV Peshawar Cantt Grid Station	Community showed concerns about outside labors and night time activities.	PESCO confirmed that the labor will be strictly restricted to the grid and contractor will be bound to restrict workers from wandering around the residential area. Also the community was assured that the activities will be totally carried out during day time to avoid disturbance during nights.
12.	132-kV Rehman Baba Grid Station	The participants raised concerns about overloaded feeders; community requested stable voltage. The residents of the staff colony expressed concerns regarding the presence of construction workers near their houses.	PESCO assured that the subproject will reduce overloading of feeders and improve voltage stability. Appropriate mitigation measures will be implemented as given in this ESMP to ensure that workers' camps are located away from the residential areas including residential colonies inside the grid stations and workers will not be allowed to enter these areas. Each project staff and worker will be bound to follow the strict code of conduct.
13.	132-kV Peshawar City Grid Station	Community raised noise issue during the subproject activities. Community raised concern about the safety during the subproject activities as the	PESCO assured that appropriate mitigation measures to control the noise have been included in this ESMP. The GRM will be

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Sr. No.	Venue	Views / Concerns Raised	PESCO's Response
		community resides along the boundary wall of the gird station.	available to the community to launch any complaint. The ESMP also includes appropriate mitigation measures to ensure safety of the community. PESCO will follow standard design features to ensure separation of live wires/systems from the structures.
14.	132-kV Peshawar Industrial Grid Station	The participants raised concerns about the grid station being surrounded by community, hence safety of the community needs to be ensured.	PESCO confirmed that this ESMP includes appropriate mitigation measures to ensure safety of the community. PESCO will follow standard design features to ensure separation of live wires/systems from the structures.
15.	132-kV Jehangira Grid Station	The participants pointed out that heavy equipment movement may damage access road and cause road blockages during transportation of equipment.	PESCO assured that this ESMP includes appropriate mitigation measures to minimize damage to the existing infrastructure including access road; the contractor will repair the damages caused by the subproject works; and the contractor will implement the traffic management plan in coordination with the traffic police.
16.	132-kV Hussai Grid Station	Community appreciated the project and were hopeful that the voltage issues will be resolved.	PESCO assured that voltage issue will be resolved with this project.
17.	132-kV Dagar Grid Station	Community asked about employment of the local community.	PESCO assured that for non-technical workers local community will be preferred and also technical workers will be employed locally having the required technical skills.
18.	132-kV Taru Jabba Grid Station	Taru Jabba community were emphasizing and requesting for reduction in load shedding schedule.	PESCO assured that Upgradation work will improve continuity of Power supply.
19.	132-kV Mardan-II Grid Station	The participants pointed out that the narrow gate may limit transformer entry and access roads may be damaged by the subproject activities.	PESCO assured that contractor will implement any modification needed for the grid station gate and also that contractor will be required to

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Sr. No.	Venue	Views / Concerns Raised	PESCO's Response
			repair any damages caused by the subproject activities.
20.	132-kV DI Khan II Grid Station	The participants pointed out that equipment movement may be restricted by road encroachments as the grid station access road is narrow.	PESCO assured that the PESCO and contractor will coordinate with the local authorities to remove encroachment along the access road.

7.7 Consultations with Interested Parties (Institutional Stakeholders)

As described in **Section 7.4**, the interested parties of the proposed subproject were consulted during the preparation of this ESMP. During these consultations, the subproject's interventions were explained to the participants and their views and concerns were obtained. See details in **Table 7-4**.

Table 7-4: Views of Interested Parties (Institutional Stakeholders)

Sr. No.	Organization	Participants	Observations Made, Issues and Concerns Raised	PESCO's Response
1.	KP-EPA	Dr. Muhammad Israr, Deputy Director EIA	Since the proposed subproject does not involve construction of new grid stations or transmission line, and the proposed works are limited to existing facilities and RoW, no environmental approval is needed from EPA.	No response needed.
2.	Pakhtunkhwa Energy Development Organization (PEDO)	Mr. Shakeel Ahmed Assistant Director, Environment	The PEDO official appreciated the proposed subproject and highlighted the need to share experiences and lessons learned between PEDO and PESCO.	PESCO team assured that liaison will be maintained with PEDO.
3.	Department of Environmental Sciences	Prof. Dr. Muhammad Nafees, Chairman Department of Environmental Science	Prof. Dr. Nafees appreciated the subproject and emphasized the need for improved electricity supply.	No response needed.
4.	World Wide Fund for Nature (WWF)	Syed Kamran Hussain, Conservationist	The WWF representative highlighted the importance of wildlife and natural habitats and the need of their protection.	The PESCO's team responded that the proposed interventions will not be carried out in or near natural habitats.

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Sr. No.	Organization	Participants	Observations Made, Issues and Concerns Raised	PESCO's Response
5.	Sarhad Rural Support Program (SRSP)	Engineer Zahid Khan, Team Leader	The SRSP representative appreciated the proposed subproject that will alleviate economic burdens caused by power outages affecting local businesses and livelihoods.	No response needed.
6.	Shirkat Gah (Non-governmental Organization - NGO)	Ms. Zakia Majid, Manager KP	The Shirkat Gah's representative stated that frequent power outages affect women significantly and increase their hardships.	The PESCO's team assured that the proposed subproject has been designed to alleviate sufferings related to power outage and poor electricity supply.
7.	Khwendo Kor (NGO)	Khalid Usman, Executive Director	The Khwendo Kor's representative expressed that the proposed subproject is likely to reduce power outages and load shedding and also generate employment opportunities.	The PESCO's team confirmed that the proposed subproject will reduce power outages and loadshedding and will also generate employment opportunities during construction phase.
8.	Planning & Development Department	Mr. Zakiullah, Director M&E	The Director pointed out that the proposed subproject needs to comply with the KP Environmental Protection Act and WB E&S requirements. He also emphasized that the E&S documents need to include the implementation cost and this cost should be included in the overall subproject cost.	The PESCO's team confirmed that the subproject would comply with the provincial environmental protection act and also the WB E&S requirements. The team also confirmed that this ESMP includes the implementation cost.
9.	Local Government, Election & Rural Development Department	Ms. Haleema, Deputy Secretary	The Deputy Secretary raised concerns about safety concerns related to transmission lines. She hoped that the proposed subproject will be beneficial for the communities.	The PESCO's team explained that the proposed subproject has been designed in accordance with the standard safety features. The team confirmed that the proposed subproject

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Sr. No.	Organization	Participants	Observations Made, Issues and Concerns Raised	PESCO's Response
				will benefit the communities by improving power supply and reducing loadshedding and power outages.
10.	Directorate of Manpower and Labor	Farzand Ali, Deputy Director, Planning	The Deputy Director raised concerns about labor issues including wage discrimination, child labor, women harassment, and lack of PPE and first-aid facilities at the construction sites. He recommended that labor-related clauses should be included in the construction contracts.	The PESCO's team confirmed that these issues have been addressed in this ESMP. The EDEIP has also prepared LMP that covers labor issues including discrimination and child labor. The EMSP includes measures to address SEA/SH risks.
11.	Forest and Wildlife Department	Mr. Rashid Hussain, Deputy Director, Forest	The Deputy Director stated that since the proposed subproject is not being implemented inside any forest area, hence the Department has no concerns regarding the subproject.	No response needed.

7.8 Issues and Concerns Raised by Women (Vulnerable Group)

Most of the female participants were initially unaware of the subproject objectives, but responded positively after the PESCO and PMISC team's explanation during the consultation meetings. They expressed hope that reliable electricity would enhance girls' education and promote gender equality. Women actively participated in the discussions, shared concerns, as outlined in Table 7-5.

Table 7-5 Issues and Concerns Raised by Women

Sr. No.	Concern Raised by Women	Response / Mitigation Measures
1.	Women expressed concerns about the presence of external workers near residential areas, fearing potential safety, security, and privacy issues.	PESCO assured that contractors will establish worker camps away from populated zones, enforce a strict code of conduct, and will ensure the safety and privacy of women as well as children.

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Sr. No.	Concern Raised by Women	Response / Mitigation Measures
2.	Participants highlighted that frequent voltage fluctuations often damage home appliances and make household work more difficult.	PESCO explained that these problems are due to an old and weak power distribution network. The planned subprojects will help stabilize voltage, ensuring steady electricity supply and minimizing appliance damage.
3.	Some women raised concerns about being excluded from project consultations and decision-making processes.	PESCO reaffirmed its commitment to promoting women's participation through separate consultation meetings and inclusion in community-level decision forums.
4.	Participants noted that the area lacks proper road infrastructure, girls' schools, and employment opportunities, which increases daily challenges for women.	PESCO responded that the subproject will indirectly support socio-economic development by generating local jobs and improving basic infrastructure in the area.
5.	Concerns were shared about temporary power shutdowns during subproject construction, which may disrupt household routines.	PESCO clarified that any required power interruptions will be of short duration, with prior notice provided to all affected households to allow them to plan accordingly.
6.	Women also raised the issue of inadequate access to clean drinking water, which forces them to fetch water from distant locations.	PESCO acknowledged this issue and noted that overall development activities under the subproject will contribute to local infrastructure improvement and service delivery.
7.	Several participants requested that women be given fair employment opportunities in project-related work.	PESCO assured that contractors will prioritize hiring unskilled and semi-skilled local workers, including women, where possible, to promote gender inclusion.
8.	In some areas female community members highlighted that the waste dumping should be proper as they had previously experienced waste dumped in their community.	PESCO and PIMSC representative assured that the waste will be dumped proper at the designated sites by the contractor and failure to this the contractor will face contractual action. Also, the community was briefed about GRM and how to lodge complaint.

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7.9 Future Consultations

Stakeholder engagement and consultations are on-going activities and will continue to be carried out during the project construction and O&M phases, in accordance with the SEP. An indicative framework is presented in **Table 7-6** listing these consultations; it will be finalized before commencing the construction activities/site mobilization.

Table 7-6: Consultation Framework

Description	Target Stakeholders	Timing	Responsibility
Public awareness sessions to share the ESMP with the communities and other stakeholders. Location: various places in subproject area	• Communities within subproject area, general public; and the relevant line departments/ agencies.	Before mobilizing each site.	PIMSC/PESCO
Consultations with the communities and other relevant stakeholders (eg, KP-EPA) during ESMP implementation. Separate meetings will be arranged with the women of the area. Location: various places in subproject area/relevant offices	• Communities at/around subproject area; relevant government departments	During implementation of subproject activities.	PIMSC/PESCO
Consultations with the communities and other relevant stakeholders regarding establishment of GRM Separate meetings will be arranged with the women of the area. Location: various places in the subproject area	• Communities at/around subproject area	Before commencement of subproject activities.	PIMSC/PESCO
Consultations with the communities and other relevant stakeholders regarding grievance redress. Separate meetings will be arranged with the women of the area, as needed. Location: various places in subproject area	• PMU staff; consultants; relevant line departments; and communities.	Subproject implementation Stage	PIMSC/PESCO
Consultations with the communities during ESMP monitoring. Separate meetings will be arranged with the women of the area, as needed. Location: various places in subproject area	• Communities at/around subproject area	Construction Stage	PIMSC/PESCO
Consultation workshops to review ESMP implementation, any outstanding issues and grievances, views and concerns of communities; and actions needed to address them. inclusion of women of the area will be ensured through appropriate means (eg, separate sessions for women). Location: site offices in subproject area.	• Communities at/around subproject area; relevant line department; relevant NGOs	Six-monthly during implementation phase	PIMSC/PESCO

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7.10 Disclosure Requirements

The present ESMP and Urdu translation of its executive summary will be disclosed at the PESCO website. The ESMP and its translated executive summary will be made available at the PESCO offices including head-office, the relevant grid stations, contractor's site office and worksites.

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Annexure A: Environmental Code of Practice

The objective of the Environmental Code of Practices (ECoPs) is to address all potential and general construction-related impacts during the implementation of the subproject. The ECoPs will provide guidelines for best-operating practices and environmental management guidelines to be followed by the contractors for sustainable management of all environmental issues. These ECoPs will be annexed to the general conditions of all the contracts, including subcontracts, carried out under the subproject.

The list of ECoPs prepared for the subproject is given below.

- ECoP 1: Waste Management
- ECoP 2: Fuels and Hazardous Goods Management
- ECoP 3: Water Resources Management
- ECoP 4: Soil Quality Management
- ECoP 5: Erosion and Sediment Control
- ECoP 6: Air Quality Management
- ECoP 7: Noise and Vibration Management
- ECoP 8: Road Transport and Road Traffic Management
- ECoP 9: Labor Influx Management and Construction Camp Management
- ECoP 10: Cultural and Religious Issues
- ECoP 11: Workers Health and Safety

ECoP 1: Waste Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
General Waste	Soil and water pollution from the improper management of wastes and excess materials from the construction sites.	The Contractor will: • Develop a waste management plan for various specific waste streams (e.g., reusable waste, flammable waste, construction debris, food waste etc.) prior to commencing of construction and submit to PIMSC for approval. • Organize disposal of all wastes generated during construction in an environmentally acceptable manner. This will include consideration of the nature and location of the disposal site, so as to cause less environmental impact. • Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach. • Segregate and reuse or recycle all the wastes, wherever practical. • Prohibit burning of solid waste • Collect and transport non-hazardous wastes to all the approved disposal sites. Vehicles transporting solid waste will be covered with tarps or nets to prevent spilling waste along the route

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process. • Provide refuse containers at each worksite. • Request suppliers to minimize packaging where practicable. • Place a high emphasis on good housekeeping practices. • Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary storage of all wastes before transportation and final disposal.
Hazardous Waste	Health hazards and environmental impacts due to improper waste management practices	The Contractor will: • Collect chemical wastes in 200-liter drums (or similar sealed containers), appropriately labeled for safe transport to an approved chemical waste depot. • Store, transport and handle all chemicals avoiding potential environmental pollution. • Store all hazardous wastes appropriately in bunded areas away from watercourses. • Make available Material Safety Data Sheets (MSDS) for hazardous materials on-site during construction. • Collect hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations. • Construct concrete or other impermeable flooring to prevent seepage in case of spills

ECoP 2: Fuels and Hazardous Goods Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Fuels and hazardous goods.	Materials used in construction have the potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals and hazardous goods/materials on-site, and potential spills from these goods may harm the environment or health of construction workers.	The Contractor will: • Prepare spill control procedures and submit the plan for PIMSC approval. • Train the relevant construction personnel in the handling of fuels and spill control procedures. • Store dangerous goods in bunded areas on a top of a sealed plastic sheet away from watercourses; and also, under rainwater shed (to prevent contact with rainwater). • Refueling will occur only within bunded areas. • Make available MSDS for chemicals and dangerous goods on-site. • Transport waste of dangerous goods, which cannot be recycled, to a designated disposal site approved by EPA or sold to EPA registered vendors. • Provide absorbent and containment material (e.g., absorbent matting) where hazardous materials are

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		used and stored and personnel trained in the correct use. • Provide protective clothing, safety boots, helmets, masks, gloves, goggles, to the construction personnel, appropriate to materials in use. • Make sure all containers, drums, and tanks that are used for storage are in good condition and are labeled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur. • Put containers and drums in temporary storages in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area will preferably slope or drain to a safe collection area in the event of a spill. • Put containers and drums in permanent storage areas on an impermeable floor that slopes to a safe collection area in the event of a spill or leak. • Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution. • Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials. • Return the gas cylinders to the supplier. However, if they are not empty prior to their return, they must be labeled with the name of the material they contained or contain, information on the supplier, cylinder serial number, pressure, their last hydrostatic test date, and any additional identification marking that may be considered necessary.

ECoP 3: Water Resources Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Hazardous Material and Waste	Water pollution from the storage, handling and disposal of hazardous materials and general construction waste, and accidental spillage	The Contractor will: • Follow the management guidelines proposed in ECoPs 1 and 2. • Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways, stormwater systems or underground water tables
Discharge from construction sites	Wastewaters from construction sites and work camps. The construction works will	The Contractor will: • Minimize the amount of exposed soil at any one time (only clear vegetation immediately before construction is about to begin)

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	modify groundcover and topography changing the surface water drainage patterns of the area including infiltration and storage of stormwater.	• Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials • Install temporary sediment basins, where appropriate, to capture sediment-laden run-off from site • Divert runoff from undisturbed areas around the construction site • Stockpile materials away from drainage lines • Prevent all solid entering waterways by collecting solid waste, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting and transport to an approved waste disposal site or recycling depot • Collect, transport and discharge the septic tank waste from the construction camps in the nearby municipal wastewater treatment plants • Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This will be done in every exit of each construction vehicle to ensure the local roads are kept clean.
Soil Erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	The Contractor will: • Ensure that sealed roads used by construction vehicles are swept regularly to remove sediment. • Water the material stockpiles, access roads and bare soils on an as required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds).

ECoP 4: Soil Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Storage of hazardous and toxic chemicals	Spillage of hazardous and toxic chemicals will contaminate the soils	The Contractor will: • Strictly manage the wastes management plans proposed in ECoP1 and storage of materials in ECoP2 • Construct appropriate spill contaminant facilities for all fuel storage areas • Establish and maintain a hazardous materials register detailing the location and quantities of hazardous substances including the storage, use of disposals • Train personnel and implement safe work practices for minimizing the risk of spillage • Identify the cause of contamination, if it is reported, and contain the area of contamination. The impact may be contained by isolating the source or implementing controls around the affected site

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Remediate the contaminated land using the most appropriate available method to achieve required commercial/industrial guideline validation results
Construction material stock piles	Erosion from construction material stockpiles may contaminate the soils	The Contractor will: • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds

ECoP 5: Erosion and Sediment Control

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities and material stockpiles	The impact of soil erosion is (i) Increased runoff and sedimentation causing a greater flood hazard to the downstream, (ii) destruction of aquatic environment in nearby lakes, streams, and reservoirs caused by erosion and/or deposition of sediment damaging the spawning grounds of fish, and (iii) destruction of vegetation by burying or gullying.	The Contractor will: • Locate stockpiles away from drainage lines • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds • Remove debris from drainage paths and sediment control structures • Cover the loose sediments and water them if required • Divert natural runoff around construction areas prior to any site disturbance • Install protective measures on-site prior to construction, for example, sediment traps • Observe the performance of drainage structures and erosion controls during rain and modify as required.

ECoP 6: Air Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels.	The Contractor will: • Fit vehicles with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition. • Operate the vehicles in a fuel-efficient manner • Cover haul vehicles carrying dusty materials moving outside the construction site • Impose speed limits on all vehicle movement at the worksite to reduce dust emissions • Control the movement of construction traffic • Water construction materials prior to loading and transport • Service all vehicles regularly to minimize emissions

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Limit the idling time of vehicles not more than 2 minutes
Construction machinery	Air quality can be adversely affected by emissions from machinery and combustion of fuels.	The Contractor will: • Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition in accordance with the specifications defined by their manufacturers to maximize combustion efficiency and minimize the contaminant emissions. Proof of maintenance register will be required by the equipment suppliers and contractors/subcontractors • Focus special attention on containing the emissions from generators • Machinery causing excess pollution (e.g. visible smoke) will be banned from construction sites Service all equipment regularly to minimize emissions • Provide filtering systems, duct collectors or humidification or other techniques (as applicable) to the concrete batching and mixing plant to control the particle emissions in all its stages, including unloading, collection, aggregate handling, cement dumping, circulation of trucks and machinery inside the installations
Construction activities	Dust generation from construction sites, material stockpiles and access roads is a nuisance in the environment and can be a health hazard.	• Water the material stockpiles, access roads and bare soils on an as required basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g. high winds). Stored materials such as gravel and sand will be covered and confined to avoid their being wind-drifted • Minimize the extent and period of exposure of the bare surfaces • Reschedule earthwork activities or vegetation clearing activities, where practical, if necessary to avoid during periods of high wind and if visible dust is blowing off-site • Store the cement in silos and minimize the emissions from silos by equipping them with filters. • Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations • Crushing of rocky and aggregate materials will be wet-crushed, or performed with particle emission control systems.

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ECoP 7: Noise and Vibration Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Noise quality will be deteriorated due to vehicular traffic	The Contractor will: • Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures • Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc. • Organize the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise on the work site
Construction machinery	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor will • Appropriately site all noise generating activities to avoid noise pollution to local residents • Use the quietest available plant and equipment • Modify equipment to reduce noise (for example, noise control kits, lining of truck trays or pipelines) • Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures. Equipment suppliers and contractors will present proof of maintenance register of their equipment. • Install acoustic enclosures around generators to reduce noise levels. • Fit high efficiency mufflers to appropriate construction equipment • Avoid the unnecessary use of alarms, horns and sirens
Construction activity	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor will: • Notify adjacent landholders prior any typical noise events outside of daylight hours (6 pm to 7 am) if the construction works are being carried out near residential areas • Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions • Employ best available work practices on-site to minimize occupational noise levels • Install temporary noise control barriers where appropriate • Notify affected people if major noisy activities will be undertaken, e.g. pile driving • Plan activities on site and deliveries to and from site to minimize impact • Monitor and analyze noise and vibration results and adjust construction practices as required. • Avoid undertaking the noisiest activities, where possible, when working at night (6pm to 7 am) near the residential areas.

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ECoP 8: Road Transport and Road Traffic Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Increased traffic use of road by construction vehicles will affect the movement of normal road traffics and the safety of the road-users.	The Contractor will: • Prepare and submit a traffic management plan to the PIMSC for their approval before commencement of construction. • Include in the traffic management plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, temporary road, temporary bridges temporary diversions, necessary barricades, warning signs / lights, and road signs. • Provide signs at strategic locations of the roads complying with the schedules of signs contained in the Pakistan Traffic Regulations. • Install and maintain a display board at each important road intersection on the roads to be used during construction, which will clearly show the following information in local language: o Location: chainage and village name o Duration of construction period o Period of proposed detour / alternative route o Suggested detour route map o Name and contact address/telephone number of the concerned personnel o Name and contact address / telephone number of the Contractor o Inconvenience is sincerely regretted.
	Accidents and spillage of fuels and chemicals	• Restrict truck deliveries, where practicable, to day time working hours (7 am to 6 pm). • Restrict the transport of oversize loads. • Operate road traffics/transport vehicles, if possible, to non-peak periods to minimize traffic disruptions. • Enforce on-site speed limit

ECoP 9: Labor Influx Management and Construction Camp Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Siting and Location of construction camps	Campsites for construction workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.	The Contractor will: • Prepare a management plan for construction of workers camp in accordance with IFC Guidance on Workers Accommodation and submit the plan for supervision consultant's approval. • Locate the construction camps within the designed sites or at areas which are acceptable from environmental, cultural or social point of view; and approved by the supervision consultant. • Consider the location of construction camps away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities.

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Submit to the supervision consultant for approval a detailed layout plan for the development of the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, and drainage facilities, prior to the development of the construction camps. • Local authorities responsible for health, religious and security will be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters.
Construction Camp Facilities	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	Contractor will provide the following facilities in the campsites: • Adequate accommodation, transportation, and basic services including water, sanitation, and medical care for the workers working on that project Safe and reliable water supply, which will meet NEQS. Drinking water to be chlorinated at source, and ensure presence of residual chlorine 0.1 ~ 0.25 ppm as minimum after 30 minutes of chlorine contact time (WHO guideline). • Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. Provide separate latrines and bathing places for males and females with total isolation by location. The minimum number of toilet facilities required is one toilet for every ten persons. • Treatment facilities for sewerage of toilet and domestic wastes. • Storm water drainage facilities. • Paved internal roads. • Provide child crèches for women working construction site. The crèche will have facilities for dormitory, kitchen, indoor and outdoor play area. Schools will be attached to these crèches so that children are not deprived of education whose mothers are construction workers. • Provide in-house community/common entertainment facilities. Dependence of local entertainment outlets by the construction camps to be discouraged/prohibited to the extent possible.
Workers Accommodation	All workers in the camp will have adequate accommodation facilities	The Contractor will provide the following: • The labor will be provided with accommodation on twin sharing basis made of insulated material and locally available building material, etc.; • The migrant workers with families will be provided with individual accommodation comprising bedroom, sanitary and cooking facilities; • The units will be supported by common latrines and bathing facilities duly segregated for male and female labor;

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Adequate number of toilets will be provided in the accommodation facilities. A minimum of 1 unit to 15 males and 1 unit for 10 females will be provided; • The contractor will provide a kitchen facility for the construction workers and the food will be of appropriate nutritional value and will consider religious/cultural backgrounds; • All doors and windows will be lockable and mobile partitions/curtains will be provided for privacy; • Facilities for the storage of personal belongings for workers will be provided within the campsite only; • Dustbins will be provided for collection of garbage and will be removed on a daily basis; • It is also required to provide first aid box in adequate numbers; and • Ventilation will be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time.
Disposal of waste	Management of wastes is crucial to minimize impacts on the environment	The Contractor will • Ensure proper collection and disposal of solid wastes within the construction camps • Insist waste separation by source; organic wastes in one pot and inorganic wastes in another pot at household level. • Store inorganic wastes in a safe place within the household and clear organic wastes on daily basis to waste collector. Establish waste collection, transportation and disposal systems with the manpower and equipment/vehicles needed. • Dispose organic wastes in a designated safe place on daily basis. At the end of the day cover the organic wastes with a thin layer of sand so that flies, mosquitoes, dogs, cats, rats, are not attracted. One may dig a large hole to put organic wastes in it; take care to protect groundwater from contamination by leachate formed due to decomposition of wastes. Cover the bed of the pit with impervious layer of materials (clayey or thin concrete) to protect groundwater from contamination. • Locate the garbage pit/waste disposal site min 500 m away from the residence so that peoples are not disturbed with the odor likely to be produced from anaerobic decomposition of wastes at the waste dumping places. Encompass the waste dumping place by fencing and tree plantation to prevent children to enter and play with. • Do not establish site specific landfill sites. All solid waste will be collected and removed from the work camps and disposed in approval waste disposal sites.
Fuel supplies for cooking purposes	Illegal sourcing of fuel wood by construction workers will impact the natural flora and fauna	The Contractor will: • Provide fuel to the construction camps for their domestic purpose, in order to discourage them to use fuel wood or other biomass.

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Made available alternative fuels like natural gas or kerosene on ration to the workforce to prevent them using biomass for cooking. • Conduct awareness campaigns to educate workers on preserving the protecting the biodiversity and wildlife of the project area, and relevant government regulations and punishments on wildlife protection.
Health and Hygiene	There will be a potential for diseases to be transmitted including malaria, exacerbated by inadequate health and safety practices. There will be an increased risk of work crews spreading sexually transmitted infections and HIV/AIDS.	The Contractor will: • Provide adequate health care facilities within construction sites. • Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint fulltime designated first aider or nurse. • Provide ambulance facility for the laborers during emergency to be transported to nearest hospitals. • Initial health screening of the laborers coming from outside areas • Inspect all camp facilities regularly to ensure o Daily sweeping of rooms and houses will be undertaken; o Regular cleaning of sanitary facilities will be undertaken; o The kitchen and canteen premises will be established under good hygiene conditions; o Daily meal times will be fixed for the labor; o Smoking and alcohol consumption will be prohibited in the workplace; o Water logging will be prevented at areas near the accommodation facilities and adequate drainage is to be provided; and o Checklists pertaining to the daily housekeeping schedule will be maintained and displayed at houses, toilets and kitchen. • Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work • Provide HIV awareness programming, including STI (sexually transmitted infections) and HIV information, education and communication for all workers on regular basis • Complement educational interventions with easy access to condoms at campsites as well as voluntary counseling and testing • Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form. Regular mosquito repellant sprays during monsoon. • Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers. Place display boards at strategic

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		locations within the camps containing messages on best hygienic practices
Safety	Inadequate safety facilities to the construction camps may create security problems and fire hazards	The Contractor will: • Provide appropriate security personnel (police / home guard or private security guards) and enclosures to prevent unauthorized entry into the camp area. • Maintain register to keep a track on a headcount of persons present in the camp at any given time. • Encourage use of flameproof material for the construction of labor housing / site office. Also, ensure that these houses/rooms are of sound construction and capable of withstanding wind storms/cyclones. • Provide appropriate type of firefighting equipment suitable for the construction camps • Display emergency contact numbers clearly and prominently at strategic places in camps. • Communicate the roles and responsibilities of laborers in case of emergency in the monthly meetings with contractors.
Site Restoration	Restoration of the construction camps to original condition requires demolition of construction camps.	The Contractor will: • Dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates at the completion of the construction work. • Dismantle camps in phases and as the work gets decreased and not wait for the entire work to be completed • Give prior notice to the laborers before demolishing their camps/units • Reuse the demolition debris to a maximum extent. Dispose remaining debris at the designated waste disposal site. • Handover the construction camps with all built facilities as it is if agreement between both parties (contactor and land-owner) has been made so. • Restore the site to its condition prior to commencement of the works or to an agreed condition with the landowner. • Not make false promises to the laborers for future employment in O&M of the project.

ECoP 10: Socio-cultural and Religious Issues

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities near residential areas	Disturbance from construction activities (dust, noise, traffic, conflicts with contractor's workforce etc.)	The Contractor will: • Establish a system for receiving complaints from the community and address them (the community can also make complaints to the GRM established under the project) • Will ensure all the construction workers follows the following code of conduct:

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• All workers are strictly forbidden to establish any kind of relationship with local women bring any un-related women to the project site. • All workers will avoid sexual harassment and child abuse. • All workers must not leave the camps or work sites unless a written authorization is issued by the respective supervisor • The contractors will advise and prohibit the local population and its authorities or representatives not to enter the project operation areas (campsites, colonies, etc.) in order to minimize the potential risk of incidents related to the operations.
Construction activities near religious and cultural sites	Disturbance from construction works to the cultural and religious sites, and contractors lack of knowledge on cultural issues cause social disturbances.	The Contractor will • Communicate to the public through community consultation and newspaper announcements regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restriction. • Do not block access to cultural and religious sites, wherever possible • Restrict all construction activities within the footprints of the construction sites. • Stop construction works that produce noise (particularly during prayer time) will there be any mosque/religious/educational institutions close to the construction sites and users make objections. • Take special care and use appropriate equipment when working next to a cultural/religious institution. • Stop work immediately and notify the site manager if, during construction, an archaeological or burial site is discovered. It is an offence to recommence work in the vicinity of the site until approval to continue is given by the PIMSC/PMU. • Provide separate prayer facilities to the construction workers. • Show appropriate behavior with all construction workers especially women and elderly people • Allow the workers to participate in praying during construction time • Resolve cultural issues in consultation with local leaders and supervision consultants • Establish a mechanism that allows local people to raise grievances arising from the construction process. • Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works so as to maintain effective surveillance over public health, social and security matters

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ECoP 11: Worker Health and Safety

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Best practices	Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g. noise, dust, chemicals, construction material, solid waste, waste water, vector transmitted diseases etc.), (ii) risk factors resulting from human behavior (e.g. STD, HIV etc.) and (iii) road accidents from construction traffic.	The Contractor will: • Implement suitable safety standards for all workers and site visitors which will not be less than those laid down on the international standards (e.g. ILO guideline on 'Safety and Health in Construction; World Bank Group's 'Environmental Health and Safety Guidelines') and contractor's own national standards or statutory regulations, in addition to complying with the national standards of the Government of Pakistan (• Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas, • Provide personal protection equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty ones and replacing them with the damaged ones. • Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job • Appoint an environment, health and safety manager to look after the health and safety of the workers • Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works and establishment of construction camps so as to maintain effective surveillance over public health, social and security matters
	Child and pregnant labor	The Contractor will: • not hire children of less than 16 years of age and pregnant women or women who delivered a child within 8 preceding weeks, in accordance with the national Labor Laws
Accidents	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	• Provide health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations will be easily accessible throughout the place of work • Document and report occupational accidents, diseases, and incidents. • Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice. • Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures.

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Provide awareness to the construction drivers to strictly follow the driving rules Provide adequate lighting in the construction area and along the roads
Construction Camps	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	The Contractor will provide the following facilities in the campsites to improve health and hygienic conditions: • Adequate ventilation facilities • Safe and reliable water supply. • Hygienic sanitary facilities and sewerage system. The toilets and domestic wastewater will be collected through a common sewerage. • Treatment facilities for sewerage of toilet and domestic wastes • Stormwater drainage facilities. • Recreational and social facilities • Safe storage facilities for petroleum and other chemicals in accordance with ECoP 2 • Solid waste collection and disposal system in accordance with ECoP1. • Arrangement for trainings • Paved internal roads. • Security fence at least 2 m height. • Sickbay and first aid facilities
Water and sanitation facilities at the construction sites	Lack of Water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.	The contractor will provide portable toilets at the construction sites, if about 25 people are working the whole day for a month. Location of portable facilities will be at least 6 m away from storm drain system and surface waters. These portable toilets will be cleaned once a day and all the sewerage will be pumped from the collection tank once a day and will be brought to the common septic tank for further treatment. Contractor will provide bottled drinking water facilities to the construction workers at all the construction sites.
Trainings	Lack of awareness and basic knowledge in health care among the construction workforce, make them susceptible to potential diseases.	The Contractor will: • Train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of sexually transmitted infections (STI) HIV/AIDS. • Train all construction workers in general health and safety matters, and on the specific hazards of their work . Training will consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. • Commence the malaria, HIV/AIDS and STI education campaign before the start of the construction phase and complement it with by a strong condom marketing, increased access to condoms in the area as well as to voluntary counseling and testing. • Implement malaria, HIV/AIDS and STI education campaign targeting all workers hired, international and national, female and male, skilled, semi- and unskilled occupations, at the time of recruitment and thereafter pursued throughout the

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		construction phase on ongoing and regular basis. This will be complemented by easy access to condoms at the workplace as well as to voluntary counseling and testing.

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