ISLAMABAD ELECTRIC SUPPLY COMPANY

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY REPORT





CONSTRUCTION OF 132 KV GRID STATION DHA ROSE SECTOR (PHASE- VII) AND ITS FEEDING T/LINE PROJECT, DISTRICT RAWALPINDI.

Islamabad Electric Supply Company (IESCO)
Website: www.iesco.com.pk

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Proposed Project

CONSTRUCTION OF 132 KV GRID STATION DHA ROSE (PHASE - VII) AND ITS FEEDING T/LINE PROJECT, DISTRICT RAWALPINDI

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EXECUTIVE SUMMARY

Background

Islamabad Electric Supply Company (IESCO), herein referred to as the "Proponent", intends to construction 132 KV grid station in DHA ROSE (Phase VII), District Rawalpindi, along with installation of feeding transmission line. This project aims to supply electric power to DHA ROSE Sector (Phase VII). As a legal obligation, the proponent needs to conduct an Environment Impact Assessment (EIA) Study of the Project and apply for Construction Phase Environmental Approval from Punjab EPA.

IESCO has engaged M/s Sustainable Solutions Consultant International (SSCI) SMC (Pvt.) Ltd for carrying out Environment Impact Assessment (EIA) Study of this project.

EIA Scope

The scope of the EIA report is to describe the project and associated legal and regulatory framework, document all baseline information of physical, ecological, and socio-economic environments of the project area; describe the project alternatives, consultation with stakeholders; assess both the positive and negative impacts and recommend mitigation measures for negative impacts including developing Environmental and Social Management and Monitoring Plans for the project.

Legislative Requirements

The EIA of the proposed project has been carried out in compliance with the mandatory requirement of Section 12 of the Punjab Environmental Protection Act 1997 (amended 2017) and PEPA (Review of EIA/IEE) Regulations 2022.

Project Description

Main features of the proposed project are summarized below:

1	**Project Title**	Construction of 132 KV Grid Station DHA ROSE Sector (PHASE - VII) and Its Feeding T/L, District Rawalpindi.
2	**T/L Length and No. Of Towers**	About 15 Km Transmission Line with 90 Electric poles.
3	**Objective**	To supply stable and reliable Electric Power to DHA ROSE (PHASE - VII), Rawalpindi.
4	**Implementation Plan**	Commencement of Construction just after getting NOC from Punjab EPA.
5	**Construction duration**	12 to 24 months.
6	**Estimated Project Cost**	PKR 2700 Million
7	**Location of GS and T/L**	Grid Station within boundaries of DHA ROSE Sector.

		- Coordinates 33°30'43.33"N 73°17'08.78"E - Both GS and T/L to be installed within District Rawalpindi.	
8	**Location Map**		
9	**Land Required**	DHA has allocated 28.6 Kanal land for Grid Station. The land has not been transferred to IESCO.	
10	**Misc. Information**	- Project does not require any dislocation or resettlement or clearing of infrastructure. - Damage to crops or land in ROW will be compensated as per applicable laws/Telegraph Act 1885. - Allocated Land is categorized as barren and broken - Site is not prone to any natural hazard – flood, landslide or any other hazard - The project site is not located in any environmentally sensitive area - Project will not alter/deteriorate surface hydrology or Waterways.	
11		**Construction Phase**	**Operation Phase (Operation area)**
	Workforce	15 – 50	5
	Water Supply	20m3/day	6m3/day
	Sewage generation	8 m3/day	3m3/day
	Solid Waste	250 Kg/day	5 Kg/day
	Power Source	Power During Construction: will be supplied by IESCO source / Diesel Generators	

Consideration of Alternatives

No Project Alternative: The 'No Project Option' is the least preferred from the socio-economic perspective as the power supply is required at DHA ROSE PHASE-VII. Therefore, the No Project Alternative is deemed inappropriate.

Site Alternatives: As DHA has provided 28.6 Kanal land for grid station within DHA, no other site alternative was considered for the site. The land ownership will remain with DHA.

Transmission Line Route Alternative: IESCO evaluated various routes; however, the final route chosen is the shortest, primarily traversing barren / cultivated land with minimal vegetation / crop and causing the least disruption to landowners and habitat.

Technology Alternatives

- Two types of grid station design – Gas Insulated Station (GIS) and Air Insulated Stations (AIS) were considered. The AIS was finalized due to low cost
- Generally, there are 3 types of circuit breakers –Conventional Oil-filled circuit breakers, Advanced SF-6 circuit breakers and Vacuum circuit breakers. The advanced SF-6 circuit breakers were selected due to their better performance.
- Single Circuit and Double Circuit Transmission Line Towers were examined; double circuit T/L towers were chosen to provide the future expansion option.
- Tower and Tubular Poles were assessed. Tubular poles are used where space available is limited. Tubular poles were selected.
- PCB free oil was selected as IESCO had banned PCB containing oils.

The Environmental Baseline

An environmental baseline was established that covers the existing physical, ecological, and socio-economic environment of the Project Area.

Topography: The terrain is moderately undulating, typical of the Potohar Plateau, with low hills, seasonal streams (nullahs), and shallow valleys. Surface runoff follows natural drainage channels toward the Soan River. Extensive urban development has modified the original landform through grading and road construction.

Seismology: According to the Building Code of Pakistan, the Islamabad–Rawalpindi region lies within Seismic Zone 2B, indicating moderate seismic hazard with peak ground acceleration approximately 0.16–0.24 g. Earthquake-resistant structural design is therefore required.

Climate: In Rawalpindi, the summers are short, sweltering, humid, wet, and clear and the winters are short, cold, and mostly clear. Over the course of the year, the temperature typically varies from 3.9°C to *38.3°C* and is rarely below *1°C* or above *42°C.* Approximately 60–70% of the annual rainfall occurs during the monsoon season (July–September).

Air Quality, Noise and Underground Water: Monitoring was carried out at the project site on to determine the base case of the project. Any change in these parameters during Construction and Operation Phases will indicate the impact of various activities on environment in these phases. The analyses results of ambient air and groundwater comply with the PEQS of ambient air and ground water quality. The average noise level during daytime and night time was observed to be 62 dB (A) and 48 dB (A) which is within the PEQS limits of 75 and 65 respectively.

Natural Habitat: The project area is located within the urbanized landscape of DHA Rawalpindi. Natural vegetation is limited to green belts, landscaped parks, roadside plantations, and seasonal drainage channels, with common urban bird and small mammal species present.

Environmentally Sensitive Area: The project site is not adjacent to or within any environmentally sensitive area such as - Cultural / Historical Heritage site, Protected Area, Wetland, Precious Ecosystem, Buffer zone of protected area, School, Mosque and Leisure Park etc.

Demographics: DHA Rawalpindi is a planned residential community with a predominantly middle- and upper-income population. The area has a high literacy rate and is occupied by government employees, military personnel, business professionals, and private-sector workers.

Education and Literacy: Rawalpindi boasts one of the highest literacy rates in the country, with 80%, placing it second after Islamabad, which has a literacy rate of 87%. Several public and private schools, colleges, and educational institutions are located within and around DHA Rawalpindi. These facilities adequately serve the educational needs of the surrounding population.

Health Facilities: The project area has easy access to public and private healthcare facilities, including hospitals, clinics, pharmacies, and emergency services. Major hospitals in Rawalpindi and Islamabad are located within a reasonable travel distance.

Accessibility and Traffic: The site is well connected through the DHA Expressway, Islamabad Expressway, and GT Road. The internal road network is well developed, and traffic mainly consists of private vehicles, public transport, and construction-related traffic during peak hours.

Cultural and Community Structure: The surrounding community is well planned, comprising residential sectors, educational institutions, mosques, commercial areas, and recreational parks. No protected archaeological or cultural heritage sites have been identified within the immediate project area.

Role of Women and Women Empowerment: Pakistan Vision 2025 has women empowerment as one of its main objectives. Power companies do not practice gender discrimination. However, information obtained from eight organizations in the energy sector revealed that, on average, women

made up 4.6% (386/8437). Women's well-being and empowerment can be enhanced through education, financial independence, access to quality healthcare, and the implementation of supportive policies and regulations. The majority of women work in power company offices, however they find it difficult to work in evening and night shifts at Power generation plants and in distribution and transmission companies.

Women in DHA Rawalpindi actively participate in education, healthcare, business, government services, and other professional sectors. They also contribute to household management, community welfare activities, and social development. Various educational institutions, community organizations, and private enterprises promote women's participation in economic and social activities, reflecting a comparatively high level of women's empowerment within the community.

Public Consultation

Public consultation was conducted with local residents, community representatives, and nearby stakeholders to obtain their views regarding the proposed project. Overall, the community expressed a positive attitude towards the project due to its expected socio-economic benefits, including employment opportunities and infrastructure development. Stakeholders emphasized the importance of controlling dust, noise, traffic, and construction waste during the implementation phase. Their concerns have been considered in the Environmental Management Plan (EMP) to minimize potential environmental and social impacts.

Environmental and Social Management Plan (ESMP)

The Environmental and Social Management Plan (ESMP) of the project provides a road map on how to address identified significant environmental and social impacts to keep it environment friendly during construction and operational phases. Monitoring Plan is also developed to check compliance of the ESMP and to take timely corrective actions in case any deviation from significant criteria, requirement or goal is found.

Potential Impacts and Mitigation Measures

Impact	Mitigation
Noise	- Ensure that noise from construction activities is within permissible levels as per the provision of PEQS for Noise - Use low noise equipment and machinery with silencers and mufflers, avoid horns

	- For stationary equipment, use an acoustic enclosure - Use noise barriers if essential - Use hearing protection e.g., plugs, earphones to eliminate or decrease noise exposure if required - Develop an appropriate mechanism to address any grievance or concerns from the Project-affected community - Proper maintenance of machinery and identify faulty machinery to fix the noise problem. - Restrict the use of mobile phone other than emergency use
Air Quality deterioration	- Ensure exhaust emissions from construction machinery and equipment, Generators to comply with PEQS for exhaust emissions - Minimize dust emissions by wet suppression – Use water sprays at appropriate frequency especially near sensitive receptors. - Cover open stockpiles of construction materials with tarpaulin. - Cordon off project area to minimize dust migration to nearby facilities - The scheduled maintenance of power generators shall be carried out to control exhaust emissions well within PEQS limits. - Avoid open burning of solid waste
Soil and Water Contamination	- Prevent washing away of construction materials, soil, silt, or debris into any drainage system. - Maintenance and servicing of vehicle, machinery, and equipment must be carried out in a designated area - Ensure periodic maintenance of vehicles to avoid oil or fuel leakages. - Inspection of vehicles for any fuel/oil leakages - Use standard practices of oil/fuel/chemicals storage handling - Ensure appropriate wastewater handling to avoid any soil contamination with consequent water contamination. - Regular monitoring of groundwater to ensure compliance with PEQS for drinking water.
Damage to Crops or Land during clearing of ROW and Installation of Towers	- Restrict the clearing as per design and marked ROW. - Timely reimbursement of any loss / damage to crops/trees or any infrastructure of the affected parties as per applicable laws. - Keep record of vegetation removal.

Impact on Terrestrial Fauna and associated Ecosystems	- Use animal proof garbage containers (Animals are Attracted to Garbage and Food Waste)
Loss of habitat or danger to wildlife due to Illegal Hunting and/or harassing	- The construction workers will not be allowed to indulge in hunting or damage to the wildlife and habitat

Social and Gender Issues	- Construction crew will be instructed that:
	  - They are not allowed to enter the nearby villages and settlements.
	  - They will respect local social norms and practices.
	- Contractor will not allow to hire child labor (proof on CNIC is required)
	- Contractor may install temporary fencing where required with the consent of relevant authority or landowner.
	- Community health and safety considerations will be addressed promptly.

Health Hazards due to inappropriate solid waste handling	<u>Construction Phase</u> - Develop and implement a waste management plan for the construction phase - Arrange on-site Segregation and collection of construction, domestic, packaging, and vehicle-related waste. (Non –risk and Risk waste) - Encourage to Reduce, Safe Reuse, and Recycle (3R) the waste. <u>Operational Phase</u> - The DHA administration will manage the waste in operation phase – On site segregation and disposal of waste will be encouraged. - Encourage to Reduce, Safe Reuse, and Recycle (3R) the non-hazardous waste
Impacts associated with Wastewater Management	<u>Construction Phase</u> - Construct designated channels for wastewater particularly from worksite toilets and divert to the septic pond before discharge to the public sewer. - Ensure compliance of effluent with relevant PEQS <u>Operational Phase</u> - Install oil and grease trap for kitchen wastewater and clean regularly. - Construct proper sewerage system for offices, control room, maintenance staff rooms/offices. - Arrange cleaning of septic tanks regularly. - Sewage sludge removed from the Septic Tank shall be properly disposed of. - Restrict entry of solid waste into the wastewater stream

	- Regularly inspect the sewerage system and repair when necessary. - Ensure that the sewage is passing through Septic Tank before discharge to municipal system
Safety Hazards due to construction activities and inappropriate waste handling	<u>Design Phase</u> - Designing using international standards and best engineering practices to prevent Natural Risks and ensure structural integrity and minimization of hazards – to workers, community, wildlife <u>Construction Phase</u> - Follow OSHA workplace safe practices - Barricade the excavation and other safety risks areas - Follow safety protocol for work on height and in confined space. - Arrange safety briefings and talks with contractor staff. - Train the staff for fire-fighting and prevention. - Provide first aid boxes and fire-fighting equipment at the site. - Limit vehicles speed within facility @20 Km/hr. Ensure drivers having a valid license. - Reliability assurance of machines and equipment - Ensure use of PPEs where required. - Emergency Response Plan (ERP) shall be prepared and implemented - Install proper lighting and arrange proper ventilation - Communicate safety hazards with adequate signage, <u>Operational Phase</u> - Ensure proper hazardous waste management to avoid occupational injuries and illness. - Enforce the use of PPEs. - Communicate safety and health hazards with adequate signage, - Timely reporting of hazards and near-misses shall be established. - Protocol for incident reporting and incident investigation should be developed. Accordingly, the waste management plan may be updated and revised to prevent the recurrence of incidents. - Fire-fighting systems including fire hydrants, fire extinguishers, sprinklers, and smoke detectors shall be installed in relevance to the type of fire

	- Ensure awareness to permanent and contract employees for potential safety and health hazards associated with the installations at Grid Station - Train workers on safe work practices, specific hazards associated with their job description, basic first aid, fire prevention, and firefighting. - Emergency Response Plan (ERP) including evacuation plan shall be developed and implemented to address any fire, explosion, spillage of oil, exposure to gases or radiation, and any safety or security incident or accident. - Conduct drills for preparation of disaster management and emergency response preparedness. - Ensure placement of first aid box at site.
Biological impacts due to removal of trees from the project area/Loss of vegetation	- Plan for compensatory planting for five trees against each fallen tree of similar floral function - Serious Efforts will be made to avoid damage to natural vegetation as far as possible during the transmission line works. Herbicides will not be used to clear vegetation along the transmission line route (or at other project locations) - Disallow introduction of exotic species with known environmental setbacks (Eucalyptus, etc.). - Keep record and follow up for their proper growth
Electrocution of Birds/Wildlife	- Minimize chance of accidental electrocution at design stage. - Installation of spikes or sonic repellent devices will discourage roosting and nesting on facilities.
Maintenance of T/L Occupational Health and Safety	Maintenance Plan and Maintenance procedures are available with IESCO to mitigate hazards associated with Live power lines, working at height on towers and structures and EMF. - Training of employees on these procedures should be conducted on regular basis

Environment Monitoring Plan for Construction and Operational Phases

Components	Parameters	Standard	Location	Frequency	
				Construction	Operations
Noise	Noise Level dB(A) Survey	Punjab EPA PEQS For Noise	At construction site and campsite	Quarterly	NA
Ambient Air Quality	CO, SO_2, NO_x, Particulates (PM_{10}, $PM_{2.5}$)	Punjab EPA PEQS For Noise	At construction site and surroundings	Quarterly	NA
Water Quality	Drinking water PEQs,	PEQS/WHO	At different Potable Water Points	Quarterly	NA
Trees Plantation	Visual Inspection	-	Along the inner boundary wall of grid station without compromising security	Regular Monitoring by IESCO& DHA Management.	
Public Grievances	Social parameters	Social parameters	At construction site and surroundings	Regular Monitoring by IESCO & DHA Management.	

CONCLUSION AND RECOMMENDATIONS

The Environmental Impact Assessment (EIA) for the proposed project, "Construction of 132 kV Grid Station DHA (PHASE- VII) and Its Feeding Transmission Line Project at DHA, District Rawalpindi," has been conducted to meet the mandatory requirements of Section 12 of the Punjab Environmental Protection Act 1997 (amended 2017) and the PEPA (Review of EIA/IEE) Regulations 2022.

Conclusion

Major conclusions of the EIA study are:

- The construction of the 132 KV grid station at DHA PHASE- VII, along with a 15 km long feeding transmission line, is a viable and sustainable option from both environmental and socioeconomic perspectives.
- This project serves a purpose, aimed to supply reliable and stable supply of electricity to the DHA PHASE- VII. The estimated cost of the project is Rs. 2700 million, with a projected timeline of 12 to 24 months.
- DHA has generously provided land for the grid station within its Complex, at no cost. The land has established accessibility and is located within secured premises. It is classified as barren and broken, eliminating the need for acquisition or resettlement. The project site is not situated in any environmentally sensitive area and is not prone to floods or landslides.
- Based on the EIA study, it has been concluded that the proposed project is unlikely to cause any significant adverse effects on the physical, biological, or socioeconomic environment, provided that the proponent adheres to the Environment and Social Management and Monitoring Plans throughout the pre-construction, construction, and operational phases.
- The majority of stakeholders have welcomed the project due to its significance. Concerns and suggestions raised by stakeholders and the public have been incorporated into the EIA. However, local communities along the right-of-way may still have concerns regarding construction activities near their land. To address these potential issues, a Grievance Redress Mechanism (GRM) has been established to mediate conflicts and reduce the need for lengthy litigation.

Recommendation

It is therefore recommended that the Punjab Environmental Protection Agency grant Environmental Approval for the Construction of the 132 kV grid station at DHA Rose PHASE-VII, along with a 15 km long feeding transmission line, provided that the suggestions made by participants during the public hearing are incorporated into the Environmental Impact Assessment (EIA).

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1. INTRODUCTION

1.1 GENERAL

Islamabad Electric Supply Company (IESCO) supplies, distributes and sells electricity in the area of Islamabad, Rawalpindi, Chakwal, Attock, Jhelum and Azad Kashmir. It serves 3.9 million consumers including domestic, commercial, industrial, bulk, tube-wells and others directly but touches the lives of more than 25 million people. IESCO intends to start construction phase of a new project titled as "Construction of 132 KV Grid Station and Its Feeding T/L Project at DHA ROSE PHASE-VII, District Rawalpindi."

In line with Punjab Environment Protection Act 1997 (amended 2017) and Punjab-EPA (Review of Initial Environment Examination-IEE and Environment Impact Assessment-EIA) Regulations, 2022, it is mandatory for the proponent of any development project to obtain Environmental Approval (before commencing construction of the Project) from EPA Punjab by filing an IEE or EIA study report, before the Agency.

1.2 THE PROPOSED PROJECT

The IESCO's proposed project includes:

- Construction of 132 KV Grid Station within the DHA ROSE PHASE- VII, District Rawalpindi
- 132 KV double circuit feeding Transmission Line for 132 KV DHA ROSE PHASE-VII Grid Station. The 132 KV transmission line will originate from IESCO Electricity Transmission Network approx. 20 KM away from the proposed Grid Station.

The salient features of project have been described in detail in Chapter 3 of this EIA Report.

1.3 OBJECTIVES OF THE PROJECT

Main objectives are:

- Accomplishment of the project will ensure the reliable and stable electric supply to the DHA ROSE PHASE-VII.
- Assessment and evaluation of the actual and potential environmental impact of the proposed development; and Development of Environmental Management Plan to identify the mitigation strategies targeted towards avoidance, minimization and rehabilitation of impacts.
- Creating employment opportunities for skilled and non-skilled workforce during Construction and Operation Phases.
- Business opportunities for local residents and local entities.

1.4 SCREENING OF THE PROJECT

Screening of the project is performed to determine whether the proposed project requires Environment Impact Assessment (EIA) study or Initial Environment Examination (IEE) study based on Regulation 3, Schedule I (for IEE) and Regulation 4 (for EIA) of Punjab Environmental Protection Agency Review of IEE and EIA Regulations, 2022. The proposed project includes sub=projects of construction of grid station and also the installation of feeding transmission lines, Screening concludes as follows:

- Construction of a grid station falls in a project category listed in Schedule II Energy Projects that need to file EIA with the agency, whereas
- Transmission Lines of 132 KV fall in the project category listed in Schedule I Energy Projects requiring submission of IEE with the agency.

Therefore, EIA will be carried out for both the sub-projects as EIA is more detailed and covers all the requirements of IEE.

1.5 SCOPING

1.5.1 Spatial and Temporal Boundaries of the Project

1.5.1.1 Spatial Scope

Project Boundaries are defined as the temporal and spatial limitations imposed by the Project's activities. For the Project, spatial limitations are confined to activities associated with construction and operations of new buildings, access road and related infrastructure. The Project Footprint includes all lands subject to direct disturbance from the Project and associated infrastructure. The Local Study Area (LSA) was established based on the zone of the Project influence, beyond which the potential environmental, cultural and socio-economic effects of the Project are expected to be non-detectable. For physical environmental study, spatial boundary was considered to be "Local" where the impact was limited to the local area in close proximity to the proposed Project. In case of the biological and socioeconomic environment, efforts were made to collect the information within one Km around the project area for grid station and even up to region of 5 Km surrounding the proposed project (grid station and 15 Km long transmission corridor) where any direct or indirect impacts were envisaged. The special boundaries of the proposed project where impacts have been assessed are:

- Immediate Area of Influence (Local): Within the proposed project site boundary.
- Direct Area of Influence: Within 5 Km from the proposed project site boundary.

1.5.1.2 Temporal Scope

Segments of the temporal boundaries include the duration of the construction and operation phases of the Project. Effects on socioeconomic receptors and resources have been assessed for the construction and operational phases of the proposed project. The construction activities of the proposed project are planned for a period of 12 to 24 months which the potential impacts have been assessed.

The temporal boundaries have been defined as lasting with the life of the project and significant throughout the year. Therefore, the operational impacts have been assessed for the entire lifespan of the facility.

The impacts related to the decommissioning of the proposed project are not included in the report as will be assessed at the time of decommissioning.

1.5.2 Important Issues and Concerns Raised During Consultation

A number of consultation meetings, key information interviews and focused group discussion sessions were conducted with different stakeholders in order to identify wide range of concerns and potential impacts associated with the project's activities. These impacts and concerns were addressed in the EIA Study.

Names stakeholders, organizations and their feedback is given Annexure IV.

1.5.3 Significant impacts and Factors to be Determined

The major impacts which need to be determined are:

- Site selection, Technology alternatives, Technology finalization
- Impact of poor design. (Design in accordance with Engineering standards and best practices)
- Impact on occupational health, safety and environment
- Maintenance of heavy machinery and nuisance created by sound, dust and vibration
- Site Security
- Traffic congestion
- Job opportunities for locals
- Water supply and water conservation
- Waste generation and disposal
- State of the art technology and energy efficiency
- Minimum damage to the crops and land
- CSR activities
- Timely Compensation for Right of the Way
- Social impacts of the project
- Site restoration after construction
- Tree plantation and Landscaping
- Firefighting and Emergency preparedness

1.6 THE PROPONENT

Islamabad Electric Supply Company Limited (IESCO) is the proponent company of the project.

1.6.1 Legal Status and Nature of Business

Islamabad Electric Supply Company Limited (IESCO) is a Public Limited Company and falls in the category of Public Interest Company under the Third Schedule of the Companies Act, 2017. It was incorporated

on 25th April 1998 vide company registration No. L09499 of 1997-98 dated 25.04.1998 under Section 32 and certificate for commencement of business was obtained on 1st June 1998 under Section 146 (2) of Companies Ordinance 1984.

- IESCO's core function is to supply, distribute and sell power (electricity) in the area from Attock to Jhelum and from the river Indus to River Neelum in Kashmir.
- The Company is owned by the Government of Pakistan, and the Administrative Ministry is the Ministry of Energy (Power Division).
- Registered Office IESCO Head Office; Street 40; Sector G-7/4; Islamabad.
- Head Office: Phone No. 051-9252036, Fax No. 051-9252893
  Website: www.iesco.com.pk

1.6.2 Contact Information

The Proponent Company has appointed Mr. Sher Afzal (Deputy Director Environment and Social Safeguard Section) to oversee the coordination between the consultant and the Environmental Protection Agency (EPA) Punjab for the EIA study until the environmental approval is granted by Punjab EPA.

- Contact Person: Mr. Sher Afzal

  Deputy Director Environment and Social Safeguard Section
- Contact No: 051-9252036, 0319 5992209
- Email ID: iescopmu@iesco.com.pk
- Address: PMU, IESCO, HQ, Street No. 40, Sector G7/4. Islamabad.

1.7 THE CONSULTANT

Sustainable Solutions Consultant International (SSCI) SMC (Pvt.) Ltd Consultancy Services has expertise of carrying out EIA studies in accordance with the EPA Guidelines, Acts and Regulations. The EIA studies are carried out in close collaboration of the proponent. It is always ensured that the EIA report is thoroughly reviewed and vetted by the proponent before its submission to Punjab EPA.

Annexure V illustrates the Terms of Reference (TOR) for appointment of consulting firm for conducting environment impact assessment (EIA) for the project.

The details of EIA Consultant's Team are given In Annexure VI.

Contact Person: Ms. Bisma Zahoor (Environmental Specialist)

Contact No: 0347-8227881

Address: M/s Sustainable Solutions Consultant International (SSCI)

SMC (Pvt.) Ltd.

Office No. 14, First Floor, Alay Plaza near PIA Head Office, Islamabad.

1.8 LAND FOR THE PROJECT

1.8.1 Land for Grid Station:

The installation of grid station requires approximately 28.6 kanal land which has already been allocated within the existing boundaries of DHA ROSE PHASE-VII, Rawalpindi. (Annexure VII).

1.8.2 Land for Transmission Line

The construction of 132 KV feeding transmission line will require 25-meter-wide strip (12.5 meter on each side of transmission line) for 30 km as Right of Way (ROW), also known as transmission corridor, for constructing, maintaining and protecting the transmission line as well as to meet the requisite safety clearances and the electromagnetic field exposure limits. The area required for each Pole will be 2 meters. The issues regarding the land for Right of Way have already been addressed. Now, the Land allocated for Transmission Corridor is clear of all legal or social ambiguities.

1.9 LOCATION OF THE PROJEC

The Grid Station will be located within the existing premises of DHA ROSE PHASE-VII, Rawalpindi District**.** Location of the project area has been marked on the map of IESCO Electrical Network as shown in Figure 1.1. The coordinates of grid station are 33°30'43.33"N 73°17'08.78"E.

1.10 COST OF THE PROJECT

Total cost: PKR 2700 million.

1.11 SCOPE OF STUDY

The scope of EIA Study is as under:

- Description of physical, ecological and socio-economic conditions in and around the proposed facility.
- To identify pre-construction, construction and operation activities (aspects) and to identify and assess the positive and negative impacts on environment.
- To propose mitigation measures in order to eliminate or offset negative impacts on environment in advance, at the planning stage.
- Consultation with Stakeholders at each step of EIA process to incorporate public views in the Project at planning and design stage.
- Identification of occupational hazards during all stages of the project and laying down suggestions for improvement in the conditions.
- To propose environment management plan (EMP)
- Prepare an EIA Report to be filed with the Punjab EPA for according Environmental Approval.

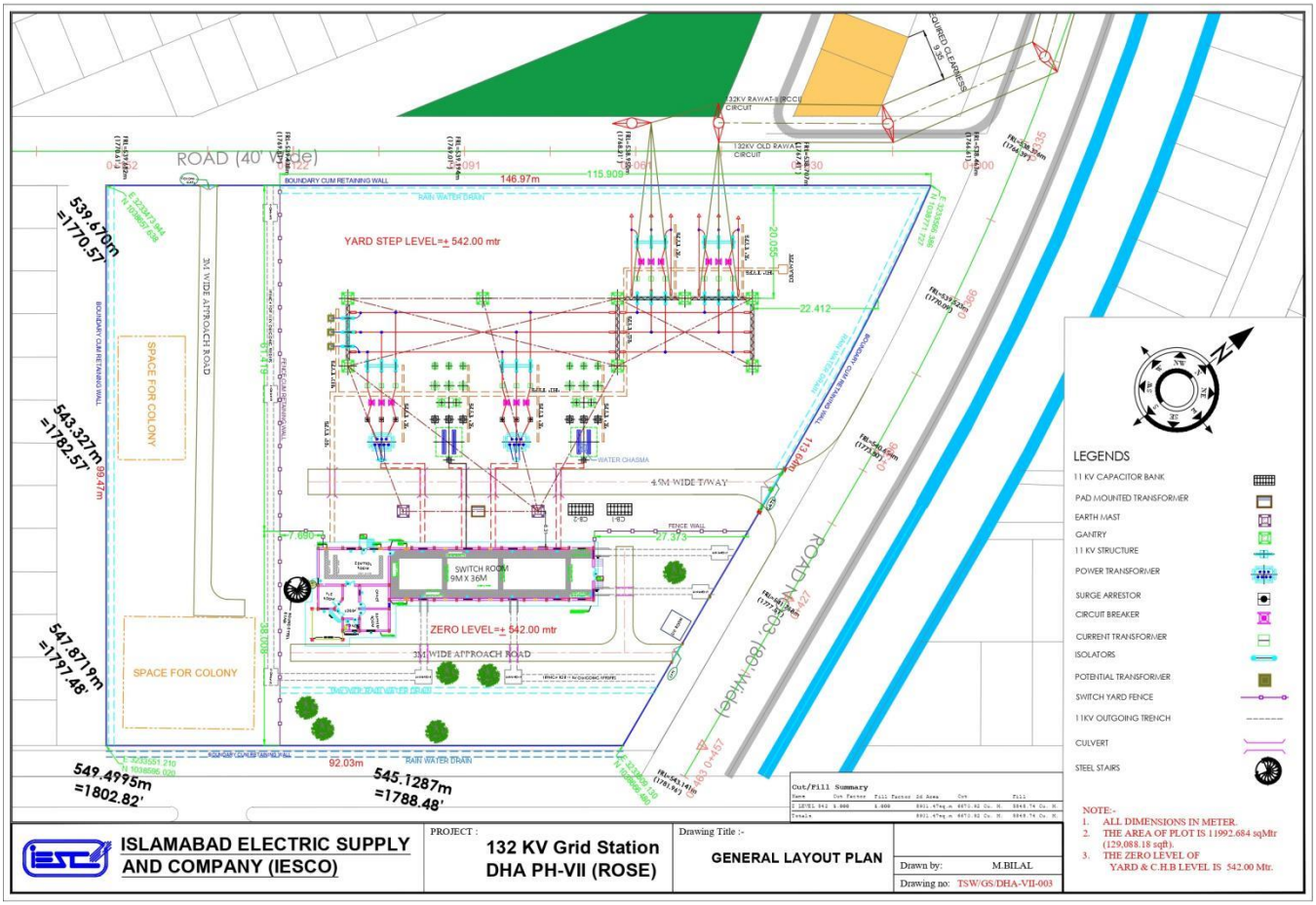


Figure 1.1 Project Area Marked on the Map of IESCO Electrical Network

1.12 METHODOLOGY FOR EIA STUDY

This Section presents methodology opted during EIA Study of the proposed Project. EIA was a cyclical process with considerable interaction between the various steps.

1.12.1 Screening

The screening is performed to determine whether the proposed Project is required to be supported by:

- Initial Environmental Examination (IEE), Schedule I (Regulation 3) or
- Environmental Impact Assessment (EIA), Schedule II (Regulation 4).

The schedules are part of the 'Punjab Environmental Protection Agency (Review of IEE and EIA) Regulations 2022', in exercise of the powers referred by Section 33 of the Punjab Protection Act 1997.

Screening of this project was performed as described in Section 1.4

1.12.2 Scoping

The scoping exercise helps identify key environmental issues that should be highlighted in the EIA. Scoping' stage defines key issues that should be included in the Environmental Assessment and determines the scope, depth and Terms of Reference for the EIA study. This is a very important step both in identifying the impacts and controlling the size of the EIA. Effective scoping enables:

- Defining the Spatial and Temporal Boundaries of the Project for the EIA study.
- Consulting with relevant stakeholders to identify full range of concerns.
- Focusing on key issues that characterize the existing environment in the baseline studies.
- Reviewing the types of alternatives to be considered.
- Making logical decisions which impacts are more significant and need to be focused in EIA.

1.12.3 Description of the Project

This includes a clarification of the purpose and rationale of the project, and an understanding of its various characteristics – including stages of development, location and processes. Kickoff meeting was held with the proponent and discussions were made to clarify the nature of the project in environment perspectives. Preliminary analyses of the data received from the proponent was performed to identify key environmental issues that could arise from the Project.

1.12.4 Consideration of Alternatives

The consideration of alternatives seeks to ensure that the proponent has considered other feasible approaches, including alternative project locations, scales, processes, layouts, operating conditions and the 'no action' option.

1.12.5 Review of Published Literature and Available Documents of Project

A literature survey is indeed crucial for enhancing the quality of Environmental Impact Assessments (EIAs). By thoroughly reviewing relevant publications and environmental reports, researchers can identify best practices and lessons learned from previous projects.

Additionally, examining the effects of similar projects can help predict outcomes and inform mitigation strategies. This holistic approach not only supports the development of robust EIA reports but also

promotes sustainable project planning and execution. Overall, a thorough literature survey is fundamental for achieving continual improvement in EIA quality.

IESCO documents such as Layout plans of grid station and Feeding T/L; IESCO Electrical Network Map were also reviewed. The secondary data collected on various aspects—such as physical conditions, ecological resources, socio-economic conditions, and heritage features—provides a comprehensive understanding of the project area. This information is vital for assessing potential impacts and ensuring that all relevant environmental factors are considered.

1.12.6 Legislative Review

Information on relevant legislations, regulations, guidelines, and standards is reviewed and compiled.

1.12.7 Field Visits and Environmental Baseline

It includes establishment of both the present and future state of the environment, in the absence of the project, taking into account changes resulting from natural events and from other human activities. The project site was visited to collect primary data on water and wastewater quality, ambient air quality, noise level, and ecological species surviving in the area and the ecosystems prevalent. Preliminary socio-economic surveys including interviews of people around the site were also carried out in order to identify relevant environmental aspects. The tests for ambient air, water and wastewater quality were conducted by the EPA-certified laboratory of M/s Seal and noise levels were measured using noise meter.

1.12.8 Identification of Main Aspects and Impacts

The aim is to ensure that all potentially significant environmental impacts (adverse and beneficial) against main aspects during pre-construction, construction and operation phases were identified.

1.12.9 Impact Assessment and Mitigation Measures

The collected data was evaluated and the relative significance of the identified impacts was assessed to allow a focus on the main adverse impacts. Mitigation involves the introduction of measures to avoid, reduce, remedy or compensate for any significant adverse impacts.

1.12.10 Consultation with Stakeholders

The Stakeholders were consulted at each stage of EIA to enhance the quality and effectiveness of the EIA study. It would ensure that the public's views were adequately taken into consideration in the decision-making process.

1.12.11 Development of Environment Monitoring and Management Plan

The Monitoring and Management Plans are required to manage environment, safety and health risks associated with the Project activities during Construction and Operation phases.

1.12.12 Review of Draft Report

The EIA Study Report was prepared in accordance with the relevant EPA guidelines, Acts and Regulations and EIA checklist. The report was prepared in close collaboration with IESCO team. The draft report was reviewed by the Proponent before its submission to Punjab EPA.

1.12.13 Final report

Before submission of final EIA report to Punjab EPA, it was ensured that

- The comments from the proponent and stakeholders have been incorporated and addressed in the final report.
- All the contents outlined in EIA Checklist are included.
- The proponent has reviewed and vetted the EIA report.

1.12.4 Filing of EIA Assessment with EPA

Five ring-bound printed paper copies and one electronic copy (PDF or word format) of EIA Report shall be filed with the agency accompanied by

- An application, in the form prescribed in Schedule IV
- Copy of receipt showing payment of the review fee
-

1.13 STRUCTURE OF EIA STUDY REPORT

The EIA Study report comprises of the following chapters:

Chapter 0: **Executive Summary**

Chapter 1**:** **Introduction** (An overview of the project, proponent and consultants, and EIA).

Chapter 2**:** **Legal Requirements and Guidelines** (A description of the pertinent national a provincial legislations, regulations and policies that are relevant and applicable to the project and a demonstration of how the project conforms to them. Also, guidelines of Punjab EPA, IFC, WHO and JCI were highlighted).

Chapter 3**:** **Description of Project** (Detailed description of the project and summary of project inputs and outputs).

Chapter 4**:** **Description of the Environment** (Baseline Study; Description of project area's existing physical, biological and socio-economic condition, including geo-morphology and soils, water resources, air quality, flora, fauna).

Chapter 5**:** **Stakeholder Consultation** (All stakeholders are Consulted)

Chapter 6**:** **Project Impacts and mitigation measures** (Presents an assessment of the project's impacts, suggested mitigation measures in order of eliminating or minimizing the impacts or compensating for the loss or rehabilitating the environment, residual impacts and the monitoring requirements).

Chapter 7**:** **Environmental Management & Monitoring Plans** (Provides Environmental Management Plan & Environmental Monitoring Plan for both construction and operation phases of the project).

Chapter 8: **Conclusion and Recommendations** (Concludes the EIA report with a few recommendations to implement the project in environment-friendly manner).

1.14 CONSULTANT'S TEAM FOR EIA

Table 1.1: Consultants team for EIA

Engineer Muhammad Ali	Team Leader
Ms. Bisma Zahoor	Environmental Specialist
Mr. Sherbaz Hussain	Forester
Mr. Muhammad Razi Ul Hassan	Sociologist
Ms. Anila Fida	Data Analyst

2 STATUTORY REQUIREMENTS, GUIDELINES& STANDARDS

2.1 GENERAL

This chapter describes the current legal responsibilities of the proponent in context of Environmental and Sustainable Development, and deals with the relevant current policies as well as legal and administrative framework related to carry out EIA of the project. An efficient and effective organizational structure is essential for successful implementation of the mitigation measures identified for the project. Like other projects, the proposed Expansion Project, before its implementation, is required to go through an Environmental Assessment, in accordance with the provisions of the Punjab Environmental Protection Act 1997 (Amended 2017).

2.2 EXISTING LEGISLATION AND LEGAL FRAMEWORK

The Federal Ministry of Environment was responsible authority for policy making on environmental protection in Pakistan but after 18th Amendment in the Constitution, the Provincial Governments have taken over the subject of Environment. This EIA study has been carried out in the light of the policy guidelines of the Preparation of IEE/EIA Reports under the procedures and practices formulated by the Pak EPA and adopted by the Punjab Environmental Protection Agency (Punjab EPA).

2.2.1 Institutional Setup

2.2.1.1 Environment Protection Department, Punjab

The Punjab Government has established Environment Protection Department (EPD) administratively controlled by the Secretary, Government of Punjab. The EPD has its independent Minister. According to the provisions of the Punjab Environmental Protection (Amendment) Act, 2012, EPD has a significant role in policy making and implementation of the environmental laws in the Punjab Province.

2.2.1.2 Environmental Protection Council

The Punjab Environmental Protection Council (PEPC) is the apex decision-making body of Punjab. It was developed under the provision of Punjab Environmental Protection (Amendment) Act 2012and headed by the Chief Minister of Punjab with other members.

2.2.1.3 Environmental Protection Agencies

Pak EPA has been established at the Federal level and EPAs are established at Provincial level also. In Punjab an independent Environmental Protection Agency is constituted headed by the Director General. The purpose of EIA is to obtain Environmental Approval from the Environmental Protection Agency (EPA), Punjab in compliance with Pakistan Environmental Protection Act (PEPA) - 1997, now having been replaced by Punjab Environment Protection (Amendment) Act 2017.

2.3 RELEVANT LEGAL / INSTITUTIONAL FRAMEWORK

The applicable laws for the environmental study of the project are briefly given below. The proponent of the project will abide by the applicable laws and regulations.

2.3.1 Pakistan Environmental Protection Order (PEPO) 1983

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO) 1983. It was the first legislation promulgated for the protection of environment. According to PEPO, 1983 it was necessary to carry out IEE / EIA for all development projects, but there were no IEE / EIA regulations under that ordinance.

2.3.2 Punjab Environmental Protection 1997 (Amended 2017)

Section 12 of the Punjab Environmental Protection (Amendment) Act 2017 makes it mandatory for the proponent of a project to file with the Environmental Protection Agency either an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA), as the case may be, in respect of the project.

2.3.3 Regulations Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations 2022

Punjab Environment Protection Department notified the Punjab Environmental Protection (Review of IEE/EIA) Regulations 2022 on December 16, 2022.

Categorization of the projects for IEE and EIA is one of the main components of the Regulations. Projects have been classified based on expected degree of adverse environmental impacts. Projects type listed in Schedule I are designated as causing potentially less adverse effects, and require an IEE whereas Schedule II covers projects with potentially high adverse effects and require EIA to be conducted.

2.3.4 The Punjab Local Government Ordinance, 2001

Schedules 4 and 8 of this Ordinance pertain to environmental pollution. There are not withstanding any specific provisions, every local government may perform functions conferred by or under the Punjab Local Government Ordinance, 2001, and in performance of such functions may exercise such powers, which are necessary and appropriate. Under the ordinance, the local councils are authorized to restrict projects causing pollution to air, water or land. They may also initiate schemes for improving the environment.

2.3.5 Pakistan Penal Code, 1860

This defines the penalties for violations concerning pollution of air, water bodies and land. Noise pollution has been covered in section 268, which defines and recognizes noise as a public nuisance. ''A person is guilty of a public nuisance who does any act or is guilty of an illegal omission which causes any common injury, danger of annoyance to the public or the people in general who dwell or occupy property in the vicinity, or which must necessarily cause injury, obstruction, danger or annoyance to persons who may have occasion to use any public right''.

2.3.6 The Land Acquisition Act, 1894

The Land Acquisition Act (1894) deals with the acquisition of private properties for public purposes. There are 55 sections in this Act mainly dealing with area notification, surveys, acquisition, compensation, apportionment awards, disputes resolution, penalties and exemptions.

Although quite old, this act laid out the legal basis for any property affected by a project and for compensating the effected owners of the land.

2.3.7 Telegraph Act, 1885

The Act establishes the authority and responsibilities of the Telegraph Authority, specifically regarding the installation and maintenance of telegraph lines and poles. It outlines the process for determining and compensating landowners for any existing structures, crops, or trees affected by the installation, while clarifying that the land itself is not purchased or title transferred. This means landowners receive compensation only for what is directly impacted, not for the land itself. The National Transmission and Dispatch Company (NTDC) and Islamabad Electric Supply Company (IESCO) adhere to this Act for constructing transmission line towers across the country.

2.3.8 Labor Laws

Labor Laws include Employment of Child Act-1991; the Bonded Labor System (Abolition) Act 1992; Workmen`s Compensation Act-1923; Minimum Wages Ordinance-1961; The Industrial and Construction Employment Ordinance 1968. Pakistan has ratified 36 ILO conventions including 8 fundamental conventions. Pakistan has declared to bring national labor laws in conformity with the ILO Conventions. Further the Constitution (Eighteenth Amendment) Act, 2010 substantially changed the roles and responsibilities of federal and provincial governments including the devolution of labour administration to the provinces.

Operational activities during construction may affect occupational health of workers. Employers are required to abide by labor laws in respect of their own employees and to ensure that contractors to follow the relevant labor laws and rules relating to safety of the workforce and creating a healthy working environment. The proponent shall ensure that the labor force engaged at the project site is not exposed to any danger by monitoring the contractor’s work frequently.

2.3.8.1 Employment of Children Act 2016

An Act to ban the employment of children and to limit the work of adolescents (ages 15 to 18) in specific occupations and processes, such as the transportation of passengers, goods, or mail; working with live electrical wires over 50 volts; and exposure to toxic materials.

2.3.9 Antiquity Act 1975

The Pakistan Antiquities Act of 1975 aims to safeguard physical cultural resources in Pakistan. This Act specifically protects designated "antiquities" from destruction, theft, neglect, illegal excavation, and trade, including in relation to the EIA. It prohibits new construction near protected antiquities and grants the Government of Pakistan (and Provincial Governments following the 18th Amendment to the Constitution) the authority to restrict excavation in areas that may contain archaeologically significant artifacts.

2.4 POLICIES FRAMEWORK

2.4.1 National Environmental Policy 2005

The National Environmental Policy (2005) provides a framework for addressing the environmental issues (particularly pollution of fresh water bodies and coastal waters, air

pollution, lack of proper waste management, deforestation, loss of bio diversity, desertification etc.) confronting Pakistan. It recognizes the goals and objectives of the Pakistan National Conservation Strategy (PNCS, 1992), National Environmental Action Plans, and other existing environment related national policies, strategies, and action plans. It also provides broad guidelines to the Federal Government, Provincial Governments, federally administrated territories and local governments to address their environmental concerns and to ensure effective management of their environmental resources.

2.4.2 National Drinking Water Policy 2009

The Government of Pakistan (Ministry of Environment) formulated this policy to provide adequate quantity of safe drinking water to entire population of Pakistan. The Policy aims to reduce the incidence of death and illness caused by water-borne diseases. The policy also provides specific guidelines for increasing access to safe drinking water, protection and conservation of surface and groundwater resources, water treatment and safety, community participation, public awareness, capacity development, public private partnership, research and development, emergency preparedness and response and coordinated planning and implementation. It also enforces National Drinking Quality Standards.

2.4.3 Pakistan Biodiversity Strategy and Action Plan (2017-2030)

This document provides a framework for implementation as well as monitoring and evaluation of the National Biodiversity Strategies and Actions Plan and also provide a framework for implementation of provincial biodiversity action plans.

2.4.4 National Climate Change Policy

The Policy provides a framework for addressing the issues in various sectors such as water, agriculture, forestry, coastal area, biodiversity and other vulnerable ecosystems. It ensures environmental compliance through IEE and EIA in the development process.

2.4.5 Protection of Trees and Brushwood Act (1949)

The Protection of Trees and Brushwood Act of 1949 prohibit the cutting or lopping of trees along roads and canals planted by the Forest Department unless prior permission of the Forest Department is obtained

2.4.6 National Safety Policy - (NP-02/2020)

The National Safety Policy outlines the Major Implementation Principles and makes it clear that the prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risks. It emphasizes to establish and implement an effective integrated management system to promote a strong safety culture within the organization and ensure that senior management shall demonstrate commitment and leadership for safety and its continual improvement within the organization. It enforces to take measures for controlling radiation risks by maintaining and controlling the radiation doses within the limits specified by PNRA.

The Policy ensures that People and the environment, present and future, must be protected against radiation risks by providing adequate protective measures against radiation exposure. The radioactive waste generated from such facilities and activities shall be managed so as to avoid burden on future generation as well as minimizing waste generation.

The Policy provides guidelines that all practical efforts must be made to prevent and mitigate nuclear or radiation accident and there should be a necessary response and mitigation infrastructure capable for coordinating and responding to nuclear accidents and radiological emergencies at facility, local, provincial, national and international level by the licensee, the employer, the regulatory body and the government as the case may be.

2.4.7 Punjab Women Development Policy 2018

The Punjab Women Development Policy 2018 was created by the provincial government with the intention of creating a gender-sensitive Punjab. Its objectives are to address the full spectrum of women's development issues and challenges in accordance with the spirit of the Constitution, Pakistan's international obligations, and the provincial government's pursuit of gender mainstreaming and women's empowerment in Punjab.

2.5 NATIONAL AND INTERNATIONAL GUIDELINES

2.5.1 GoP "Guidelines for the Preparation and Review of Environmental Reports" 2017

The scope of this guideline is confined to those aspects of environmental report preparation and review which are of a general nature. Most of the Sections of these guidelines apply to both IEE and to EIA.

2.5.2 Guidelines for Public Consultation 1997

Pakistan EPA`s guidelines explain objectives, stakeholders and their level of involvement; techniques for public consultation; factors for effective public consultation; consensus building and dispute resolution etc.

2.5.3 International Finance Corporation (IFC) Guidelines

IFC Environmental and Social Performance Standards (PSs): The Performance Standards are directed towards clients providing guidance on how to identify risk and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. The following are the eight standards that Client is to meet throughout the life of an investment by IFC:

- PS 1: Assessment and Management of Environmental and Social Risks and Impacts;
- PS 2: Labour and Working Conditions;
- PS 3: Resource Efficiency and Pollution Prevention;
- PS 4: Community Health, Safety and Security;
- PS 5: Land Acquisition and Involuntary Resettlement;
- PS 6: Biodiversity Conservation & Sustainable Management of Living Resources; and
- PS 8: Cultural Heritage.

Performance Standard 1 applies to all projects that have environmental and social risks and impacts. Specific objectives of PS1 are:

- To identify and assess social and environmental impacts, both adverse and beneficial, in the project area of influence;
- To avoid, or where avoidance is not possible, minimize, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment;
- To ensure that affected communities are appropriately engaged on issues that could potentially affect them;
- To promote improved social and environmental performance for companies through the effective use of management systems.

IFC guidelines considered in the study are:

- IFC General Environment, Health and Safety (EHS) Guidelines, 2007;
- IFC EHS Guidelines for Environmental, Health, and Safety Guidelines Electric Power Transmission and Distribution 2007

2.6 NTERNATIONAL TREATIES SIGNED BY PAKISTAN

The following are the relevant international treaties and conventions to which Pakistan is a party:

- Convention on the Conservation of Migratory Species of Wild Animals
- Convention on Wetlands of International Importance
- Convention on the Control of Trans-Boundary Movements of Hazardous Wastes and their Disposal
- Convention concerning the Protection of World Culture and Natural Heritage
- Convention on the International Trade in Endangered Species
- International plant protection convention
- Covenant on Economic, Social and Cultural Rights
- International Labour Organization's (ILO) Core Labour Standards on
    - Freedom of association (convention 87)
    - Elimination of forced and compulsory labour (conventions 29 and 105)
    - Elimination of discrimination in respect of employment and occupation (conventions 100 and 111)
    - Abolition of child labour (conventions 138 and 182)
- Kyoto Protocol to the Convention United Nations Framework on Climate Change
- Stockholm Convention on Persistent Organic Pollutants
- United Nations Convention on Biological Diversity
- United Nations Convention on the Rights of the Child
- United Nations Framework Convention on Climate Change
-

2.7 PUNJAB ENVIRONMENTAL QUALITY STANDARDS

The Punjab Environment Department had notified the relevant PEQ standards for:

- Ambient Air
- Drinking Water
- Industrial Gaseous Emissions

- Motor vehicles exhaust and noise
- Noise
- Municipal and Liquid Industrial Effluents.

3 DESCRIPTION OF THE PROJECT

3.1 GENERAL

This Chapter provides a brief description of the proposed Project "Construction of 132 KV Grid Station at DHA ROSE PHASE-VII and Its Feeding T/L Project, District Rawalpindi." The salient features of grid station and feeding T/L are given with an emphasis on project layout, geographical location of installations, land requirement, detail of utilities and waste management.

3.2 TYPE AND CATEGORY OF THE PROJECT

As per the Punjab EPA Review of EIA/IEE Regulations 2022, the proposed sub-project of Grid Station Construction falls under "Energy Projects" of Schedule II justifying the requirement of EIA whereas the sub-project for installation of 132 KV Feeding T/L falls in Energy Projects of Schedule I thus justifying the requirement of IEE. The EIA/IEE Studies will be subjected to all provincial and national policies and current statuary requirements that have relevance to the Project.

3.3 OBJECTIVES OF THE PROJECT

The main objectives of the proposed project are:

- To ensure a reliable, safe, and uninterrupted electricity supply to the rapidly developing residential and commercial areas of DHA ROSE Phase VII and adjoining sectors.
- The project aims to strengthen the existing power distribution network, improve system reliability, reduce transmission losses, and meet the increasing electricity demand resulting from urban growth.
- Load reduction on presently overloaded grid stations and transmission

lines. The project has additional benefits of creating:

- Employment opportunities for skilled and non-skilled workforce during construction and operational phase.
- Business opportunities for local residents and local entities.
-

3.4 PROJECT LOCATION AND ACCESSIBILITY

The grid station will be situated within the DHA ROSE PHASE-VII in Rawalpindi District. The feeding transmission line will originate from the existing IESCO Transmission Network, the length of proposed transmission line is approximately 15 Km. Both the grid station and its feeding transmission line are located entirely in District Rawalpindi. The GPS coordinates of the grid station are given in **Table 3.1.**

Table 3.1: Location of Proposed Project

	Coordinates	
	Latitude	Longitude
Grid Station	33°30'43.33"N	73°17'08.78"E

As shown in **Figure 3.1**, the project site is situated at DHA ROSE PHASE-VII and is accessible through the DHA Expressway and the internal road network of DHA. Surroundings of the project site are shown in **Figure 3.2** whereas **Figure 3.3** illustrates the Route of Transmission Line (ROW) as finalized by IESCO.

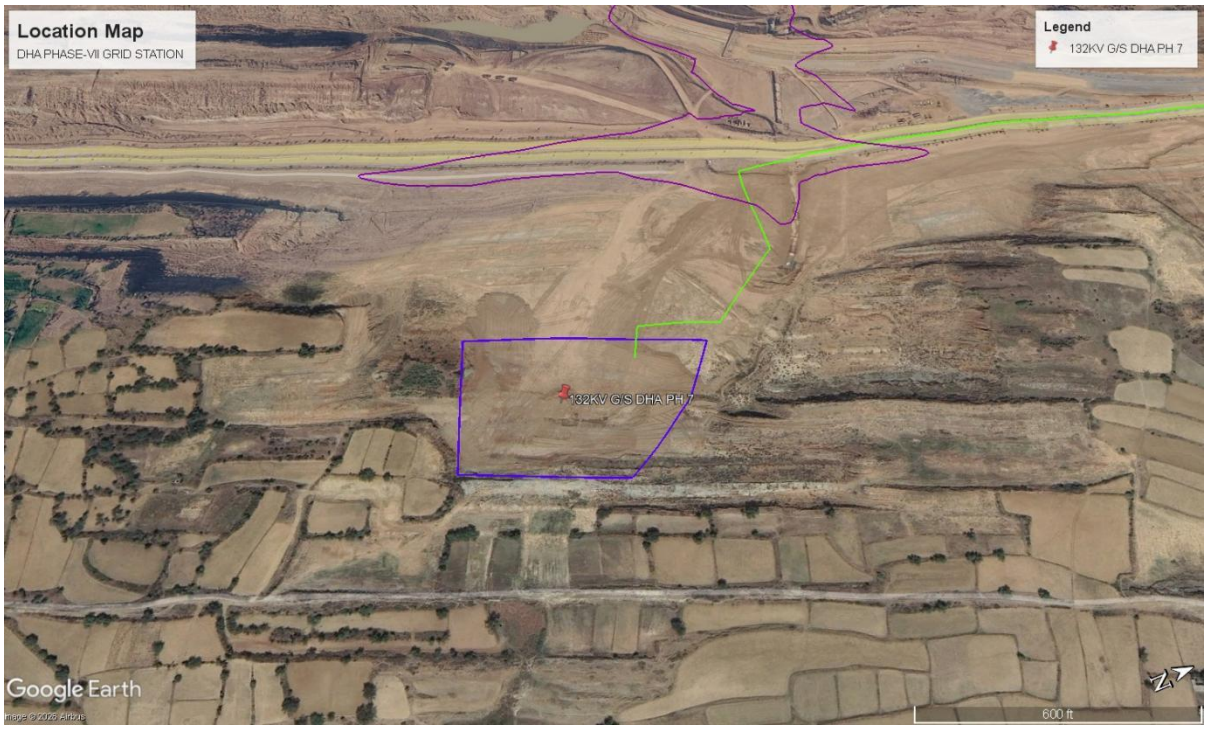


Figure 3.1 Location of DHA Rose PHASE-VII Grid Station

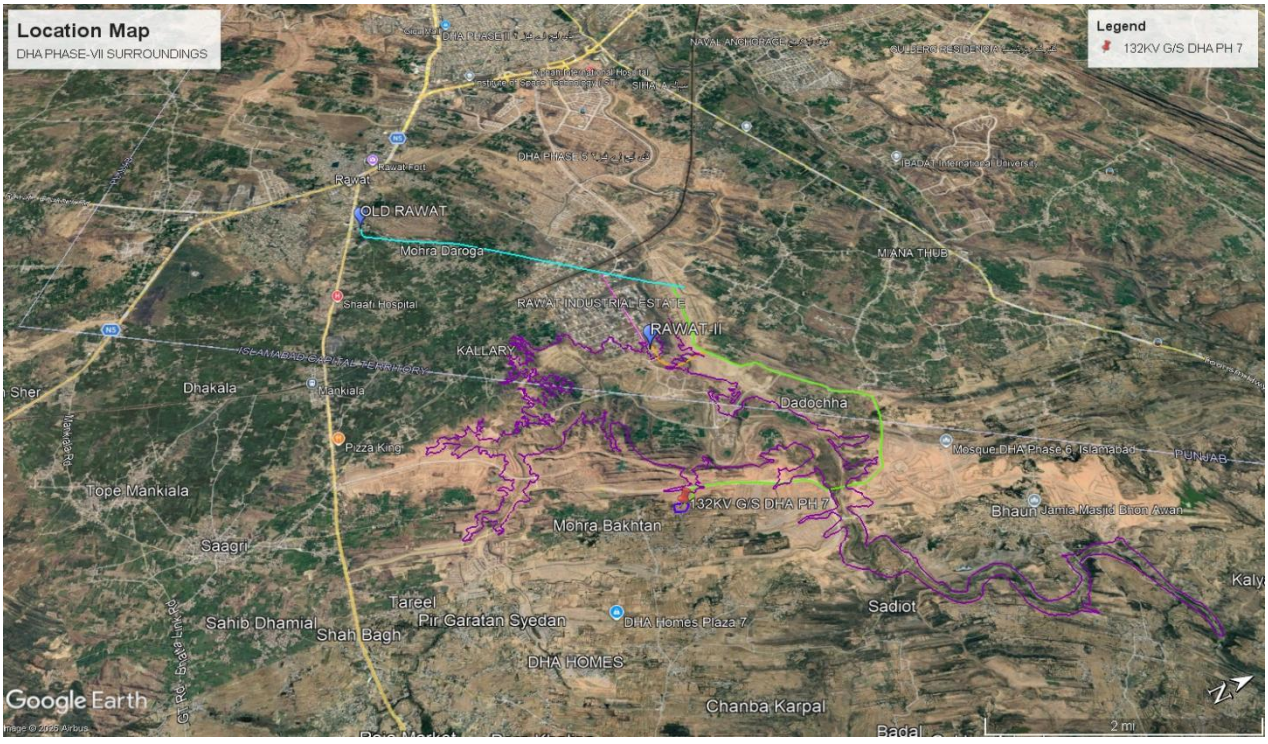


Figure 3.2 Surroundings of Grid Station



Figure 3.3 Transmission Line Route (ROW)

3.5 PROJECT DESCRIPTION

DHA has allocated 28.6 Kanal of land for construction of new 132 KV Grid Station at DHA ROSE PHASE-VII. The land has not been transferred to IESCO. Project location and accessibility have been described in Section 3.4.

3.5.1 Grid Station

Spread over 28.6 Kanal area, the Basic infrastructure facilities include civil work foundations for installation of equipment, control room buildings and other non-residential buildings and cable trenches etc. The Grid will also comprise of the residential area and miscellaneous facilities.

3.5.1.1 Description of the Grid Station Equipment

The 132 KV Grid Station will be AIS system, with Transformer Capacity of 02 x 20 MVA Power Transformer, Transformer Bay x 4.0, Capacitor Bay x 2.0 and Line Bay x 3.0.

The layout of 132 KV grid station is shown in Figure 3.4. The major equipment of grid station is listed in Table 3.2. The equipment list for T/L is given in Table 3.3

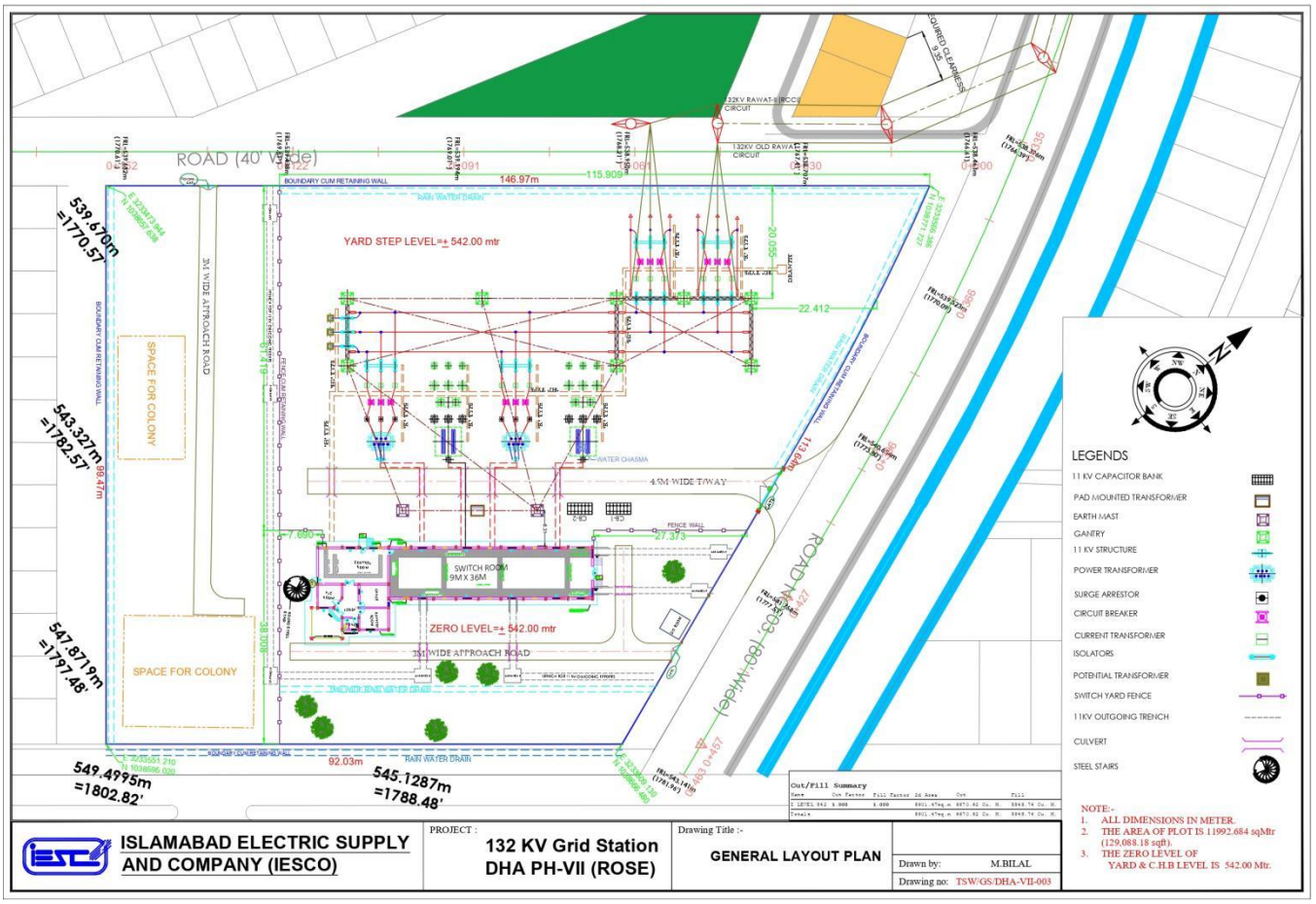


Figure 3.4 General Layout Plan for Grid Station

3.5.5.2 Control Building

Control buildings are required for the grid station to house valves, protective relays, control devices, battery banks for primary control power, and remote monitoring equipment. The size of the building depends on design of the station. Typically, the control building will be constructed of concrete block, pre-engineered metal sheathed, or composite surfaced materials.

Tale 3.2 Equipment List of Grid Station DHA ROSE PHASE-VII

Sr. No	Description
1	20/26 MVA 132/11.5 KV Power Transformer along with all allied accessories
2	132 KV Circuit Breaker with SSS along with allied accessories & Termination Connectors
3	132 KV Transformer C.T with SSS along with allied accessories & Termination Connectors Ratio 200:100:5/5A
4	132 KV Line C.T with SSS along with allied accessories & Termination Connectors Ratio 1200:600:300:5/5A
5	132 KV PT With SSS along with allied accessories & Termination Connectors
6	132KV Bus Isolator with SSS with allied accessories & Termination Connectors
7	132KV Line Isolator with SSS with allied accessories & Termination Connectors
8	132KV Lightening Arrester with SSS with allied & Termination Connectors Accessories
9	11KV Lightning Arrestor with allied accessories
10	11 KV Post Insulator with clamps
11	132KV Column
12	132KV Beam
13	132KV Earth Mast
14	11KV Bus Bar Structure
15	Control Panel CP-30
16	Control Panel CP-50
17	Relay Panel RP-3
18	Relay Panel RP-4
19	Connector Type TMRH
20	Connector Type TM63A.
21	Connector Type TMHH.
22	Connector Type 90B75F
23	Connector Type 90BH30.
24	AC/DC Station Aux Panel
25	11KV Incoming Panel 25KA

26	11KV Outgoing Panel 25 KA
27	11KV Bus Bar Coupler
28	Pad-Mounted Auxiliary Transformer 100 KVA
29	Earthing Platform
30	110 Volt Battery Bank a/w allied accessories
31	110 Volt Battery Charger
32	Earth Rod 16mm dia 3Mtr Long
33	Cartridge Type A
34	Cartridge Type B
35	Cartridge Type C
36	Mould for Type A
37	Mould for Type B
38	Mould for Type C
39	Holding Clamps for Moulds
40	String Tension Assembly for Conductor 600mm
41	Tension Assembly for Earth wire 9 mm
42	Earth wire 9mm
43	Aluminum Conductor 600 mm
44	Grounding Conductor 95 mm
45	Disc Insulator 100 KN
46	All: Pipe 75mm dia 4Mtr long
47	Power Cable 1000 MCM
48	Indoor Termination Kits for 1000 MCM
49	Outdoor Termination Kits for 1000 MCM
50	Control Cable 4x2.5 mm
51	Control Cable 8x2.5
52	mm Control Cable 16x2.5 mm
53	53 Control Cable size 4x6 mm
54	54 Power Cable 4/0 AWG
55	Outdoor Termination Kits for 4/0 AWG

56	Indoor Termination Kits for 4/0 AWG
57	L.T Power Cable 2/core.
58	L.T Power Cable 4/0 core.
59	11 KV Capacitor Control Panel
60	11 KV Capacitor 200 KVAR
61	11 KV Capacitor Rack with Structure along with all allied accessories Complete Set
62	Neutral CTs
63	LT service Box
64	Earthing Unit
65	lamp 125 watt
66	Shade for mercury lamp
67	Holder 3 pin type
68	Conventional Towers
69	19/.083 4 Core Cable

Table 3.3 Transmission Line Equipment List

Sr. No	**Description**
1	132KV Towers
2	Grounding
3	Disc Insulator a. 80 KN, b. 100 KN
4	Conductor Rail
5	HARDWARE FOR RAIL Conductor Suspension Fitting for Rail, Tension Fitting for Rail, Mid Span Joint for Rail, Stock Bridge Damper for Rail. Repair Sleeve. Earth Wire (9mm)
6	EARTH WIRE HARDWARE Suspension Fitting, Tension Fitting. Mid Span Joint
7	Stock Bridge Damper

3.5.5.3 General Facilities in Grid Stations

A. **Potable Water Supply:** Potable/drinking water supply will be provided through groundwater wells.

B. **Sewerage System**: Sewerage system will be constructed. The effluent from residences and offices will be discharged to the DHA sewer system after passing through the septic pond complying with the PEQs.

C. Firefighting System: See Section 3-10

D. **Storm water drainage and Roads:** These amenities will be built for the grid station.

E. **Fencing and Security Facilities:** The entire perimeter of the grid station will be surrounded by security fencing, or a fencing wall, to protect sensitive equipment and prevent uninvited visitors from coming into contact with live wires. A number of factors will be taken into account to ensure the station has foolproof security. These consist of security towers, CCTV cameras, sentry posts, concrete obstacles to prevent entry at the main entrance, firing positions and bunkers, etc.

F. **Tree Plantation and Landscaping**: Native plants will be planted in a three-meter buffer zone surrounding the fence, and wherever permitted, landscaping will be done most likely after completion of Construction Phase.

3.5.2 Feeding Transmission Line

The proposed transmission line that will be connected to the current IESCO electrical network (132KV Grid Station RCCI Rawalpindi) roughly 15 kilometers long within the bound of DHA. On the Transmission line, a total of 90 electric towers will be installed in accordance with IESCO specifications. Following thorough surveys, the Grid Station Construction (GSC) Department and the Environment and Social Safeguard Section (E&SS) of IESCO determined the transmission line's ultimate path. The following factors were taken into account: the least amount of socioeconomic damage, the ecological environment, and adjacent settlements along the route. A route alignment with the least amount of vegetation preferably bare ground was chosen in order to prevent tree cutting and to ensure that there were no Right-of-Way (ROW) conflicts.

3.5.2.1 Right of Way (ROW)

There are two sorts of safety considerations. One pertains to the system's safety, while the other concerns with the general public. For this reason, the related 132 KV transmission line's right-of-way (ROW) has been adopted by IESCO as a 25 m wide corridor that is 12.5 m on either side of the center line. The area allocated for each tower spot is 2 meters. The settlements residing adjacent to the transmission line have been granted trust and will receive payment in accordance with the relevant applicable laws. There is no problem with the community regarding resettlement because most of the area needed for the transmission line is primarily undeveloped. In case the transmission line causes damage to crops, trees, infrastructure, etc., compensation will be arranged within a month of the construction activities.

3.6 DESIGN CONSIDERATIONS

3.6.1 DESIGN for Grid Station and T/L

The design parameters for the proposed Grid Station and transmission lines are based on standard of NTDC / IESCO.
Permissible conductor clearances used for planning and designing of Transmission Lines are illustrated in Table 3.4

Table 3.4: **Permissible Conductor Clearance Parameters.**

Sr. No	Description	Clearance
1	Roads and Streets	7.9
2	Cultivated land and traversed by vehicles	6.7
3	Highways	7.9
4	Railroads	7.9
5	River at high flood	9.1
6	Electrified railroad trolley wire	3.85
7	Places accessible to pedestrians	7.9
8	Building roofs not accessible to people	5.2
9	Top of trees	5
10	Canals	9.1
11	Communication and Power Lines:	
12	Power Line up to 66 KV	2.7
13	Power Line up to 33 KV	2.7

3.6.2 Tower Structure for Feeding T/L

Every tower will be made of galvanized structural steel forms and will be of the self-supporting lattice steel structure type. The steel used will comply with the most recent version of the specifications. There will be anti-climbing devices, number plates, and hazard plates on every tower.

3.6.3 Safety Measures

There are two types of safety considerations. Some deal with the public, while others are related to the system's safety. For this reason, the linked 132 KV transmission line will use a 25 m wide (12.5 m on either side of the centerline) corridor as its right-of-way (ROW). This decision was made by IESCO.

3.6.3.1 System Safety

Conductor to Tower Clearance: Every element that could disrupt the power supply needs to be taken into account throughout the design process for the system's safety. It is crucial that the conductor is free from trusses and tower legs. As a result, under a minimum clearance of 1.55 m has been included in the design under severe wind conditions. This is based on GOP/WAPDA standards and the National Electric Safety Code's minimal criteria (ANSI C2). With this clearance, the maximum excess voltage under unfavorable weather circumstances has a 99% chance of not causing a switching surge with a 3-sigma margin.

Earthing of the System: An earthing system is attached to each tower. This is done to maintain the resistance of the tower footings below 10 ohms. In order to do this, two earth electrodes made of steel rods covered in copper are plunged vertically into the ground to a minimum depth of three meters. Crow footing will be applied if the necessary resistance is not reached.

Lightning Performance: Within the allowed lightning intensities, the tower geometry, system insulation, and clearance are all designed to operate safely. One trip out or 100 km/year due to lightning is the permitted level.

Work Uniform and Safety and Health Equipment: Building grid stations and related transmission lines is a specialized profession, requiring workers to wear protective uniforms and personal protective equipment in order to meet safety and health regulations. It will be made sure that laborers handling construction debris, mixing concrete, moving transmission lines, and other such tasks wear safety helmets, long boots, overall clothes, goggles, and gloves. They will always have their business identity cards tied with a ribbon around their necks. Anyone entering the building site will also be required to wear safety shoes and a helmet as a general precaution for their health, safety, and the environment. It is necessary to make special provisions for fire protection, such as giving concerned staff firefighting training and the proper kind of extinguisher.

3.6.3.2 Public Safety

General Aspects: IESCO has implemented a policy allowing fruit trees in existing orchards that are no taller than 4 meters to stay under the lines in the interest of public safety. Persian wheels and other open wells may continue to lie beneath the transmission cables. However, under the high voltage conductors, tube wells and peter pumps are not allowed. This is due to the possibility of lines coming into touch with piping and cranes used to renovate such wells. The corridor is off-limits to residential properties and other public structures, such as factories, schools, hospitals, etc. However, as long as a minimum clearance of 7.0 meters is maintained, farm buildings that are not utilized for residential purposes may continue to be above the high voltage lines. Tower heights can be raised to make room for these kinds of structures.

Conductor to Ground Clearance: It is preferable to calculate the conductor to ground clearance based on switching surge over voltage. Moving objects under the 4.5 m line must have safe clearance in order to sustain a switching surge with a 3-sigma margin and a 99.7% probability under unfavorable air conditions. This should maintain the maximum induced current in a person and the maximum voltage gradient at ground level within the internationally permitted limits. Therefore, the overall clearance between the conductor and the ground must never be less than 7.0 meters. This complies with NTDC policy as well as Government of Pakistan (GOP) laws.

3.7 CONSTRUCTION

3.7.1 Construction Contractor

Constructor will hire a staff of 15 to 20 persons. In addition to facilities required for construction phase, the contractor will need construction camps to accommodate 15 to 20 skilled and semi-skilled workforce (in addition to local unskilled labor) that are involved in construction. The construction camps will include:

- Offices, kitchen, restrooms, water storage etc.
- Arrangements for the disposal of solid waste and sewage waste (Septic Tank)
- Firefighting arrangements,
- Fuel storage, Oil storage, electric generators, etc.
- The estimated demand for water supply will be 20 m3 per day during the peak construction period and the contractor camp will generate a maximum of 0.25 ton of solid waste. In view of the extent of the works under the proposed project, IESCO's GSC directorate officials will work as supervision engineers, in order to ensure the quality of the construction, installation, and testing work.

3.7.2 Construction of Grid Station

Construction of grid stations will be carried out in accordance with NTDC /IESCO procedures.

- Soil and Field survey
- Site preparation and mobilization of construction equipment and material
- Foundation construction: Once ground surface is levelled and terraced, the concrete works and construction of foundations for the supporting steel work, heavy transformers and other switch gear will commence. This will also include the construction of storm water drainage pipes, slabs, bund walls, a control room, small buildings and storage areas that are needed.
- All open areas between the major equipment will be covered with about a 100 mm layer of 25 – 38 mm crushed stone.
- Installing the Structures
- Installation of Grid Station Equipment: The transformers, circuit breakers, reactors and other high voltage equipment will be delivered to site and erected
- Land Restoration: Cleaning and land restoration of grid station site.

3.7.3 Installation of Transmission Line

The installation will be in accordance with NTDC/IESCO specifications and procedures. Major steps involved are:

- Property staking to indicate the boundaries
- Soil and Field survey
- Construction access needed so large equipment including a drill rig, concrete trucks, and a crane can be delivered to the site.
- Tree clearing and other vegetation removal (only if essential and unavoidable) on the identified access route and the construction sites.
- Equipment and Material Mobilization to the Construction sites including crane, drill rig, concrete truck, boom trucks, trailers, structures, etc.
- Installation of Conductors (Wires) which are attached to insulators attached to the structure. This requires trucks, heavy equipment etc. Stringing is undertaken using a winch to pull the conductor along the towers and a 'tensioner' at the other end to keep the conductor above the ground.

- Land Restoration: After completion of installation, cleaning and land restoration of ROW is carried out. In case of damage to crops or other non-restorable property during construction, IESCO will fairly reimburse the landowner for those damages.

3.7.4 Water Supplies during Construction

The tube wells will be installed to supply ground water for the new project during its construction and operational phases.

- Estimated water consumption during construction = 20 m3/day (5300 gallons per day)
- Source = Groundwater

3.7.5 Waste Disposal during Construction Phase

3.7.5.1 Wastewater Generation:

Major source of wastewater is from kitchen and sewage that will be disposed of (after passing Septic Tank) through existing sewerage system of DHA. On the other side, the solid waste collected in waste-bins will be disposed of through existing solid waste disposal contractor of DHA.

3.7.5.2 Solid Waste Generation

Solid waste during Construction Phase is classified as domestic solid waste, packaging waste, construction waste (includes cables, copper, empty containers, steel etc.) and excavated material. Other waste includes oily rags, used air and oil filters, waste fluorescent and used cartridge etc.

Maintenance and repair of construction machinery generate waste oil. Spillage of fuel may occur during felling of vehicles and machineries. If not properly disposed of, it may contaminate soil with subsequent contamination of groundwater.

After replacement, waste batteries of electronic devices and vehicles' accumulators may cause soil contamination by hazardous material such as lead, cadmium and nickel. Worn tyres are another waste expected at Construction sites.

Domestic and hazardous waste shall be segregated on site and be collected by the Contractor on weekly basis for recycling and safe disposal as per local codes.

Table 3.5 depicts the workforce, water supply and waste generation during Construction Phase.

Table 3.5 Construction Workforce, Water Supply and Waste

Construction Workforce	15 to 50 Persons
Water Supply, m3/day	20 m3/day (5300 gallons)
Estimated Wastewater Generation, m3/day	8 m3 /day
Estimated Solid Waste Generation, Kgs/day	250 Kgs/day

3.7.6 Electricity Generation/Supply

- IESCO supply / Diesel Generators.

3.8 OPERATIONS

The normal operation of a power substation is crucial for the supply of electricity to cities and industries. The grid station and transmission lines are operated in accordance with IESCO's developed standard operating procedures which have developed under guidelines of equipment manufacturers' operating manuals, engineering best practices and safety management. For grid station, the operating team works in three shifts morning, evening, and night and is made up of shift engineers, operators, attendants, and other personnel at grid station control rooms. All of the important data such as voltage, load, and power factor is recorded on daily log sheets. Every incident of non-compliance is noted, and the relevant departments are notified so corrective action can be taken.

However, if there are safety issues in a grid station, it can lead to power failures and outages, causing economic and social impacts. The safety management of a power substation includes the identification, assessment, and control of various potential hazards. The safety management of substations needs to be comprehensively considered from multiple aspects and necessary preventive and responsive measures should be taken to ensure the safety of personnel and equipment.

Training on operating and safety procedures are carried out on regular basis.

Table 3.7 illustrates the operation staff. Water supply and waste generation quantities for Operation Phase.

Table: 3.6 Operation Staff, water supply and waste generation

Operation Staff	5 Persons
Water Supply, m3/day (Including colony)	6 m3/day
Estimated Wastewater Generation, m3/day	3 m3/day
Solid Waste Generation, Kgs/day	5 Kgs /day

3.9 MAINTENANCE

Schedule and proactive maintenance include checking/testing of transformers, testing of breakers and protection systems, washing/replacement of insulators, calibrations of measuring and controlling instruments and equipment. IESCO maintenance team is fully trained and equipped to deal with emergency failures and maintenance. Maintenance also includes the regular maintenance of water supply and sewerage systems and storm water drains. Weed control at the grid station will be carried out using mechanical methods, without the use of pesticides.

The transmission line facilities will be maintained by IESCO in accordance with their developed maintenance procedures. Visual inspection of the Transmission corridor is carried as per schedule in order to identify any defect for repair/replacement requirement. Maintenance teams are mobilized for rectification. IESCO enforce the land users/title holder to maintain the tree heights within 2.5 m limit.

3.10 FIREFIGHTING

There are a wide range of types and causes of fires that can occur in electrical substations

The types of fires depend on the equipment and systems used in the stations. Fires involving DC valves, outdoor or indoor oil-insulated equipment, oil-insulated cable, hydrogen-cooled synchronous condensers, are usually well documented, and these types of equipment are easily recognized as a fire hazard. Other types of fire include Arch flash which can have a devastating consequence. An Arc flash happens when electrical current travels through the air, jumping from conductor to conductor or from a conductor to the ground.

To mitigate the risks of substation fires, fire suppression systems are installed, which typically consist of a combination of sprinklers, water mist, or clean agents. These systems are designed to detect and extinguish fires quickly and automatically, minimizing damage and downtime. In addition to active fire suppression systems, passive fire protection measures such as fire-rated walls and floors, fire doors, and fire stop sealants are also essential components of substation fire protection. It is essential to have a comprehensive and regularly scheduled maintenance plan for the substation fire suppression system, including regular inspections, testing, and repairs.

3.11 CONSIDERATION OF ALTERNATIVES

3.11.1 No Project Alternative

The proposed project seeks to provide stable and reliable electricity to DHA ROSE PHASE-VII and to upgrade the secondary transmission and grid network of the IESCO system and provide the much-needed relief to the existing over-loaded system. This will also help in reducing line losses and power breakdowns resulting in the reduction of financial loss to IESCO. In case the proposed project is not undertaken, the IESCO system will not be able to cope with the increasing electricity demand in future, the existing system will remain over-loaded, line losses will also remain high, and the system reliability will progressively decrease, with increasing pressure on the system. The IESCO will also forego the opportunity of increasing its consumers as well as revenue associated with the system expansion. In view of the above, the 'no project' option is not a preferred alternative.

3.11.2 Site Alternatives

3.11.2.1 Grid Station

The proposed site for the project was selected based on the following factors:

3.11.2.1.1 The primary purpose of the grid station is to supply electricity to DHA ROSE PHASE-VII.

3.11.2.1.2 DHA has donated the land for the proposed project at no cost.

Therefore, no other site alternative was considered for the site alternative.

3.11.2.2 Transmission Line Alternative

GSC Department of IESCO carried out various survey in order to determine feasible routes for the transmission line. However, the final selected route is the best possible route, primarily traversing barren and agriculture land with minimal vegetation and causing the least disruption to local communities and habitat.

3.11.3 Technology Alternatives

3.11.3.1 Type of Grid Station

There are two types of grid station design:

1. Gas Insulated Station (GIS)

The majority of the equipment in the Gas Insulated Stations (GIS) is completely enclosed and gas-insulated, and the system has an extremely compact design. In contrast to the traditional design, this makes it possible to install the entire system indoors in a comparatively small space. Nevertheless, this grid station is far more expensive than a traditional one.

2. Air Insulated Station (AIS)

Control panels and feeder panels are located indoors, whereas transformers and their accessories are housed in open yards at the air-insulated grid stations. AIS is quite less expensive compared to GIS.

IESCO finalized the conventional grid station AIS design because of the high cost of GIS.

3.11.3.2 Type of Circuit Breakers

Generally, there are 3 types of circuit breakers 1. Oil-filled circuit breakers 2. SF-6 circuit breakers. 3 Vacuum circuit breakers

Oil-Filled Circuit Breakers: 132-KV and 11-KV circuit breakers were traditionally equipped with oil-filled circuit breakers. The contamination of the land and water due to potential oil leakage is the main concern regarding the environmental effects of the oil-filled circuit breakers.

SF-6 Circuit Breaker: For systems 132 KV and higher, SF-6 circuit breakers are now available,
Vacuum Circuit Breakers: They are available for systems of 11 KV and lower.

When compared to the traditional oil-type breakers, these breakers have extremely effective arc-quenching qualities. Therefore, for the proposed project, these modern technology-based breakers will be used.

3.11.3.3 Type of Transformer Oil

Oils containing polychlorinated biphenyls (PCB) were being used in traditional transformer. However, due to environmental issues of PCB, the manufacture and procurement of PCBs containing transformers are banned in Pakistan since 2002.

As an alternate, now IESCO use PCB free oil in Transformers and will purchase equipment having PCB-free oil.

3.11.3.4 Type of Transmission Line Towers

Single Circuit or Double Circuit: When single circuit and double circuit towers were examined, the DC towers were chosen for the project because they could be expanded in the future, were more reliable, and could transfer more power over a given distance despite being more expensive.

Tower or Tubular Poles: Tower base occupies larger space (10 m2) compared to tubular poles which occupy significantly less space.

For the planned project, using the Tubular poles will be the preferred alternative as they occupy less space and are feasible in project area.

3.12 LAND OWNERSHIP

Defence Housing Authority (DHA) has allotted 28.6 kanal of land in area DHA ROSE PHASE-VII, District Rawalpindi. This includes the land for the proposed project as the new grid station will be constructed within the premises of DHA ROSE PHASE-VII.

As a proof land ownership, following documents have been attached with the Application Form:

A. Environmental Approval for the Project "Construction of 132 kV grid station at DHA ROSE PHASE-VII and its feeding transmission line, District Rawalpindi" has been attached with the Application Form.

B. DHA's Land Offer for Grid Station.

3.13 LAND CURRENT USE

The project site consists of barren and broken land. Photograph of the proposed project is illustrated in Figure 3.5.

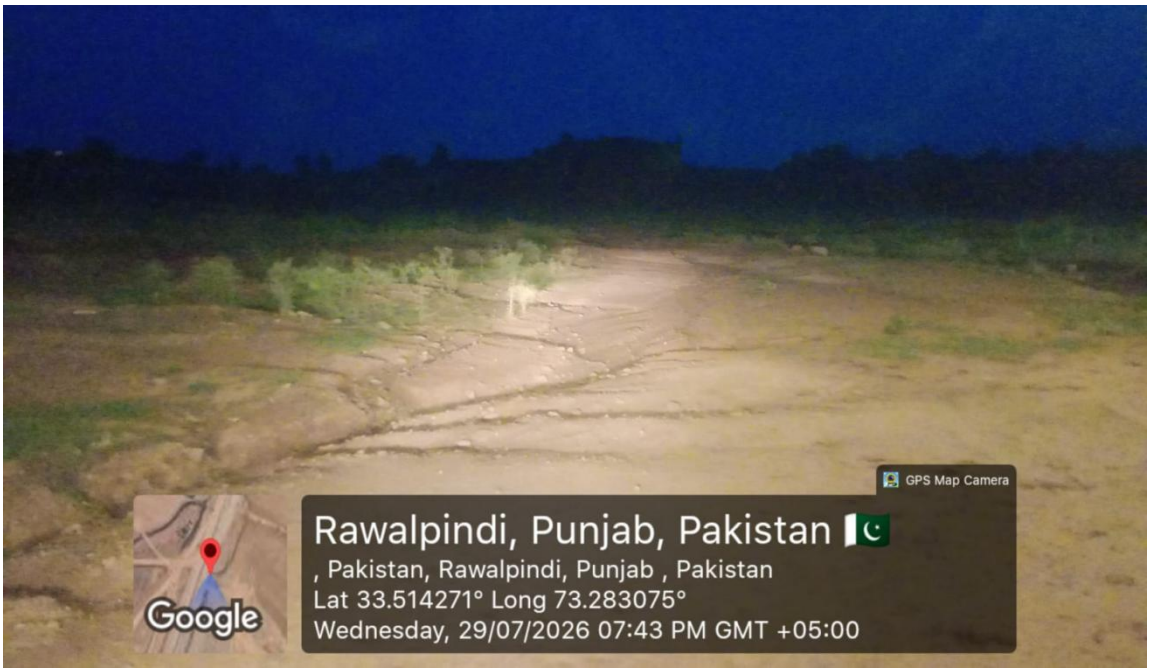


Figure 3.5 Project Site

3.14 RELOCATION AND REHABILITATION PLAN

There is no human dislocation or resettlement required on grid station land. No structure of any significance stands at the site to be relocated or dismantled. However, the construction of Transmission Line may damage a few trees and crops. The effected parties of the Transmission Line corridor shall be compensated as per applicable national laws/Telegraph Act.

3.15 ENVIRONMENTALLY SENSITIVE AREA

The project site is 'NOT' located in any environmentally sensitive area such as cultural/ historical heritage site, protected area, wetland, precious ecosystem, buffer zone of protected area, school, Mosque, Leisure Park etc.

The project will not alter/deteriorate any surface hydrology or waterways.

3.16 NATURAL HAZARDS

The project site is 'NOT' prone to floods, landslides or any other hazard. The Seismic zone is 2B which has been taken into consideration for design of all buildings. IEEE Standard 693-2018 provides Recommended Practice for Seismic Design of Substations.

3.17 VEGETATION FEATURES ON-SITE

The site is classified as barren and broken, with naturally occurring vegetation that is unevenly distributed. The construction of the grid station will necessitate the removal of 6-7 trees, and some damage to trees and crops is anticipated along the transmission line corridor. The management is committed to replanting new trees with a ratio of five new trees for each one removed. Affected landowners along the right-of-way will receive compensation for their losses in accordance with applicable laws. Figure 3.6 illustrates the current vegetation on the project site.



Figure 3.6 Current Vegetation on Project Site

3.18 APPROVALS

IESCO and DHA have obtained approvals or approvals are in progress.

Following documents have been attached with the Application Form whereas Environmental Approval for Construction is Under Process

- Application for Electricity Connection of DHA
- Approval of Electricity Connection (Demand Notice) from IESCO

The effluent from Grid Station will be discharged to the existing DHA's sewerage system; therefore, not requires any approval for Effluent discharge.

3.19 COST OF THE PROJECT

The total construction cost of the project amounts to Rs. 2700 million. The cost of Grid Station and Transmission Line will be borne by DHA. The proof of Project is attached with the Application Form.

3.20 PROJECT IMPLEMENTATION SCHEDULE.

IESCO has completed Planning and Design Phase. After receiving Environmental approval for construction from Punjab EPA, the construction of 132 KV Grid Station and its Feeding Transmission Line will be commenced. Planned duration for completion of construction phase is 12 months.

Tentative project implementation schedule is presented below. The expected start of the project is, just after obtaining the Construction Phase NOC.

Implementation Plan	Just after obtaining Construction Phase NOC/approval
Expected Inauguration	End 2027

3.21 SAFETY AND HEALTH MANAGEMENT IN IESCO

A safety and health management system is a proactive, collaborative process to find and fix workplace hazards before employees are injured or become ill. The IESCO includes six core elements:

- Management leadership
- Employee participation
- Hazard identification and assessment
- Hazard prevention and control
- Education and training
- Program evaluation and improvement

3.21.1 Safety and Health at Workplace

IESCO Management:

- Implement a written Safety and Health Policy

- Recognizes the employees' contribution to worker safety and health at the grid station;
- Defines and communicate effective worker safety goals and expectations.
- Allocates appropriate resources (funds and time) to accomplish goals and manage the program
- Informs employees of hazards in their work areas.
- Review all contractor job plans for safety and health hazards, prevention, and control.
- Inform all contractors of the hazards they may encounter during their work on site
- Employees:
- Know how to report an injury, illness, hazard, or concern, including near misses
- Are involved in workplace health and safety inspections and incident investigations.
- Understand the employers' responsibility in the safety and health management system.
- Know their role in Safety and Health Management System
- Are provided trainings of hazards identification, hazards prevention and control, the use of PPEs where necessary.
- Are responsible for using appropriate protective methods and equipment while working in areas where potential exposure to harmful radiation may occur.

4. DESCRIPTION OF ENVIRONMENT

4.1 GENERAL

This section describes the baseline conditions, which covers all the relevant information on the current status of the environment of the Project Area. Information on these aspects has been derived from the desk study of available data, field visits to the project area as well as information obtained from official websites of Government departments and other relevant agencies.

The data regarding the physical environment was collected mainly within the project surroundings. In case of the biological and socioeconomic environment, efforts were made to collect the information within one Km around the project area and even up to 10 Km where any direct or indirect impacts were envisaged.

a. METHODOLOGY OF CONDUCTING BASELINE STUDY

Establishing the environmental baseline includes both the present and likely further state of the environment, taking into account changes resulting from natural events and other human activities, assuming the project is not undertaken – the no action alternative.

The guiding factors for the present baseline study are the EPA's requirements for the Environmental Impact Assessment and IEE/EIA Regulations 2022, local regulations and directives. The studies were conducted by considering both primary and secondary means i.e. by sampling, monitoring, observations and field verification along with review of past relevant EIA studies and literature survey.

The data generation were formulated with interdisciplinary team discussions, criteria questions, and professional judgment.

The baseline data provides the “base line” against which severity of the future impacts can be assessed.

b. PHYSICAL ENVIRONMENT

This Section examines the physical resources such as topography, geology and soil, climate, surface and groundwater resources, wastewater effluent handling, noise levels and ambient air quality of not only the Project site but also the surroundings as a whole to assess whether the project under assessment can or does have any impact on any of these parameters

4.1.1 Topography, Geology and Soil

The proposed project area is located within DHA Phase VII, Islamabad, on the Potwar Plateau, which is characterized by gently undulating to relatively flat terrain with mild natural slopes that facilitate surface drainage. The regional geology primarily comprises sedimentary formations and alluvial deposits consisting of sandstone, siltstone, clay, gravel, and sand. The predominant soil types are sandy loam to clay loam, exhibiting moderate permeability, good drainage characteristics, and adequate bearing capacity for infrastructure development. These geological and soil conditions are considered suitable for the construction of the proposed grid station and transmission line foundations, subject to detailed geotechnical investigations. Temporary soil disturbance during excavation and foundation works will be managed through appropriate erosion control and site restoration measures.

4.1.2 Seismology

According to Seismic zoning map of Pakistan proposed by the building code of Pakistan, Pakistan is divided in five seismic hazards zones (Zones 1, 2A, 2B, 3 and 4); Zone 1 being the lowest and Zone 4 is the highest seismic zone. Figure 4.2 shows the seismic zoning map of Pakistan. The project area falls in Zone 2B that is considered to be at 'Moderate' risk of a major earthquake event. Zone 2B represents peak ground acceleration (PGA) from 0.16 to 0.24 g (Table 4.1)

Table 4-1: Seismic Zones

Seismic Zone	Peak Horizontal Ground Acceleration	Zone Factor Z
1	0.05 to 0.08g	0.075
2A	0.08 to 0.16g	0.15
2B	0.16to 0.24g	0.20
3	0.24 to 0.32g	0.30
4	➢ 0.32 g	0.4

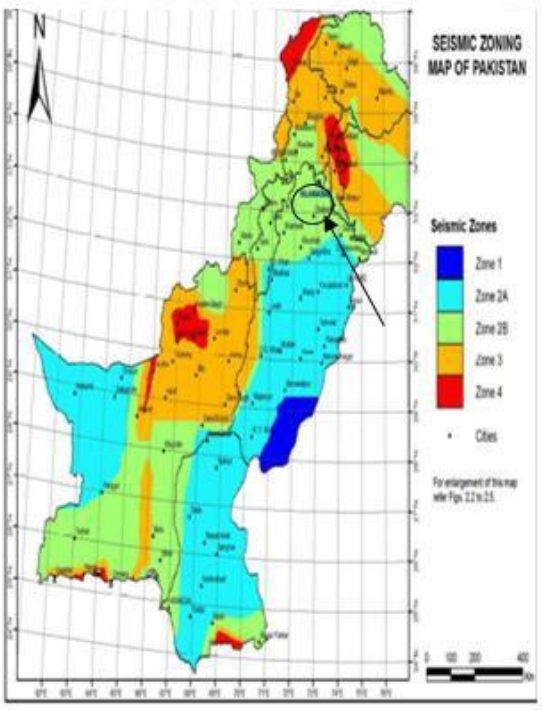


Figure 4.1 Seismic Zoning Map

4.1.3 Land Use and Land Cover (LULC)

For the last three decades, Rawalpindi - an unplanned city, has experienced massive land use and land cover changes. The built-up increased from 3.7% (60 km^2) to 14.1% (228 km^2) from 1990 to 2021 for Rawalpindi. Wherein the bare land decreased from 65.5% (1058 km^2) to 32.1% (518 km^2). Vegetation showed an increment of 24.5% for Rawalpindi. Surface water bodies decreased in both study areas. Population growth showed a strong positive correlation with the built-up class and a strong negative correlation with the bare land class for both cities

Transformation of one land-use type to another, may bring changes in surface energy, because different classes of LULC have different reflectance and evapotranspiration. Such rapid changes lead to significant changes in local climate, particularly having impacts on land surface temperature (LST) and local air temperature. The LST increases with decrease in vegetation and with increase in urban built-up and barren land. The LST in Rawalpindi city has substantially increased during last 20 years.

4.1.4 Climate

Rawalpindi features a humid subtropical climate with hot summers which stays usually for long, a monsoon and mild wet winters which stays for short period of time. Rawalpindi's weather has historically been known to change rather quickly due to its proximity to Himalayas and the Pir Panjal Range. In Rawalpindi, the summers are short, sweltering, humid, wet, and clear and the winters are short, cold, and mostly clear. Over the course of the year, the temperature typically varies from *39°F* to *101°F* and is rarely below *34°F* or above *108°F*. (Figure 4.2)

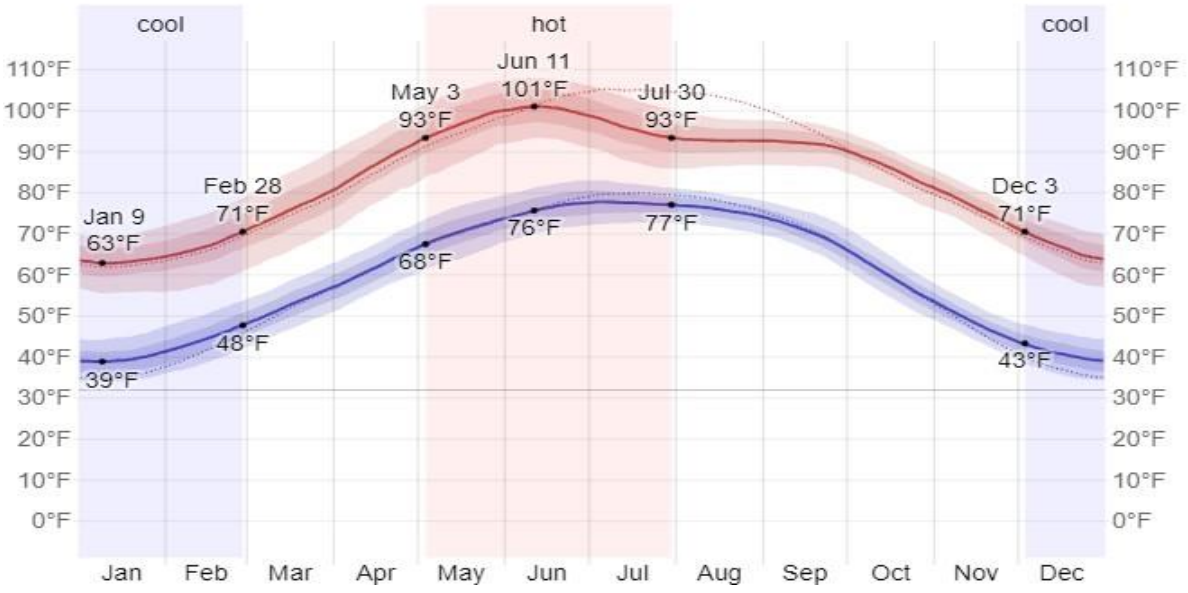


Figure 4.2: Temperature Data Rawalpindi Region (Data Source: Weather Spark)

4.1.4.1 Rainfall

Rain falls throughout the year in Rawalpindi. The month with the most rain in Rawalpindi is July, with an average rainfall of 6.8 inches. The month with the least rain in Rawalpindi is November, with an average rainfall of 0.5 inches. Figure 4.3 shows the rainfall in different months.

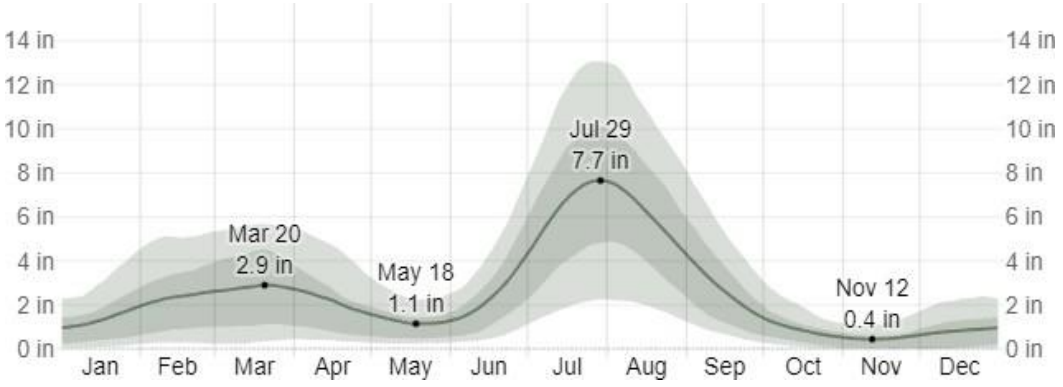


Figure 4.3: Average Monthly Rainfall Rawalpindi Region (Data Source: Weather Spark.com)

4.1.4.2 Humidity

Rawalpindi experiences *extreme* seasonal variation in the perceived humidity. *The* high humid period of the year lasts for 3.7 months*, from* June 11 *to* October 2, during which time the comfort level is muggy*,* oppressive*, or* miserable *at least 24%* of the time. The month with the most humid days in Rawalpindi is August. Figure 4.4 presents humidity data for Rawalpindi Region.

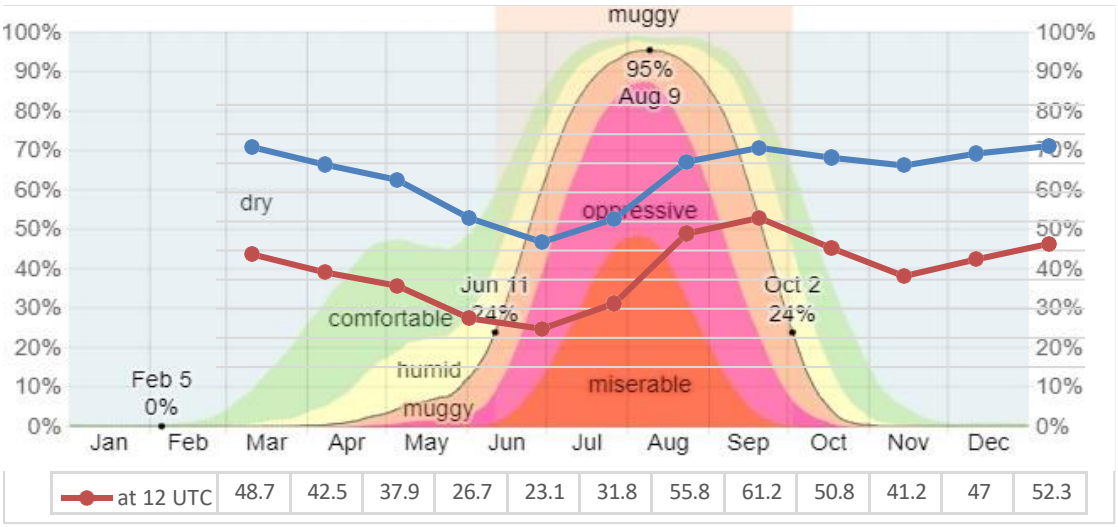


Figure 4.4: Humidity Data Rawalpindi Region (Data Source: Weather Spark.com)

4.1.4.3 Wind

The monthly mean velocities for 2000 – 2020 are exhibited in Figure 4.5.

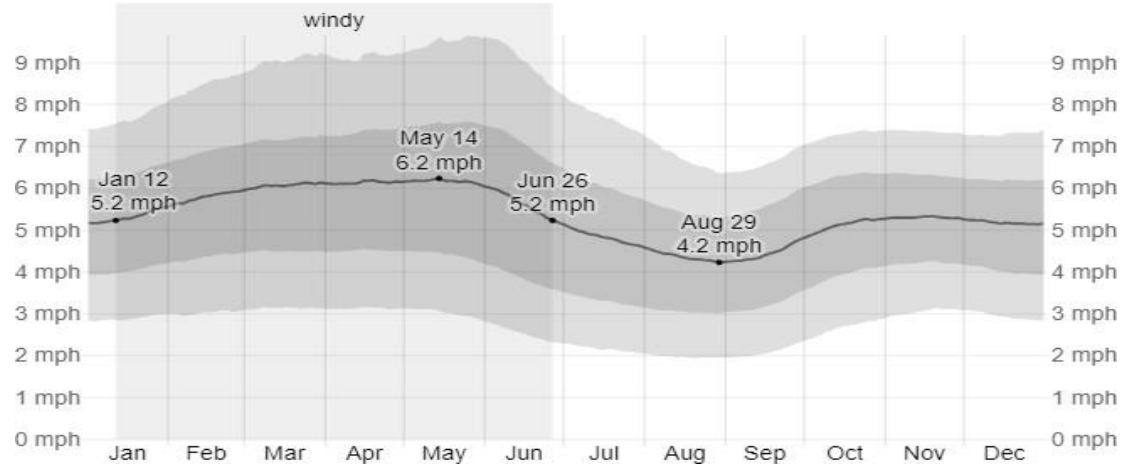


Figure 4.5 Average Wind Speed, Rawalpindi Region (Data Source: Weather Spark.com)

Wind Direction*:* The predominant average hourly wind direction in Rawalpindi varies throughout the year. The wind is most often from the *west* for *1.7 months*, from *May 7* to *June 27*, with a peak percentage of *34%* on *June 13*. The wind is most often from the *east* for *3.1 months*, from *August 7* to *November 11*, with a peak percentage of *43%* on *September 5*. The wind is most often from the *north* for *5.9 months*, from *November 11* to *May 7*, with a peak percentage of *38%* on *January* 1.

4.1.5 Ambient Air Quality and Noise

Baseline environmental data of the project area was monitored from (Figure 4.6)



Figure 4.6: Baseline Data Monitoring at Project Site

The lab monitoring reports of ambient air quality and noise and groundwater quality are given Annexure VI. The summarized baseline data for noise levels and ambient air quality are presented below.

4.1.5.1 Noise

The sound levels at center of the project area were measured continuous for 24 hrs; during day (6 AM – 10 PM) and night time (10 PM -6 AM) on 29 July 2026. The results are summarized in Table 4.2 and monitoring report is attached as Annexure-VI. The measured sound levels comply with PEQS for noise of Category C.

Table 4.2: Noise Levels at Project Site

Sr. No.	Location	Day Time dB(A) 6 AM -10 PM	Night Time dB(A) 10 PM – 6 AM
1.	Grid Station Site	50.6 – 55.9 (63.2 Avg.)	55.9 – 48.9 (52.4 Avg.)
2.	PEQS	65	55

4.1.5.2 Ambient Air Quality:

Monitoring was carried out for SO_2, NO_x, CO, and particulates PM_{10} and $PM_{2.5}$ for 24 hours at Grid Station Project Site. The measured data are exhibited in Table 4.3. Lab analytical report is attached as Annexure VI. Results for all parameters are well within PEQS limits for Ambient Air.

Table 4.3: Ambient Air Quality at Project Site for 24 hours

		Unit	Results	PEQS
1	Particulate Matter (PM_{10})	$\mu g/m^3$	91.71	150
2	Particulate Matter ($PM_{2.5}$)	$\mu g/m^3$	27.67	35
3	CO	$\mu g/m^3$	2.80	10
4	NOx	$\mu g/m^3$	3.99	80
5	SO2	$\mu g/m^3$	5.09	120

4.1.6 Water Resources

The resources of surface water and ground water have been discussed in this section. Most of the information is based on review of the published literature. The groundwater from the project site was also analyzed to check the quality of water available at the Project site.

4.1.6.1 Surface Water

The surface water resources in Rawalpindi district are shown in Figure 4.7. The Small Dam Department Rawalpindi district develops water resources storages as primarily source of drinking water and secondly is being utilized for irrigation. Eleven dams existed under jurisdiction of small dam's department Rawalpindi district out of which two existed in Islamabad and nine dams are located in Rawalpindi district boundary. Only two dams, i.e. Rawal and Chahan dams, are fulfilling water supply demand of Islamabad and Rawalpindi. The total water supply of 35 MGD (Rawal Dam - 23 MGD and Chahan Dam – 12 MGD) is being provided by these two dams. Rawal Dam and Chahan Dam have gross storing capacity of 37397 A-ft and 12000 A-ft respectively.

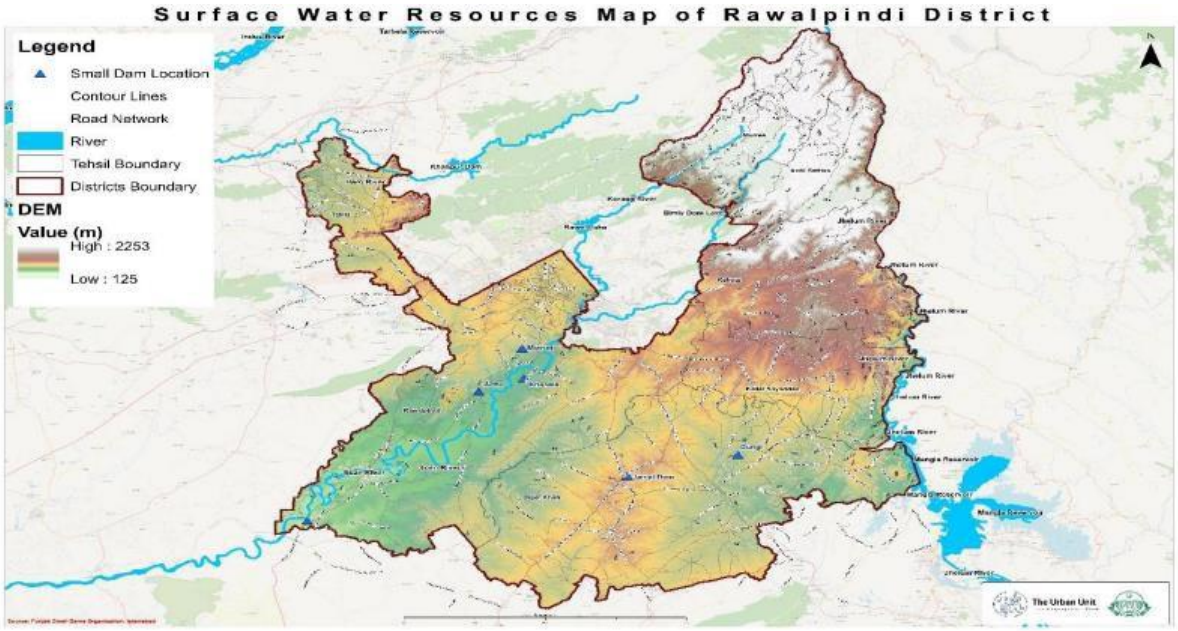


Figure 4.7: Surface water resources of Rawalpindi District

4.1.6.2 Groundwater

The laboratory analyses of groundwater samples collected from Grid Station site were tested. The results are compared with PEQs of drinking water in Table 4.4. The lab reports are attached as Annexure VI.

Table 4.4: Groundwater Analyses Results

Sr. No	Parameters	Units	Results	PEQS
1	pH	--	7.14	6.5-8.5
2	Total Dissolved Solids (TDS)	mg/l	252	1000
3	Chloride	mg/l	7.63	250
4	Fluoride	mg/l	0.0	1.5
5	Taste	Objectionable /Unobjectionable	Unobjectionable	Unobjectionable
6	Odour	Objectionable /Unobjectionable	Unobjectionable	Unobjectionable
7	Colour	TCU	0.12	15
8	Nitrate (as NO_3^-)	mg/l	0.2	50
9	Nitrite (as NO_2^-)	mg/l	0.004	3

10	Lead	mg/l	BDL	0.05
11	Total Hardness as $CaCO_3$	mg/l	159.96	500
12	Turbidity	NTU	1.0	5
13	Zinc	mg/l	0.0	5
14	Aluminum	mg/l	0.0	0.2
15	Chromium	mg/l	0.0	0.050
16	Cadmium	mg/l	0.0	0.01
17	Copper	mg/l	BDL	2
18	Boron	mg/l	0.0082	0.300
19	Barium	mg/l	0.0126	0.700
20	Antimony	mg/l	0.009	0.020
21	Maganese	mg/l	0.0629	0.5
22	Cyanide	mg/l	0.0032	0.05
23	Sodium	mg/l	84.09	200
24	Nickel	mg/l	0.0	0.020
25	Residual Chlorine	mg/l	0.301	0.2 – 0.5
26	Total Coliform	Number/100ml	0	0/100 ml
27	Thermo Coliform	Number/100ml	0	0/100 ml
28	E. coli	Number/100ml	0	0/100 ml

*BDL: below detection limit

4.2 BIOLOGICAL ENVIRONMENT

4.2.1 Natural Habitat

The proposed project area is located within the urbanized setting of DHA Phase VII, where natural habitats have been extensively modified due to residential, commercial, and infrastructure development. The existing habitat mainly comprises landscaped green belts, roadside plantations, vacant plots with scattered grasses, and ornamental vegetation, providing habitat for common urban flora and fauna. No natural forests, wetlands, rivers, or ecologically sensitive ecosystems are present within the immediate project footprint.

4.2.2 Flora

According to the natural vegetation classification of Pakistan, Rawalpindi falls within the thorny vegetation zone. This area experiences medium rainfall, high summer temperatures, low winter temperatures, and a limited diversity of plant species. Additionally, urbanization and rapid development over recent decades have significantly disturbed and degraded the local flora.

Common trees in the Rawalpindi district include Shisham (Dalbergia sissoo), Keekar (Acacia arabica), Shareen (Albizzia lebbek), Bari (Ziziphus jujuba), guava, and various citrus species. The district also has an abundance of pine, kai, fir, poplar, shisham, kikar, willow, walnut, ban-akhore, and mannu.

The district features a variety of flowers, including zianna, dahlia, marigold, cosmos, daffodil, aster, and several types of roses. However, the project site itself has natural vegetation consisting mainly of shrubs, bushes and grass, and a few trees.

4.2.3 Fauna

The wildlife includes various species such as Rhesus monkeys, jackals, wild boars, porcupines, mongooses, and pangolins (also known as scaly anteaters). Leopards are less frequently seen. The area is home to several types of venomous snakes, including cobras, Russell's vipers, kraits—locally referred to as the half-minute killer—and Indian pytsparrows, pippehons.

Birds include around 485 species of different birds including dove, goose, peafowl, common quail, rain quail, partridge, francolin, pheasants, Hill/wood Pigeon, nightjar, stork, Bittern, plover, lapwing, owl, vulture, Woodpecker, Kingfisher, Kestrel, falcon, Minivet, shrike, Oriole, Treepie, fantail, crow, sun bird, sparrows, pipit, wagtail, finch, bunting, tit, lark, Prinia, Warbler, martin, swallow, Warbler, Babbler, Tree creeper, wall creeper, starling, dipper, robin, wheatear, thrush,

4.2.4 Environmentally Sensitive Area

The project site is not adjacent to or within any environmentally sensitive area such as - Cultural / Historical Heritage site, Protected Area, Wetland, Precious Ecosystem, Buffer zone of protected area, School, Mosque and Leisure Park etc.

4.3 SOCIOECONOMIC ENVIRONMENT

4.3.1 Demographics

Rawalpindi district has an estimated population of 6.12 million people as per the census of 2023. Women are 49.2% whereas transgender is around 0.02%. Annual population change is **2.1%** [2017 → 2023. Almost all the population of the district is Muslim. They constitute 97.6 per cent of the total population in rural as well as in urban areas. There are very few Christians, Hindu, Qadiani, schedule caste and other communities which are only 1.7 per cent of the total population. Like much of the country, male family members in the project area serve as the primary breadwinners. On average, 47% of the male population is economically active, while the remaining 53% are inactive. Among those inactive, 25% are under the age of 10, while others include students, domestic workers, landlords, property owners, retirees, disabled individuals, and the unemployed.

The majority of the rural population falls into the middle or lower middle class due to small landholdings and the rain-fed (barani) nature of the area. However, the population in the Rawalpindi district is relatively better off, as many residents have settled in European countries and send remittances back to their families in Pakistan and Azad Jammu and Kashmir (AJK).

4.3.2 Education and Literacy

Rawalpindi boasts one of the highest literacy rates in the country, with 80%, placing it second after Islamabad, which has a literacy rate of 87%. There are several educational institutions that offer pre-school to graduate degree programs. These are private and public institutions including institutions for technical, special and religious education (madrasas). The private institutions are maintaining better environment of education however not easily affordable by the middleclass citizens of the

community. On the other hand, a few local public institutions are unable to serve a large proportion of the area population with quality education. Therefore, the parents prefer sending their children to Private schools despite low fee structure of public schools. Some of the public and private institutions near DHA ROSE PHASE-VII are illustrated in Figure 4.8.

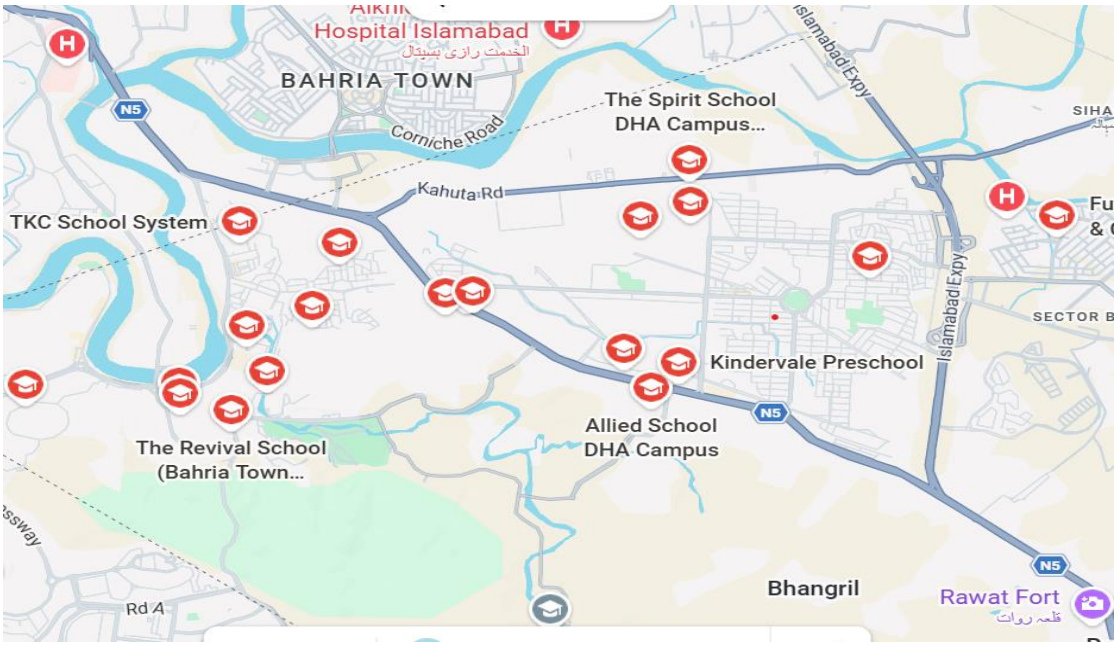


Figure 4.8: Schools near DHA ROSE PHASE-VII

4.3.3 Health Facilities

Healthcare needs are taken care of by Public as well as Private Sectors. There are a number of hospitals in and around Rawalpindi mainly on G.T Road. The health care services provided by the public health sector in District Rawalpindi consists of 4 THQ Hospitals, 10 Rural Health Centres, 98 Basic Health Units and 66 Dispensaries. In addition, there are three public sector tertiary care hospitals. Pakistan Army also provides specialized tertiary care through Military Hospital, Combined Military Hospital and Armed Forces Institutes of Pathology, Cardiology, Ophthalmology, Rehabilitation, Dentistry and Blood Transfusion.

4.3.4 Accessibility and Traffic

The proposed Grid Station site at DHA ROSE Phase VII, is easily accessible through the existing road network, including major arterial roads connecting the area to Islamabad and Rawalpindi. The surrounding roads are well-developed, paved, and capable of accommodating construction vehicles and heavy equipment required for the project. Existing traffic in the area mainly comprises private vehicles, commercial traffic, and public transport associated with residential and commercial activities. During the construction phase, there may be a temporary increase in traffic due to the movement of construction materials, machinery, and workforce. However, these impacts are expected to be short-term and can be effectively managed through proper traffic management plans, scheduling of material deliveries during off-peak hours, and the installation of appropriate traffic safety signs and warning notices. Public transportation is varied, including taxis, auto-rickshaws, and mini-buses that are easily available near the project site.

4.3.5 Cultural and Community Structure

There are currently no known archaeological or historical sites in the vicinity of the project site. The local population is primarily ethnically Punjabi, with roots tracing back to Aryan origins. Prominent castes, tribes, and braderies in the area include Rawal, Junjua, Chohan, Awan, Mughal, Qureshi, Syed, Bhatti, Satthi, Ghakkar, Rajput, Gujar, Jatt, Jalap, Minhas, Gondal, Sheikh, Kahut, Arain, and Kashmiri. Most residents live in the nearby villages. In the past 5 to 10 years, more than ten new housing societies developed by well-known builders. The affordability and accessibility of these large housing schemes have made the area appealing to real estate buyers. It is expected that within the next two decades, the community structure in this region will undergo complete urbanization.

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4.3.6 Role of Women and Women Empowerment

Women make up 49.2 percent of the total population of Rawalpindi district. Pakistan Vision 2025 has women empowerment as one of its main objectives and includes the following five components:

- Activities that promote women's self-worth,
- Right to determine their choices,
- Access to opportunities and resources,
- Right and power to control their lives, and
- Ability to influence social change

The government is well aware of the issues that women face in Pakistan and the current government has taken various steps and initiatives to promote women's empowerment. A quota of 10 percent has been fixed for women in public sector employment which has been raised to 15 percent in Punjab. The National Commission on the Status of Women (NCSW) was established in the year 2000 to examine the various policies in place for women's development and gender equality. The Punjab Fair Representation of Women Act 2014 is another important legislation that was passed, which ensures representation of women in the boards of special task forces and committees, public sector companies and other organizations. The Punjab Women Development Policy 2018 created by the provincial government addresses the full spectrum of women's development issues and challenges in accordance with the spirit of the Constitution, Pakistan's international obligations, and the provincial government's pursuit of gender mainstreaming and women's empowerment in Punjab.

Research indicates that working women experience greater empowerment compared to their non-working counterparts. Among them, married and older women with good health and stable financial backgrounds report higher life satisfaction. Women's well-being and empowerment can be enhanced through education, financial independence, access to quality healthcare, and the implementation of supportive policies and regulations.

4.3.6.1 Role of Women in Power Sector

Power companies do not practice gender discrimination. However, information obtained from eight organizations in the energy sector revealed that, on average, women made up 4.6% (386/8437). The majority of female technical staff members are found in grade 17, which is reserved for officers in entry-level positions. Women make up 3.6% of the total staff at NTDC and 16% (189/1181) of the technical staff. The majority of women work in power company offices however; they find it difficult to work in evening and night shifts at Power generation plants and in distribution and transmission companies. In 2023, USAID in collaboration with LUMs organized a training program for 31 female engineers from Pakistan's power distribution and transmission companies. The training of female engineers aimed to break gender barriers in the engineering sector, addressing the under-representation of women in various roles.

In the project area, most women are housewives focused on managing household tasks and raising children. The participation rate of women in various socioeconomic activities is generally low, as they are often restricted from engaging in outdoor activities. Their roles are primarily limited to indoor household responsibilities and assisting with farming tasks.

5. PUBLIC CONSULTATION

5.1 GENERAL

Any person, group or organization with an interest in the project or who can be affected directly or indirectly, negatively or positively by the project activities is a project stakeholder. There are two types of stakeholders - primary and secondary stakeholders. Primary stakeholders are those which are directly affected by the project activities and secondary stakeholders are those which are affected indirectly. Stakeholder consultation is a mean of involving the primary and secondary stakeholders in the project decision making process by getting feedback from the community and addressing their concerns.

Stakeholder consultation was therefore conducted in the project area, not only to comply with the obligation imposed by Punjab EPA for conducting EIA Study but also to improve and enhance the social and environmental design of the project and achieve the goal of sustainable development.

5.2 OBJECTIVE OF THE STAKEHOLDER'S CONSULTATION

Role of the public participation is very important in the design making process to achieve the goal of sustainable development. The major objectives of public consultation are as follows:

- Promote better understanding of the project, its objectives and its likely impacts and their management.
- Identify and address the concerns of all interested and affected parties of the project.
- Provide a mean to Identify and resolve issues before plans are finalized and development commences, thus avoiding public anger, resentment and potentially costly delays.
- Encourage transparency and inculcate trust among various stakeholders to promote cooperation and partnership with the communities and local leadership.

5.3 STAKEHOLDERS IDENTIFICATION

Identifying the stakeholders for the proposed project is crucial for its success as it helps to quantify and integrate the contributions of the various parties. Residents of neighboring communities of grid station are considered to be the primary stakeholders. Also, the land owners of cultivated land affected by ROW must be consulted for their concerns and feedback. Construction activities, if not properly performed, may cause damage to their health, stakeholders' crops and agriculture land. Therefore, their concerns should be incorporated into the EIA for both the construction and operational phases. Furthermore, employees involved in the operation and maintenance of IESCO are at risk if the grid station is poorly designed or if inappropriate equipment or contractors are selected. Therefore, engaging IESCO personnel as stakeholder and considering their suggestions is vital to avoid equipment failure or safety incidents. Projects should always leverage the expertise and vision of environmental and social experts to meet sustainability goals.

5.4 CONSULTATION PROCESS

Based on the discussion above, the following stakeholders should be engaged:

- Local Community (living in the vicinity of grid station / transmission line)
- Government Organizations (IESCO)
- Grass-root stakeholder discussions

Stakeholders were consulted during informal and formal meetings held in the project area. The consultation process was carried out in Urdu and native language. During these meetings, a simple, non-technical, description of the project was presented, with the overview of the project's likely human and environmental impacts. This was followed by an open discussion allowing participants to voice their concerns and opinion. Their feedback along with their major concerns and suggestions were documented for analysis and mitigation. Focus group discussions and in-depth interviews were also conducted. The issues recorded in the consultation were examined, validated, and addressed in the EIA report.

The consultation process will continue even after the EIA report submission, particularly in the Public Hearing and afterwards to create consensus among the stakeholders on specific environmental and social issues in context of the project in order to incorporate sustainability in the on-going project.

It is important not to raise community expectation unnecessarily or unrealistically during the stakeholder consultation meetings in order to avoid undue conflicts with local administration

5.5 STAKEHOLDERS FEEDBACK

The findings of the community consultation have been addressed in relevant sections of EIA Study and mitigations have been incorporated in EMP. The consultation with various stakeholders is summarized in Table 5.1 and Annexure VII

Table 5.1: Consultation with Stakeholders

Name & Designation	Location	Opinions/Concerns/Issues/Suggestions
Mr. Mohammad Iqbal GM Electrical DHA	DHA, Rawalpindi-Islamabad.	▪ He explained how this project is important in future as the load will be increased up to 20 MW. ▪ Looking forward to early completion of the project as it will also facilitate the society to establish more quickly.
Mr. Sher Afzal, Deputy Director Environment and Social Safeguard Section, IESCO	IESCO, Islamabad	▪ The project is a part of positive approach for community living in the project area to provide them reliable power supply. IESCO will make every effort to make the project sustainable and green as possible. ▪ There will be no harm to general public living in the vicinity of the project location as the grid station is quite far away from public activities area. ▪ The project site has been established considering important factors like land use, ecological environment and nearby settlements.

Muhammad Tayyab, Project Incharge	IESCO	▪ He pointed towards the electricity need for this area and appreciated the initiation of this project. ▪ Construction of new Grid Station and its allied infrastructure should be carried out keeping in mind the safety of community.
Mr. Ahmad	DHA Resident	▪ Showed no concern over the execution of the project. ▪ The selected sites are quite distant from public and have minimal impacts on community.
Mr. Muhammad Bilal Sub-engineer	IESCO	▪ The grid station will ensure best practice use of energy resources, provide greater power supply capacity, and make power system operations more economical and reliable.
Mr. Usman	DHA Resident	▪ Concerned about the structure of the grid station and towers of transmission line. ▪ It will be good for the growing of society.

5.5.1 Public Consultation

The DHA officials, IESCO officials and DHA residents mentioned in above table were consulted during site visit.

- The usage of electricity is primarily for domestic purposes followed by commercial activities. With growing population, demand of electricity is increasing day by day.
- The project implementation will be very beneficial for the community as grid station after making a ring system will minimize electricity failure chances in future and reliability of the system will be increased.
- Proper mitigation plans should be adopted for this project.
- Work should be completed within scheduled time
- In order to reduce the chances of risks associated with electricity accidents, IESCO should take into consideration that the passage of electricity distribution networks and lines away from houses and populated areas.
- It is foreseen that the proposed project will improve their life standards.
- Boundary wall should be constructed around the grid station area to make it safe from external disturbance.
- There should be proper safety measures in case of any emergency.
- Environmental degradation will occur so plantation should be done around the project site to minimize its eye soaring aesthetic effects.

5.5.2 Concerns Regarding the Project

Based on the consultations with the affected persons and general public, the following major concerns/ feedback were highlighted.

- About three-fourth of the total required unskilled/ semi-skilled labour should be taken from the local population. This opportunity will help to increase the household income of local population of the project area.
- ROW clearance for installation of towers and transmission line should be minimum at the best possible extent.

6. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATIONS

6.1 GENERAL

This section addresses the Project's potential impacts on physical, biological and socio-economic environment of the area that may be encountered during pre-construction, construction and operations phases. Impacts have been predicted and assessed. Where applicable, mitigation measures have been suggested to be implemented in order to reduce the adverse impacts, if not eliminated. It is aimed to:

- Find different alternatives and ways of doing the project activities.
- Enhance the environmental and social benefits of proposal.
- Avoid, minimize and remediate adverse impacts.
- Ensure that residual adverse impacts are kept in acceptable limits

6.2 IMPACT ASSESSMENT METHODOLOGY

6.2.1 Screening of Potential Impacts

Based on site visit, observation, brain storming, provided information and social interviews, significant impacts were evaluated in the light of technical and regulatory concerns. Then qualitative and quantitative (where possible) assessment of these anticipated impacts was carried out.

6.2.2 Mitigation Measures

After anticipation and screening of significant impacts, certain mitigation measures are to be provided in order to enhance benefits of project by reducing negative impacts.

6.2.3 Evaluation of Residual Impacts

Incorporation of suggested mitigation measures may reduce the magnitude of the environmental impacts of the project but sometimes, it may fail in bringing them within the acceptable limits. This step refers to the identification of the anticipated remaining impacts after mitigation measures have been applied.

6.2.4 Identification of Monitoring Requirements

The last step in the assessment process is the identification of minimum monitoring requirements. The scope and frequency of monitoring depend on the residual impacts. The purpose of the monitoring is to confirm that the impacts are within the prescribed limits and to provide timely information if acceptable limits are being breached.

6.3 IMPACT SCREENING

Screening of the potential impacts associated with various Project's activities of preconstruction, construction and Operational phases was conducted to determine impacts with high severity. A matrix

developed for the proposed Project was used which relates Project's activities with various components of the environment. The impacts were ranked with respect to their severity as under:

High negative impact	-2	No impact	N
Low negative	-1	Low positive impact	+ 1
Insignificant impact	0	High positive impact	+2
		NA Not applicable	

After screening, following six impacts were categorized as moderate to highly negative in severity. These impacts were considered to be significant and mainly focused in EIA.

- Air Quality
- Noise
- Health Hazard mainly due to inappropriate waste management
- Safety Hazards: Handling of waste; construction activities,
- Soil Contamination
- Water contamination

Table 6.1: Environmental Screening Matrix (Impact before Mitigation)

Project Activities	*Physical*							*Biological*			*Social and Socioeconomic*												
	Soil	Air Quality	Surface Water	Groundwater	Water Consumption	Topography	Noise	Natural Vegetation	Wildlife	Reduction of Biodiversity		Economical activities	Livelihood and Economy	Resettlement	Safety Hazards	Employment	Traffic congestion	Health Hazards	Natural Risks	Gender Issues	Site Aesthetic	Historical/ Archeological Sites	
Preconstruction Phase																							
Project Siting (GS)	-1	N	N	N	N	N	N	N	N	N		+ 1	+1	-1	-1	+2	-1	0	N	N	-1	N	
T/L Route	-1	N	N	N	N	-1	-1	-1	-1	-1		-1	-1	-1	-2	0	-1	-2	N	0	-2	N	
Land Acquisition	NA	NA	NA	NA	NA	N	NA	-1	0	N		N	N	N	N	N	N	N	N	N	N	N	
Design	N	+1	N	N	N	N	+1	N	N	N		N	N	N	+2	0	0	+2	+2	0	+1	N	
Equipment Selection	0	-1	-1	-2	N	0	-1	0	0	N		N	N	NA	-1	0	N	-1	N	NA	0	NA	
Construction Phase																							
Contractor Mobilization	-1	-1	-1	-1	0	-1	-2	-1	-1	0		0	0	N	-2	+1	-2	-1	NA	0	-2	NA	
Site Preparation	-1	-1	-1	-1	0	-1	-1	-2	-1	-1		0	0	0	-2	+1	-1	-1	NA	0	-2	NA	
Transportation of Construction Material	- 1	-1	-1	0	-1	-1	-1	0	0	0		+1	+1	N	-1	+1	-1	0	N	0	-1	N	

	Soil	Air Quality	Surface Water	Groundwater	Water Consumption	Topography	Noise	Natural Vegetation	Wildlife	Reduction of Biodiversity	Habitat	Economical activities	Livelihood and Economy	Resettlement	Safety Hazards	Employment	Traffic congestion	Health Hazards	Natural Risks	Gender Issues	Site Aesthetic	Historical/ Archeological Sites	
Construction of Campsites	-1	-1	-1	0	0	0	-1	-1	N	0	-1	+1	0	0	-1	+1	0	-1	N	0	0	N	
Excavation	-1	-1	-1	-1	0	-1	-1	-1	N	0	-1	N	0	0	-2	+1	0	-1	N	0	-2	N	
Machinery, Generators Operation	-1	-1	-1	-1	o	N	-2	0	0	N	-1	+1	0	N	-1	+1	0	-1	N	0	0	N	
Construction of buildings	-1	-1	-1	0	-1	0	-2	-1	0	0	-1	+1	0	N	-2	+2	-1	0	N	0	-1	N	
Equipment Installation	0	0	0	N	N	N	-1	N	N	N	0	+1	+1	N	-1	+1	0	0	N	0	0	N	
Solid Waste disposal	-2	0	-1	-1	N	0	0	0	0	0	0	0	N	N	-1	+1	N	0	N	N	0	N	
Liquid Effluent	-2	0	-1	-2	N	0	N	0	0	0	0	N	N	N	-2	0	N	-2	N	N	0	N	
Contractor's Demobilization	-1	-1	-1	0	0	0	-1	0	0	0	-1	0	0	N	-1	-1	-1	0	N	N	0	N	
Restoration	+1	0	0	0	0	+1	0	+1	0	0	0	N	N	N	0	0	0	0	N	N	+1	N	

Project Activities	Physical							Biological				Social and Socioeconomic											
	Soil	Air Quality	Surface Water	Groundwater	Noise	Water Consumption		Natural Vegetation	Wildlife	Biodiversity	Habitat	Livelihood and Economy	Resettlement	Safety Hazards	Employment	Traffic congestion	Health Hazards	Cultural Issues	Gender Issues	Recreational Sites	Site Aesthetic	Historical/Archeological Sites	
Operational Phase																							
Operations	-1	0	-1	-1	-1	-1		0	0	0	0	+1	N	-2	+2	0	-2	0	-1	+1	0	N	
Solid Waste Disposal	-1	N	0	N	N	NA		N	N	N	0	N	NA	-1	+1	NA	-1	N	N	N	0	N	
Sewage Disposal	-1	N	-1	01	N	N		N	N	N	0	N	N	-2	N	N	-2	N	N	N	0	N	
Transformer Oil	-1	0	-1	-1	N	N		N	N	N	0	N	N	-2	0	N	-1	N	N	N	0	N	
Maintenance	-1	0	-1	-1	0	N		N	N	N	-2	N	N	-2	+1	N	-2	-1	N	N	0	N	
Residents (Colony)	0	0	0	0	0	0		+1	N	N	0	+!	NA	0	0	+1	0	-1	N	+1	0	N	

Note: Key: -2: High negative impact; -1: Low negative impact; 0: insignificant/negligible impact; +1: low positive impact; +2: High positive impact, N: no impact. NA Not applicable;

6.4 IMPACT CHARACTERIZATION AND ASSESSMENT

Impacts are characterized on the basis of significance, probability and prevalence of the potential impacts on the surrounding environment. Primarily, anticipated impacts have been categorized as:

- Direct or Indirect
- Positive or Negative
- Local or Widespread
- Reversible or Irreversible
- Probability (Unlikely, Likely, Certain)
- Severity (Low, Medium, High)

6.4.1 Significance of Impact

Significance of impact is assessed as low, medium and high based on Impact consequences severity and likelihood (Table 6.2), reversibility, impact duration, public concern and mainly the compliance with the EPA Rules and Regulations.

Table 6.2: Impact Assessment

Probability of Impact Occurrence		Impact Severity		
		Mild	Moderate	High
		1	2	3
Unlikely	1	Low Significance	Low Significance	Medium Significance
Likely	2	Low Significance	Medium Significance	High Significance
Certain	3	Medium Significance	High Significance	High Significance

Summary of characterization and significance is summarized in Table 6.3 and 6.4

Table 6.3: Summary of Characterization and Significance of Impacts for Construction Phase.

	Air Quality	Noise	Health Hazard	Safety Hazard	Soil Contamination	Water Contamination
Direct and indirect	Direct	Direct	Direct	Direct	Direct	Indirect
Positive and negative	Negative	Negative	Negative	Negative	Negative	Negative
Local or widespread	Local	Local	Local	Local	Local	Local
Short- or long-term	Short term	Short term	Long Term	Short Term	Short Term	Short Term
Reversible or Irreversible	Reversible	Reversible	Irreversible	Reversible	Reversible	Reversible
Severity	Moderate	Moderate	Moderate	High	Moderate	Moderate
Probability	Likely	Likely	Likely	Likely	Likely	Likely
Significance	Medium	Medium	Medium	High	Medium	Medium

Table 6.4: Summary of Characterization and Significance of Impacts for Operation Phase

	Air Quality	Noise	Health Hazard	Safety Hazard	Soil Contamination	Water Contamination
Direct and indirect	Direct	Direct	Direct	Direct	Direct	Indirect
Positive and negative	Negative	Negative	Negative	Negative	Negative	Negative
Local or widespread	Local	Local	Local	Local	Widespread	Widespread
Short- or long-term	Short term	Short term	Long Term	Long Term	Long Term	Long Term
Reversible or Irreversible	Reversible	Reversible	Irreversible	Irreversible	Reversible	Reversible
Severity*	Moderate	Moderate	High	High	Moderate	Moderate
Probability	Unlikely	Unlikely	Likely	Likely	Likely	Likely
Significance	Low Significance	Low Significance	High Significance	High Significance	Medium Significance	Medium Significance

6.5 IMPACTS ASSOCIATED WITH PRE-CONSTRUCTION PHASE:

6.5.1 Project Siting and Land Acquisition

6.5.1.1 Grid Station

Potential Impact:

Environmental and social impacts may arise with poor siting and improper land acquisition.

Mitigation

The application of good and sound siting criteria is often the best and first strategy to minimize the environmental and social impacts that can be caused by Grid Station. The Proposed site is undisputed open land situated within the existing premises of the DHA. Easy road access, no settlements in close vicinity, no archeological or cultural resources to be dismantled or relocated, and no ecologically sensitive or declared protected area existing on proposed site that favors the point of no impact due to project location.

No issues of land acquisition as the land (28.6 Kanal) had been provided by DHA. Land ownership will remain with DHA.

Residual Impact

Impacts significance pertaining to Project siting and land acquisition will reduce to insignificant.

6.5.1.2 Transmission Line

The proposed transmission line from IESCO existing T/L to the proposed Grid Station at DHA ROSE PHASE-VII, Rawalpindi is about 15 km long.

Potential Impact:

- Issues related to ROW
- May impact on Vegetation, land, ecosystem, Aesthetics, surface hydrology, waterways
- Health hazard of Electromagnetic Field (EMF) near high voltage Transmission Line

Mitigation Measures

- The route of T/L has been selected by IESCO which is as shortest as possible in length and mostly passes through the barren land to avoid disturbance, safety incidents or damage to the land/crop of the public involved as much as possible. However, the damage to trees and crops is expected which will be compensated as per applicable laws/Telegraph Act.
- Meetings with the ROW landowners and communities to explain that the project is for the national cause and any damage to their crop or land will be compensated as per applicable laws. As required compensation laws should be explained to the land owners.
- Site is not located in any environmentally sensitive area and not prone to floods and landslides.
- The site will not disturb any surface hydrology, waterways or Aquatic Fauna and associated Ecosystems

- No known sites of archeological or cultural value exist near the proposed site

Residual Impact

- Impacts significance pertaining to Project siting and land acquisition will reduce to medium

6.5.2 Design

Potential Impacts

At the design phase, no considerable impact will occur on land, soil, topography, ground water, and on people of the area. However, in pre-construction phase those impacts will be identified that can be addressed at design phase. Impacts that may be addressed during design phase include:

- Physical trauma associated with failure of building structures
- Exposure to hazardous material
- Electric and Magnetic Fields

Reduction of potential hazards is best accomplished during the design phase when the structural design, layout and site modifications can be adapted more easily.

Mitigation Measures

The following issues should be considered and incorporated as appropriate into the planning, siting, and design phases of a project.

- Inclusion of buffer strips or other methods of physical separation around project sites to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odors, or other emissions
- Incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, tsunamis, wind, flooding, landslides and fire. To this end, all project structures should be designed in accordance with engineering and design criteria mandated by site-specific risks, including but not limited to seismic activity, slope stability, wind loading, and other dynamic loads·
- Application of locally regulated or internationally recognized building codes to ensure structures are designed and constructed in accordance with sound architectural and engineering practice, including aspects of fire prevention and response
- **Electromagnetic Field:** Although the evidence of adverse health risks is weak, it is still sufficient to design safe and protected Transmission system. IESCO design of T/L installation comply with all requirements of international standards that minimize the potential hazard impact of EMF near high voltage T/L. This includes the following measures:
    - Provision of Sufficient space for transmission corridor
    - IESCO design of T/L installation comply with all requirements of international standards that minimize the potential hazard impact of EMF near high voltage T/L. This includes the following measures:
        - Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation

Protection (ICNIRP). Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure.

- If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines, substations, or transformers. Examples of these techniques include:
  - Shielding with specific metal alloys
  - Increasing height of transmission towers
  - Modifications to size, spacing, and configuration of conductors

6.6 IMPACTS ASSOCIATED WITH CONSTRUCTION PHASE

The Environmental and Socio-Economic Impacts associated with the construction activities of the proposed project are:

- Impacts on Physical Environment
- Impacts on Biological Environment
- Social Impacts

6.6.1 Impact on Physical Environment

6.6.1.1 Impact on Soil and Topography

Potential Impact

Soil of the Project site may be affected by earthworks including excavation, dumping of construction debris, leveling of the site; installation of water drainage channels; spillage of fuel and oil during handling, transportation and storage; silt-water from concrete batching and accidental leakage of chemicals to be used.

The likely impacts of these activities may include:

- Physical scarring of the landscape.
- Increased risk of land slippage.
- Increased sediment load in surface run off.
- Soil contamination

Soil erosion may occur after excavation. Adverse impact is expected in case surface topography is modified and project site is flooded during rainy season. Spillage of fuel and oil may cause soil contamination. Possibility of impact is more at fuel and chemical storage areas at campsites; leakage from vehicles and machinery if not properly maintained and at areas of vehicle fueling and maintenance. Overall, impact on topography is assessed to be of low significance whereas adverse impact of moderate significance is expected on soil with reference to its contamination.

Mitigation Measures

- Good engineering practices will help control soil erosion. Excavation work should be sprayed with water.
- Spill Prevention and Response Plan for storage, use and transfer of fuel and hazardous materials should be prepared.
- Workers should be trained on spill prevention and response plan.

- Fuels, lubricants and chemicals should be stored in covered areas, underlain with impervious lining.
- Maintenance and washing of vehicles and equipment should be carried out at designated areas.
- Regular inspections should be carried out to detect leakages in construction vehicles and equipment. Their scheduled maintenance should be carried out.
- Appropriate arrangements, including shovels, plastic bags and absorbent materials, should be available near fuel storage areas.
- Document all related accidents of spillage to take corrective actions and to avoid recurrence.

Residual impacts:

The implementation of above-mentioned measures is expected to reduce the adverse effects within low range.

Monitoring requirement:

Soil of the construction site should be visually inspected for any adverse effect and its mitigation on daily basis by Contractor's Engineer/Supervisor.

6.6.1.2 Water Consumption

Potential Impact

Water during construction phase will be required mainly for domestic water consumption at the construction camp and for the construction activities including sprinkling of water for dust suppression. The water will be supplied from extension of existing potable water circuit of existing tube-wells or water will be purchased from water tanker owners.

An adverse impact on the water resources will be established only if the water consumption/extraction during construction directly affects the ability of the water users at existing DHA facility to meet their water needs. However, the capacity of installed tube-wells is enough to cater the additional load of water consumption. Therefore, low significance of impact is expected.

Mitigation Measures:

Water conservation program will be initiated to prevent wastage of water. During base line study, groundwater was tested by an EPA certified lab (SEAL). The water results comply with PEQS of drinking water.

Residual Impact

Low residual impact is expected.

Monitoring

Annual performance checking of tube-wells is suggested along with static water level and draw down.

6.6.1.3 Water Quality

Potential Impact

The quality of surface and groundwater supplies may deteriorate in case pollutants mix with surface runoff during rain are carried to water resources in the vicinity, or if pollutants leach into the ground. Potential sources of pollution in such cases may include:

- Domestic waste (sanitary and kitchen discharge)
- Oil and grease from vehicles and construction machinery
- Sediments from altered land surfaces
- Spillage of fuel or chemicals on ground

Pollution by sediments can lead both to excessive levels of turbidity in receiving waters and to off-site ecological and physical impacts from deposition in rivers and lake beds. Also, the silt and clay is a primary carrier of adsorbed chemicals especially phosphorus, chlorinated pesticides and most metals which are transported by sediments into the aquatic system however the impact of sediments from the Project will be insignificant. Similarly, there will insignificantly impact on surface water as no surface water source is located in nearby surroundings. The wastewater from construction site will be disposed in the sewerage system of the DHA thereby posing no harm to the soil with subsequent effect on groundwater within DHA and grid station premises.

Chemicals in fuel and oil can quickly move through soil and pollute groundwater. A significant impact on the groundwater will be interpreted if construction material and other pollutants are not effectively controlled.

Mitigation Measures

- Effluents from Construction site will be diverted through sewerage channels to Septic Tank.
- Fuels, lubricants and chemicals will be stored in areas with impervious floors. The accidental spills should be handled in accordance with the relevant SOPs.
- The scheduled maintenance of vehicles and construction machinery shall be carried out to prevent fuel and oil leakages. Fueling and vehicles washing will be carried out at designated areas.
- Recently groundwater has been analyzed for various parameters which are found to be within the PEQS/WHO's limits for drinking water.

Residual Impact

Low scale residual impact is predicted if mitigation measures are incorporated.

Monitoring Requirement

The Contractor's mechanical crew will closely monitor any leakages from vehicles and machineries on regular basis. Groundwater will be analyzed for parameters of drinking water PEQS on monthly basis during Construction Phase.

6.6.1.4 Air Quality

Potential Impact

Dust generation during construction can cause detrimental effects to the health and amenity of neighbors and employees, reduced visibility on site, increased wear on machinery/equipment and cause complaints. During the construction phase, major sources of potential impacts on air quality are

the dust emissions generated from earthworks, movement of vehicles on unpaved surfaces, exposed storage piles, construction material transportation, concrete mixing and batching. The main health hazards are the particles smaller than 10 microns (designated as 'PM10') as they are respirable. Large particles tend to settle rapidly and often do not reach receptors. Wind-blown emissions make the problem worse. Also, the exhaust emissions of CO, NO_x, SO_2 and particulates can pose significant adverse impact on health and environment when the emissions are not in compliance with PEQS. The other construction activities which can pose occupational health hazards are welding, metal cutting and painting fumes.

To make the construction activities lawful and neighbor friendly, following are the practical ways to control nuisance.

Mitigation Measures

- Dampening of material and unsurfaced roads. The most effective means of reducing the dust emission is wet suppression. Use water sprays and commence landscaping as early as practicable.
- Dust emission from soil piles and aggregate storage stockpiles will be reduced by covering the piles, for example with tarpaulin or thick plastic sheet.
- Stripping topsoil when there is sufficient moisture content in the soil.
- Restring dust generating activities during extremely dry or windy days.
- Construction materials that are susceptible to dust formation will be transported only in securely covered trucks to prevent dust emission during transportation. Restrict vehicles speed.
- Provision of dust respirators to equipment operators and other permanent and contract employees who are exposed to dust.
- Use of vehicles, machinery and generators with high combustion efficiency. Scheduled maintenance will be carried out to meet specifications of the Manufacturer as to minimize the emissions. Do not leave plant or equipment idling when not in use.
- Before and during the building works, all excavations must be fenced or otherwise guarded against being a danger to the life or property.
- Welders, painters and their co-workers should understand the hazards of material they are working with. Prolonged exposure of fumes may cause serious health complications. They should be enforced to wear PPEs. General ventilation, the natural or forced air movement, can reduce fume and gas level in the work area. Develop SOPs for welding including relevant guidelines of OSHA.

Residual Impact

- After taking mitigation measures, impact is assessed to be of low significance.

Monitoring requirements

- Dust emission will be visually monitored on regular basis and shall be analyzed on quarterly basis.
- Ambient air quality will be checked for CO, NO_x, SO_2 and particulates near or at project site on quarterly basis.

6.6.1.5 Noise

Potential Impacts

Depending on the Construction Equipment used and its distance from the receptors, the community and the existing Complex may typically be exposed to intermittent and variable noise levels. During the day such noise results in general annoyance and can interfere with sleep during the night. The potential sources of significant noise include the construction machinery, generators at camps and construction related traffic, crushing, scaffolding and radios and mobile phones. The noise will be maximum during the day time when construction and operational activities are ongoing.

The noises loud enough to impair someone's hearing will contribute to hearing loss and accidents when can't hear the alarm.

Loud sound levels at workplace leads to unhappy workers.

Mitigation Measures:

- Position plant and machinery as far as possible from noise sensitive area.
- Use low noise machinery (use of silencer and mufflers) which is properly maintained and operated.
- Fit an acoustic enclosure if machine is stationary.
- Where possible use main electricity rather than a generator supply.
- Switch off all equipment when not in use.
- Try to keep noisier work for middle of the day.
- For scaffolding, reduce drop heights.
- Screen noisy machinery from noise sensitive areas.
- Keep the music volume of radio or mobile phone down
- Provide sound related PPEs to the workers.

Noise levels shall be controlled within PEQS limits as monitored near the project boundaries. For noisy areas, the workers must use hearing protective devices such as ear muffs, ear plugs.

Place Warning Sign Boards at high sound level areas.

Residual Impact

Low residual impact is expected after taking mitigation measures however needs strict control and monitoring to maintain sound levels within PEQS limits. Use of ear muffs or ear plugs are essential where sound levels are above the PEQS.

Monitoring requirement

Monitoring of ambient sound levels and machinery generated noise will be done by Contractor's Inspection engineer on quarterly basis to avoid increase in noise level beyond PEQS limits.

6.6.1.6 Solid Waste Management

Potential Impacts

Solid waste during Construction Phase is classified as domestic solid waste, packaging waste, construction waste (includes cables, copper, empty containers, steel etc.) and excavated material. Other waste includes oily rags, used air and oil filters, waste fluorescent and used cartridge etc. The waste if inadequately managed, can cause health hazard and contamination of soil and groundwater.

Mitigation Measures

- Site Waste Management Plan (SWMP) shall be prepared and implemented by the Construction Contractor that details the amount and type of waste that will be produced at construction site and how it will be reused, recycled or disposed of at a legitimate site.
- Waste will be segregated at source and collected in labelled bins for different type of waste.
- Record waste for each category of waste with their quantities will be maintained.
- Hazardous waste shall not be mixed with general household waste.
- In case of hazardous waste, EPA certified waste carrier will be engaged during construction phase to ensure the waste is being disposed of legally.
- Disposal of waste by burning at construction site will be prohibited.

Residual Impact

Impact can be significantly reduced provided the above-mentioned mitigations are appropriately incorporated.

Monitoring Requirements

The Contractor's site engineer will monitor and ensure the good practices of SWMP at Construction site.

6.6.2 Biological Environment

6.6.2.1 Vegetation/Trees Loss

Potential Impact

The project area for Grid Station is barren land within DHA having herbs, grass and a few trees. These need to be partially removed during construction phase. However, Near the TL alignment, there are no protected or reserved forests. During construction phase, cutting of trees would be required particularly while installing about 15 Km transmission line and 90 poles.

Chemical herbicides are occasionally used as well to get rid of the vegetation beneath the transmission wires. When this technology is used carelessly, biodiversity can be seriously lost. The construction crew may also choose to harvest trees and shrubs for fuel-wood.

Mitigation Measures

- IESCO will provide an approved list of trees for removal to the contractor.
- Implementation of an integrated vegetation management approach (IVM). The selective removal of tall-growing tree species and the encouragement of low-growing grasses and shrubs is the common approach to vegetation management in transmission line rights-of-way.
- Avoidance of construction activities during the breeding season and other sensitive seasons or times of day.
- Re-vegetation of disturbed areas with native plant species;
- The IESCO management is committed to plant new trees in place of the removed trees (if any), at least 5-6 trees of 6-7 ft height for every lost tree, with the consent of relevant authority.
- Maintain a record of new planted trees for follow up and maintain their growth
- Herbicides will not be used at project site including Grid station and T/L to clear vegetation.

Residual Impact

The residual impact will be of low significance provided the growth of new plants is regularly monitored and maintained.

Monitoring

The Contractor's site engineer will regularly monitor the cutting of trees and ensure that:

- All regulations are being complied.
- Construction activities particularly for T/L are not damaging the crops, vegetation and land

IESCO will monitor and ensure that:

- Damage of crops or land is being reimbursed to the land owner
- The new trees are being planted and maintained

6.6.2.2 Wildlife and Habitat

Potential Impact

The construction and maintenance of transmission line rights-of way, especially those aligned through forested areas, may result in alteration and disruption to terrestrial habitat, including impacts to avian species and an increased risk of forest fires. The habitat alteration from these activities includes fragmentation of forested habitat; loss of wildlife habitat, including for nesting; establishment of non-native invasive plant species; and visual and auditory disturbance due to the presence of construction machinery, workers, towers and associated equipment.

During installation of towers, the construction workers may also go hunting or harass wildlife.

Mitigation Measures

- The construction workers will not be allowed to indulge in hunting or damage to the wildlife and habitat.
- Scheduling activities to avoid breeding and nesting seasons for any critically endangered or endangered wildlife species;
- When feasible, use existing utility and transport corridors, existing road to avoid critical habitat;
- Re-vegetation of disturbed areas with native plant species;

Residual Impact

Residual impact is expected within low to medium significance.

Monitoring

The environmental monitoring will guarantee adherence to the previously mentioned mitigating measures.

6.6.3 Socio-Economic Impacts

6.6.3.1 Possible Displacement

Potential Impact

Construction of Grid Station and Transmission Line/corridor may involve displacement if there is any community exist at Grid station selected site or on the ROW.

Mitigation Measures

- As the grid station site has no resettlements or community on the selected project area, therefore requiring no mitigation measure to displace or relocate the people during project construction.
- Efforts were made to select a Transmission corridor which does not require any displacement. However, any loss of crops or land of the owner will be compensated as agreed with the land owners in line with the current relevant regulations.

Residual Impact

No displacement is required.

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6.6.3.2 Land Use

Potential Impact

The Proposed land is going to fulfill the need of electricity demand, therefore has an overall positive impact in relevance to the land use. However, the land space under a transmission line tower usually remains un-occupied and barren.

Mitigation Measures

- Any negative impact may be mitigated by planting native plant species.

- No major change in the ROWs of transmission lines is expected as all area under transmission line will remain under-use as previously

Residual Impact

Overall positive impact.

Monitoring Measures

Project Manager will ensure plantation of new trees in place of removed trees and restoration of site by the Contractor.

6.6.3.3 Impact on Livelihood of Local Communities

Potential Impact

The construction phase of grid Station will generate employment opportunities. The project will provide the communities with the opportunity to expand their existing businesses such as restaurants, hotels and transport. Overall, it will pose a positive impact on livelihood of local communities. However, installation of T/L may disturb the local community around the ROW.

Mitigation Measures

- Local community would be preferred for employment of unskilled labor. They may also be given priority as semi-skilled and skilled workforce if they qualify the job criteria.
- Disturbance caused to community and land owners of ROW will be minimized by earliest possible restoration after installation of T/L and Towers.

Residual Impact

Overall positive impact

6.6.3.4 Archeological or Cultural Resources

No known sites of archeological or cultural value exist near the proposed site. The project is therefore not expected to have any impact.

6.6.3.5 Community Health and Safety

Potential Impact

Inappropriate management of solid waste, wastewater, emissions, and mainly noise and traffic may pose a threat to the community. Also, noteworthy issues are public safety regarding construction activities. Piles of construction debris, excavated land and deep trenches may pose a risk to public safety in case of unattended walking through the construction site.

Mitigation Measures

- Unauthorized entry to the construction site will be restricted and barricaded where required.
- Environment management will ensure that all waste disposal, air emissions and noise from construction activities comply with EPA rules, PEQS and Safety Standards.
- To reduce road accidents involving project vehicles during construction, avoid activities during heavy traffic at office and school's timings.
- Provision of appropriate warning sign boards at near work site and roads where necessary
- Adopt risk management strategies to safeguard the community from physical, chemical, and other hazards related to the construction and decommissioning sites.

Residual Impact

Impact after mitigation measure is expected to be within low-moderate significance.

6.6.3.6 Occupational Health and Safety

Occupational health and safety hazards include:

- Over exertion
- Slips and Falls
- Work on height
- Struck by objects
- Moving Machinery
- Dust
- Confined Spaces and Excavations, other site hazards such as exposure to dust, chemicals, hazardous or flammable materials, and wastes in a combination of liquid, solid, or gaseous forms
- People from the project area cannot be considered isolated from the rest of the country. They are regularly exposed to illnesses common to other populations and have similar levels of immunity.

Impact before mitigation is of high significance.

Mitigation Measures

- Enforce the use of PPEs
- Ensure the use of SOPs for work on height and in confined space and excavations.
- Manage proper housekeeping to avoid safety incidents.
- Fire prevention plan for Construction Phase should be implemented.

Residual Impact

Impact of low to medium significance is expected after implementing mitigation measures.

6.7 IMPACTS ASSOCIATED WITH OPERATIONAL PHASE:

6.7.1 Impact on Physical Environment

6.7.1.1 Air Emissions and Effluent

Potential Impact

The power transmission and distribution sector does not typically give rise to significant air emissions or effluents.

Mitigation

- The site should comply with PEQS
- Effluent from grid station and the employees' colony should be discharged after passing through Septic Tanks.

Residual Impact

Low Impact

Monitoring

Ambient air should be analyzed for given parameters of PEQS on quarterly basis.

6.7.1.2 Noise and Ozone

Potential Impact

Noise characterized by buzzing or humming is commonly associated with transformers or high voltage power transmission lines that produce corona effect. This is caused by ionization of air surrounding the transmission lines causing the conductors to glow producing a hissing noise. Additionally, ozone—a colorless gas with a pungent—may be also be produced.

Neither the noise nor the ozone produced by power systems is typically harmful. The noise

from overhead power lines can be troubling to nearby residents.

Mitigations

This may be addressed during project planning stages:

- By locating rights-of-way away from human receptors, to the extent possible.
- By using noise barriers or noise canceling acoustic devices.
- By employing corona rings at the terminals of high voltage equipment

6.7.1.3 Soil and Water Contamination/Water Quality

Potential Impact

Soil and Water contamination can be caused by improper waste management.

Mitigation Measures

- Soil contamination and consequent water contamination can be minimized by proper waste management of solid waste and sewage.
- IESCO has developed solid waste management procedures which are in practice at all the grid stations. The collected waste is disposed of through a contractor avoiding any soil contamination.
- Appropriate Sewerage system at grid station will be connected to existing sewerage system of DHA ensuring that there is no soil or water contamination by sewage.
- Prepare procedures for waste oil disposal and oil spillage in accordance with MSDS
- Groundwater has been recently analyzed and found to be compliant with PEQS of drinking water.

Residual Impact:

Implementing mitigation measures, impact can be reduced to low significance.

Monitoring Measures

- Visual inspection of soil on regular basis for any soil contamination
- Ground water lab analysis on quarterly basis to check its compliance with PEQS of drinking water.

6.7.1.4 Hazardous Materials at Grid Station

Potential Impacts

Hazardous materials in this sector include insulating oils / gases (e.g. Polychlorinated Biphenyls [PCB] and sulfur hexafluoride [SF6], and fuels, in addition to chemicals have negative impact if not properly handled

Mitigation Measures

- Avoid using PCB containing oils and equipment as its use is prohibited.
- Minimize the use of SF6 as it is a greenhouse gas having higher global warming potential (GWP) than CO2.
- Prepare procedures for prevention and control of hazards associated with spill prevention, waste oil disposal, emergency response, clean-up, and contaminated soil remediation in accordance with generalized hazardous waste management system and MSDS of the hazardous materials.

Residual Impact

Significance of the residual impact is predicted to be low to medium if mitigation measured are adequately incorporated.

Monitoring Measures

- Perform safety and environment audits including field inspection for any oil spillage, soil contamination.
- Periodic monitoring of groundwater water quality is proposed in accordance with PEQS for drinking water on quarterly basis.

6.7.1.5 Occupational Health and Safety Hazards

A. Live power lines

Potential Impact

During construction, commissioning, operation and maintenance activities, workers may be exposed to hazards of live power lines.

Mitigation Measures

- Ensure that Live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards.
- Deactivate and properly ground live power distribution lines before work is performed on, or in close proximity, to the lines;
- A health and safety plan should be developed for the maintenance and operation to be performed within minimum setback distances. The plan should include specific training, safety measures, personal safety devices, and other precautions.
- Work permit system should be in practice for any maintenance work.

Residual Impact

The impact is expected to be reduced to low to medium range.

B. Working at height on towers and structures

Potential Impact

Exposure to occupational hazard when working at elevation during construction, maintenance, and operation activities.

Mitigation Measures

- Work on height will be performed in accordance with IESCO Maintenance Procedures.
- Ensure that work on height is carried out by trained workers with strict adherence to specific safety and insulation standards
- Testing structures for integrity prior to undertaking work
- Implementation a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others;
- Ensure training and use of hoisting equipment and safety belt and a second (backup) safety strap
- Use an approved tool bag for raising or lowering tools or materials to workers on structure

Residual Impact

If mitigation measures are implemented, expected impact will be within low to medium significance.

Monitoring

Regularly monitor the condition of hosting equipment, safety belts and conduct trainings on relevant O&M procedures

C. Electric and magnetic fields

Potential Impact

Higher exposure of electric Utility worker to occupational hazard of EMF due to working in close proximity to high voltage electric lines.

Mitigation Measures

- See Section 6.5.2 for understanding of EMF and mitigation measures to prevent from hazard.
- Identification of potential exposure levels in the workplace and training of workers for identification.
- Establish safety zone based on level of EMF and system of authorization for entering different safety zones.
- Develop and implement action plans to address occupational exposure to EMP by limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials.

Residual Impact

Low impact may be achieved

6.7.2 Socio-economic Impacts

6.7.2.1 Noise and Ozone

Potential Impact

The noise from overhead power lines can be troubling to nearby residents.

Mitigation Measures

- Same as described in Section 6.7.1.2

6.7.2.2 Impact on Livelihood of Local Communities

Potential Impact

The operation phase of grid Station will generate employment opportunities. The project will provide the communities with the opportunity to expand their existing businesses such

as grocery store, restaurants, and transport. Overall, it will pose a positive impact on livelihood of local communities.

Mitigation Measures

- Local community would be preferred for employment of unskilled labor. They may also be given priority as semi-skilled and skilled workforce if they qualify the job criteria.
- IESCO may start CSR activities for the community.

Residual Impact Overall positive impact

6.7.2.3 Community Health and Safety Near Live Transmission Lines

Potential Impacts

The operation of live power lines may generate the following industry-specific impacts:

- Electrocution: from direct contact with high-voltage electricity by any means ·
- Electromagnetic interference: ·Corona effect and high frequency currents of overhead transmission lines may result in the creation of radio noise.
- Visual amenity: Transmissions lines may be visually intrusive and undesirable to local residents ·
- Noise and Ozone; Corona effect as described in Section 6.7.1.2 ·
- Aircraft Navigation Safety: Aircraft collision – direct or indirect through radar interference.

Mitigation Measures

- **Electrocution:** The use of signs, barriers (such as locked doors, gates, and steel posts around transmission towers, especially in urban areas), along with education and public outreach, will help prevent public contact with potentially hazardous equipment. Additionally, grounding conductive objects (like fences or other metallic structures) near power lines will be implemented to prevent electric shock.

- **Electromagnetic Interference:** Transmission line rights-of-way and conductor bundles are typically established to maintain normal radio reception at the outer limits. However, during periods of rain, sleet, or freezing rain, the streaming corona on conductors significantly increases, which may impact radio reception in residential areas close to transmission lines.

- **Visual amenity:** Comprehensive public consultation was conducted during the planning of power line and right-of-way locations.

- **Noise and Ozone:** As described in Section 6.7.1.2

- **Aircraft Navigation Safety**: Installation should be avoided near an airport or known flight path.

Residual Impacts

Expected impact of low to medium significance.

6.7.2.4 Community Health and Safety near Grid Station

Impact Potential

- Poor quality or inadequate supply of drinking water, sanitation and drainage facilities may have negative impact on the families of the employees living in the residential colonies.
- The families may be exposed to health hazards associated with High value of EMF and noise from the grid station facilities.
- Chance of electro

Mitigation Measures

- Adequate supply of safe drinking water, sanitation and sewage disposal system will be provided to the Employees Colony.
- Safety considerations have been taken at design stage for EMF and noise to mitigate the effects of associated hazards on residents of colony and grid station office.
- Warning sign boards and safety barriers will be placed to avoid the risk of electrocution.
- IESCO provides free medical facility to their employees.

Residual Impact

- Impact is expected within low to medium significance.

Monitoring

- Regular monitoring of drinking water quality to comply with PEQS on quarterly basis.
- Regular monitoring of EMF and noise levels near residential colony.
- Periodic medical checkup of employees and their families residing in Employees Colony.

6.7.3 Biological Environment

6.7.3.1 Impacts from right-of-way vegetation maintenance

Potential Impacts

Unchecked growth of tall trees and the accumulation of vegetation within rights-of-way can lead to various issues, including power outages from branches and trees contacting transmission lines and towers, the potential ignition of forest and brush fires, corrosion of steel equipment, restricted access to equipment, and interference with essential grounding equipment.
Maintenance may result in alteration and disruption to terrestrial habitat, including impacts to avian species and an increased risk of forest fires

Mitigation Measures

- Implement an integrated vegetation management strategy.

- Remove invasive plant species whenever possible and promote the cultivation of native plant species.
- Schedule maintenance activities to avoid the breeding and nesting seasons of critically endangered or endangered wildlife species.
- Adhere to manufacturer guidelines and procedures for machinery and equipment concerning noise, oil spill prevention, and emergency response.
- Avoid using machinery near watercourses.

Residual Impact
Impact of low significance

Monitoring
Monitoring of ROW for growth of vegetation as tree related incidents account for a large portion of electric power failures.

6.7.3.2 Birds and Bat Collisions and Electrocutions

Potential Impact
High electricity towers and live transmission lines can result in fatality of birds and bats through collision and electrocutions particularly if

- Power lines are located within daily flyways or migration corridors
- Groups are traveling at night or during low light conditions of fog
- These collisions may cause power outages and fires

Mitigation Measures

- Aligning transmission corridors to avoid critical habitats (e.g. nesting grounds, heronries, rookeries, bat foraging corridors, and migration corridors)
- The proposed transmission corridor mostly passes through barren land and clear of any critical habitats.
- As per IESCO standard design, sufficient space between two conductors will be maintained to avoid any risk of bird electrocution due to their large wingspan.
- The exposed coverings of the energized parts and hardware will be insulated to avoid any electrocution of birds.
- No incident of birds' collision or electrocution has been reported at another transmission line which are passing through a nearby area of the project.

Residual Impact
Impact after mitigation measures is expected to be low.

7. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLANS

7.1 GENERAL

The Environmental and Social Management Plan (ESMP) of the project provides a road map on how to address identified significant environmental and social impacts to keep it environment friendly during construction and operational phases. This Chapter also presents the Monitoring Plan to check compliance of the ESMP and to take timely corrective actions in case any deviation from significant criteria, requirement or goal is found.

7.2 OBJECTIVES OF ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The primary objectives of the ESMP are to:

- Facilitate the implementation of the mitigation measures identified
- Define the responsibilities of the Project's proponent and contractor and provide a means of effective communication of environmental issues between them.
- Identify monitoring parameters in order to ensure the effectiveness of the mitigation measures
- Establish a system for prompt action in response to unanticipated environmental situations.
- Identify training requirements at various levels.

7.3 MANAGEMENT APPROACH

The organizational roles and responsibilities of the Proponent and Contractor are summarized below:

Proponent: The project proponent will assume overall responsibility for compliance with the ESMP. Relevant departments will carry out verification checks to ensure that the contractors are effectively meeting their environmental and social obligations.

Contractors: The contractors will carry out the majority of environmental and social mitigation measures in their field activities as part of the project. The contractors are subject to certain liabilities under the laws of the country and under different clauses of their contract with the proponent. The responsibilities outlined in ESMP should be included in the scope of work during agreement with the Contractor.

7.4 ENVIRONMENT AND SOCIAL MANAGEMENT PLAN

Table 7.1 illustrates the ESMP for Pre-Construction, Construction and Operation Phases of the Project for Construction of 132 Grid Station and Feeding Transmission Line at DHA ROSE PHASE-VII.

7.5 Environment Monitoring Plan

Environmental monitoring is a vital component of the Environmental and Social Management Plan.

The feedback provided by the environmental monitoring is instrumental in identifying any problem or lapse in the system under implementation and planning the corrective actions. Main objectives are:

- To provide a mechanism to determine whether the Construction contractors are carrying out the project in conformity with the ESMP.
- To document the actual project impacts on physical, biological, and socioeconomic receptors, quantitatively where possible, in order to evaluate adequacy of ESMP and determine the need for any improvement.
- To ensure that all the negative impacts generated during Construction and Operations activities have been mitigated to an acceptable level to meet EPA Rules and Regulations and are compliant with Punjab PEQs.

Table 7.2 presents the Monitoring Plan for Construction and Operation Phases.

Following record should be maintained:

- Periodic inspection reports of the site
- Audit reports of Environment, Energy, Safety and Health
- Record of all moderate and major spills and other incidents; investigation reports.
- Waste tracking registers keeping records of waste generation and disposal.
- Analyses reports of groundwater, Ambient air, particulates emissions and sound level survey reports
- Record of Utilities
- Employment opportunities offered to local community
- Community complaints and corrective measures taken

Table 7.1: Environmental and Social Management Plan for Proposed Project

	Project Activities/Aspects	Potential Impacts	Mitigation Measure /Environment or Social Plan
1	**PRE-CONSTRUCTION PHASE**		
1.1	**Land Acquisition for Grid Station / Resettlement**	- No issue related to grid station land as it has been donated by DHA - No issue of resettlement/displacement - **Improvement in Aesthetic Value**	- No mitigation or Environment Plan for land acquisition or resettlement is needed. - Plan to be made for plantation of indigenous trees inside and along the periphery of grid station (considering safety and security issues) to improve the environment and also the aesthetic value of the site.

1.2	**Land Acquisition for Feeding T/L (ROW)/Resettlement**	No land acquisition involved, as per Telegraph Act 1885 compensations will be paid for damages i.e. crops/trees and other properties whereas the land of T/L passing through private land will remain in the ownership of current landowners.	- Meetings with the ROW landowners and communities to explain that:
			  - The project is for a national cause and
			  - Any damage to their crop or land will be compensated as per applicable laws / Telegraph Act 1885.
			- No resettlement is involved

1.3	**Design**	Positive impact as hazards can be minimized at design phase	- International codes for designing are used by IESCO to protect grid station and T/L from Natural Risks and ensure structural integrity and minimization/elimination of safety and health hazards. - Environmental and energy conservation related considerations are also incorporated.

	Activities/ Aspects	Potential Impacts	Mitigation Measures
2	**CONSTRUCTION PHASE**		
2.1	**Construction Camp and Onsite Housing Activities**		-
2.1.1	**Camp management**	Impact on **Terrestrial Fauna and associated Ecosystems** (Animals are Attracted to Garbage and Food Waste)	- Dispose of garbage and food waste in animal proof containers. - Prohibit hunting and harassing wildlife in construction camps, especially during reproductive (e.g., courtship, nesting) seasons -
2.1.2	**Solid and Sewage disposal**	Degradation of Soil and Water Quality (by poor management of solid and sewage disposal)	- Use existing, authorized wastewater treatment and solid waste disposal facilities if available. - Provide enough bathrooms, showers, and sanitary latrines; also, wastewater disposing into a septic tank or sanitary sewer system. - Create a plan for the appropriate collection, storage, transportation, and disposal of solid waste. - Use water conservation techniques (such as reduce, reuse, and recycle) to cut down on wastewater production and water use. - Put in place a program for solid waste reduction, reuse, and recycling. - Provide sufficient sanitary latrines, bathrooms and showers and treat wastewater or discharge to a sanitary sewer system (Septic tank)

			- Prepare a solid waste management plan for proper collection, storage, transport and disposal. - Apply water conservation (e.g., reduce, reuse and recycle) measures to reduce water use and wastewater generation. - Implement a solid waste reduce, reuse and recycle program.
2.1.3	**Water Supply**	Water quantity (An issue of water supply)	- Secure necessary water rights. - Use water conservation practices.
2.1.4	**Fuel and chemical storage and handling**	Contamination from Spills and Fuel Leaks (Fuel and chemical storage and handling)	- Make a detailed inventory of every hazardous material that will be utilized, stored, transported, or disposed of throughout the entire operation. - Create containment systems for the handling, storage, and dispensing of hazardous materials, such as solvents, oils, greases, fuels, and leftovers - Create a spill prevention and response plan for the use, transportation, and storage of hazardous goods and fuel. - Train workers regarding the Spill Prevention and Response Plan - Supply portable supplies and equipment for on-site spill management, control, and cleanup. - Prepare incident investigation reports of all the accidental spills
2.1.5	**Energy production**	Air Quality	Generator Emissions Consider fuel efficiency, types of fuels, and emissions controls in the selection of equipment.

2.1.6	**Transportation**	Water quality Air emissions	Contamination from Spills and Fuel Leaks Vehicles emissions Assure proper tuning and carburetor of engines. Check fuel supplies for impurities or adulteration.
2.2	**Clearing of vegetation**	Major impacts are - Destructive for the environment - Loss of flora and fauna - Impact on Aesthetics - Impact on habitat - Legal complications However, the project land is categorized as a barren land therefore clearing of vegetation has a low significance	- Clearing natural vegetation will be avoided as far as possible during T/Line work. - Total of 6-7 trees need removal for the whole project. New trees of indigenous species of low height trees and shrubs will be planted as 10 trees for every one removed tree. Eucalyptus trees will not be planted - All the cuttings and removal of trees will be carried out after approval of relevant authorities and landowners. - The plan for trees removal or relocation (if possible) will be provided to the contractor. - Keep record of tree cutting and new plantation as audit - able documentation.
2.3	**Clearing of ROW and Installation of T/L**	Damage to crops and land	- Clearing of ROW and installation of towers will be limited to the area as per engineering drawings. - The landowners will be compensated for any loss of crops and/or land as per applicable laws, regulations or policies.

		- Loss of habitat or danger to wildlife due to Illegal Hunting and/or harassing	- The construction workers will not be allowed to indulge in hunting or damage to the wildlife and habitat

		- Social and Gender Issues	- Construction crew will be instructed that:
			  - They are not allowed to enter the nearby villages and settlements.
			  - They will respect local social norms and practices.
			- Contractor will not allow to hire child labor (proof on CNIC is required)
			- Contractor may install temporary fencing where required with the consent of relevant authority or landowner.
			- Community health and safety considerations will be addressed promptly.

2.4	**Construction activities including excavation, filling and grading, foundations, etc.**		
2.4.1	**Excavation**	Impact on Topography	<u>Topography</u> - Excavations shall be kept confined to the specified location as per the approved engineering drawings. - Unnecessary excavations should be avoided - Carry out restoration just after job completion

		Soil Erosion & Sedimentation	<u>Soil erosion and soil sedimentation</u> - Employ good engineering practices to prevent Soil erosion and soil sedimentation - Plan excavation in low rainfall period - Excavate immediately before construction rather leaving soils exposed for long time. - Prevent sediment movement off-site. - Where wind erosion is a concern, plan and install windbreaks. - Carry out restoration and cover with vegetation as soon as possible.
		Impact on Wildlife and Habitat during T/L work	
2.4.2	**Earthworks, excavation, movement of vehicles on unpaved surfaces, exposed storage piles, construction material transportation, concrete mixing and batching etc.**	Dust emissions	<u>Dust Emissions</u> - Minimize dust emissions by wet suppression, particularly road and paths, excavated sites - Use water sprays at appropriate frequency especially near sensitive receptors. - Cover open stockpiles of construction materials with tarpaulin. - Vehicular traffic on unpaved roads will be avoided as far as possible. - Cordon off project area to minimize dust migration to nearby facilities.

2.4.3	**Waste management** **Oil/fuel spillage or leakages**	Soil and Water contamination	<u>Soil and Water Contamination</u> - Prevent washing away of construction materials, soil, silt or debris into any drainage system. - Maintenance and servicing of vehicle, machinery and equipment must be carried out in a designated area particularly to restrain oil reaching the ground. - Plan for solid and sewage waste management - Visual checks of soil on daily basis in Grid station construction site - Lab analysis of groundwater on quarterly basis during construction phase
2.4.4	- **Operation of Construction Machinery and equipment,** - **Construction material Unloading** - **Mechanical activities** - **Mobile phones**	Noise	<u>Noise</u> - Use low noise equipment and machinery with silencers and mufflers - For stationary equipment, use acoustic enclosure - Use noise barriers if essential - Ensure that noise from construction activities are within permissible levels as per the provision of PEQs for Noise. - Nighttime traffic will be avoided near the communities. - Place warning signboards at high sound level area. - Enforce use of PPEs for noise such as earmuffs, ear plugs dust and for other safety risks - Restrict the use of mobile phone other than emergency use.

2.4.5	**Machinery and Diesel generator**	Air Emissions (discharge emissions)	Air Emissions - Ensure regular maintenance of heavy machinery, equipment and to maintain design efficiency and control noise and air emissions well within limits of PEQS. - Where possible, use main electric supply rather than generators supply.
2.4.6	**All Construction phase activities at work place**	Health and Safety Hazards	<u>Occupational Health and Safety</u> - Barricading the excavation and other safety risks areas - Follow safety protocol for work on height and in confined space. - Safety briefings and talks with contractor staff - Develop evacuation procedures to handle emergency situations. - Use signage to warn staff or visitors about safety and health risk. - Train the staff for fire-fighting and prevention. - Provide first aid boxes and fire-fighting equipment at site. - Ensure that all operators are trained on the equipment they are operating. - Ensure load testing of cranes before use - Wear earplugs or earmuffs in areas of high sound levels from hearing loss - Use dust mask to protect from health hazards of dust - Arrange first aid box and train some contractor staff on first aid. - Ensure the availability of driver along-with a vehicle at construction site during the

			construction period to take the injured person to the hospital. .
2.5	**Borrow pits required during Construction Phase**	Legal Issue Safety issues	- The contractor will take legal permission/lease for borrow pits (if required) from the relevant authorities Reclamation of borrow pit should be done by moving spoil heaps, using adjoining land area to fill the pit.
2.6	**Construction Material Transportation**	Health and Safety Hazards Noise Traffic congestion	- Limit vehicles speed within facility @20 Km/hr. Provide temporary speed bumps where necessary. - Use PPEs - Use vehicles with low noise using mufflers and silencers; Avoid horns - Allow vehicles with exhaust emissions that comply PEQs. - Cover transporting material trucks/trolleys - Observe best safety practices when transferring materials from delivery trailers - Use alternate route, entry/exit for material Transportation - Delivery of materials should not be performed during peak travel periods to the maximum extent practicable; - Ensure drivers having valid license - Arrange safety briefings for drivers and accompanying labor
			-
2.7	**Construction Material Storage/Handling**	Health and Safety Hazards	- Cover dust producing material with tarpaulin - Carry out water spraying on piles at appropriate frequency.

		Blockage of passages or routes	- Ensure material stock piling without causing hindrance/blockage of routs
2.8	**Movement, fueling and washing of vehicles**	Soil and Water contamination Safety hazard Health Hazard	- Ensure periodic maintenance of vehicles. - Inspection of vehicles for any fuel/oil leakage - Avoid washing of vehicles at other than designated, impermeable area and direct run-off to on-site septic pond before discharge to public sewer. - Ensure vehicles with proper functioning of silencers/mufflers
2.9	**Oil/chemical storage handling**	Soil and water contamination Safety hazards	- Use standard practices of oil/fuel/chemicals storage handling. - Arrange safety briefings to contractor employees on oil/fuel/chemical handling - Arrange Safety instruction on field boards for oil/fuel/chemical handling based on their MSDS.
2.10	**Water Supply**	In-sufficient water supply can cause inadequate sanitation and health hazards Water Quality	- Provide adequate water supply for campsite and construction activities - Ensure water quality to be complied with PEQS of drinking water - Arrange groundwater analysis on monthly basis - Prevent soil/water contamination from poor management of sewage, solid waste, oil spillage/leakages, vehicles' washing etc.
2.11	**Wastewater Management**	- Inappropriate wastewater management can cause	- Construct designated channels for wastewater particularly from worksite toilets and divert to septic pond before discharge to public sewer.

		soil and water contamination - Health Hazard	- Ensure appropriate wastewater handling to prevent humans and environment. - Ensure groundwater quality compliance with PEQS of drinking water
2.12	**Solid waste generation and handling**	● Soil contamination ● Water contamination ● Occupational Safety and health Hazard	Arrange on-site Segregation and collection of construction, domestic, packaging and vehicle related waste. (Non –risk and Risk waste) Encourage to Reduce, Safe Reuse, Recycle (3R) the waste. Periodic removal and disposal by Waste Sub-contractor engaged by Construction contractor Use of PPEs Hazardous waste should not be mixed with other solid waste
2.13	**Site restoration**	Housekeeping Safety Hazard	- Clear all left over, excess construction material, waste of construction activities. - Restore the site - Re-vegetate the site with grass and trees of indigenous tree species. - Landscaping
2.14	**Workplace Unsafe Activities**	Work related injuries, occupational illness, property damage, spills fires or near	- Emergency Response Plan (ERP) shall be prepared and implemented for Construction phase,

		miss events, workplace violence and safety incidents	- Promote safety awareness at workplace for understanding of unique risks associated with work environment of Construction site. - Install proper lighting: - Communicate safety hazards with adequate signage, - Contain spills quickly, - Install proper ventilation; - Enforce use of PPEs - Timely reporting of hazards and near-misses - Fire extinguishers will be placed at appropriate locations. - Conduct safety audits. - Training of employees on Emergency handling, basic first aid, fire prevention and firefighting. - Conduct drills for preparation of disaster management and emergency response preparedness. - Follow safety protocol for work on height and in confined space. - Safety briefings and talks with contractor staff

			- Develop evacuation procedures to handle emergency situations. - Use signage to warn staff or visitors about safety and health risks
2.15	**Ecological Aspect**	Ecological impacts due to removal of 6-7 trees in the project area	- Plan for compensatory planting for five trees against each fallen tree of similar floral function - Disallow introduction of exotic species with known environmental setbacks (Eucalyptus, etc.).
2.16	**Livelihood of Local Communities and Economic Growth**	Overall, Positive impact is anticipated as the project shall create employment opportunities for the local community and provide the chances of business expansion.	- Local community shall be given priority for employment provided they qualify the job criteria. - Local community has appreciated the project however; any grievances or concerns from Project-affected community shall be appropriately addressed through a grievance mechanism that would contribute to maintaining broad community support for the project.

3.0	OPERATION PHASE		
	Operational Activities/Aspect	**Potential Impacts**	**Mitigation Measure**
3.1	**Solid and Sewage Disposal**	Degradation of Soil and Water Quality (Improper Management)	Same mitigations as described in Section 2.1.2:
3.2	**Fuel/Oil/Chemical storage and handling**	Contamination of Soil and Water Quality (Spillage/Leakage)	Same mitigations for Spillage/Leakage as described in Section 2.14
3.3	**Accidental release of insulating Fluids**	Contamination of Soil and Water Quality (Spillage/Leakage)	
3.4	**Water Supply to fulfill the water needs at Grid Station**	Sanitation issues due to insufficient water quantity and poor quality	Ensure water supply in sufficient quantity and appropriate water drinking water quality. Apply water conservation (e.g., reduce, reuse and recycle) measures to reduce water use and wastewater generation.
3.5	**Operations of Grid Station**	Air Emission	Power transmission and distribution sector does not typically give rise to significant air emissions.

			Ambient air should comply with PEQS of ambient air.
		Noise and vibration during operations Impact of Noise from transmission lines is of low significance	Make sure the mounting hardware for the substation is regularly tightened. Choose devices with reduced sound power outputs.
		Aesthetics ▪ Landscaping ▪ Lighting Pollution	Maintain the landscapes Make a plan for lighting that includes steps to reduce the quantity and requirement of lighting on structures.
		Electrocution of birds/Wildlife	Minimize chance of accidental electrocution at design stage. Installation of spikes or sonic repellent devices will discourage roosting and nesting on facilities.
3.6	**Maintenance of T/L**	Workers may expose to hazards associated with Occupational Health and Safety - Live Power Lines - Work at Height - Electric and Magnetic Field	Maintenance Plan and Maintenance procedures are available with IESCO to mitigate hazards associated with Live power lines, working at height on towers and structures and EMF. Training of employees on these procedures should be conducted on regular basis

Table 7.2: Environment Monitoring Plan for Construction and Operational Phases

Components	Parameters	Standard	Location	Frequency	
				Construction	Operations
Noise	Noise Level dB(A) Survey	Punjab EPA PEQS For Noise	At construction site and campsite	Quarterly	NA
Ambient Air Quality	CO, SO_2, NO_x, Particulates (PM_{10}, $PM_{2.5}$)	Punjab EPA PEQS For Noise	At construction site and surroundings	Quarterly	NA
Water Quality	Drinking water PEQs,	PEQS/WHO	At different Potable Water Points	Quarterly	NA
Trees Plantation	Visual Inspection	-	Along the inner boundary wall of grid station without compromising security	Regular Monitoring by IESCO & DHA Management.	
Public Grievances	Social parameters	Social parameters	At construction site and surroundings	Regular Monitoring by IESCO & DHA Management.	

7.6 ENVIRONMENT MANAGEMENT TEAM, ROLES AND RESPONSIBILITIES

The project proponent, IESCO, is committed to implementing the Environmental Management Plan (EMP). IESCO has already established a Project Management Unit (PMU), which includes the Environment and Social Safeguard (E&SS) Section. The E&SS Section plays a crucial role in addressing the environmental and socio-economic aspects of the project. Table 7.3 outlines the roles and responsibilities of the officials involved in the implementation of the project.

Table 7.3 Roles and Responsibilities of Management Team for Environment

Sr. No	Department/Division /Cell	Role	Responsibility
1	IESCO	CEO	The CEO is the supreme authority of IESCO. All kinds of administrative decision will be taken by him or any person on his behalf
2	GM/Chief Engineer (Development)	GM/Chief Engineer/ Head of PMU	Fulfil IESCO's obligations as laid out various project documents. Ensure that the construction is carried out within the agreed time frame according to satisfactory HSE and technical standards.
3	Grid Station Construction (GSC), IESCO	Project Director	Responsible for overall construction work Facilitate field management of contractors; **Report regularly to the Chief Engineer (Development)**
4	GC Division (XEN office), T&G Division (XEN office),	Deputy Director Grid Station Construction	Responsible for the grid construction works Ensure that the entire project is conducted in an environment and social friendly manner. Facilitate field management of contractors; **Report regularly to the Project Director**
		Deputy Director Transmission Lines Construction	Responsible for the T/L works Ensure that the entire project is conducted in an environment and social friendly manner. Facilitate field management of contractors; **Report regularly to the Project Director**
		Deputy Director Civil Works	Responsible for the civil works Ensure that the entire project is conducted in an environment and social friendly manner. Facilitate field management of contractors; **Report regularly to the Project Director**
5	Environment and Social Safeguard (E&SS) Section	Additional Director E&SS	Advise GSC and other IESCO departments on matters relating to environment and social aspects of the project. Responsible for overall environmental issues regarding to the project Advice and support Environment and Social Impact officer for the implementation of EIA and EMMP. **Report regularly to the Chief Engineer (Development).**
		Additional Deputy Director Environment& Additional Deputy Director Social Impact	Responsible for the implementation of EMMP in the field, Coordinate with other level of GSC Division, take proper action on non-compliance, also provide training to GSC staff, Advice and support ESI for the implementation of EIA and EMMP. **Report regularly to the Additional Director Environment.**

6	Contractors related to all works - grid station construction, T/L and Civil works	Site Manager/ Engineer	Manage construction activities, manage construction crew, camp crew and other site personnel, in an environmentally responsible manner, Liaise with GSC's Project Manager, and; Liaise with GSC's Site In-charge

7.6.1 Pre-Construction Phase

Before commencing the project, IESCO will obtain all the approvals required by Government of Pakistan/Punjab including getting NOC from EPA Punjab. Following the approval of the EIA, if any aspect of the operation or EIA requirements needs to be modified, IESCO will classify the change according to the EMMP and implement the necessary measures.

The EMMP will be incorporated into the contracts between project contractor/s and IESCO.

7.6.2 Construction Phase

7.6.2.1 E&SS

The project proponent (IESCO) holds the primary responsibility for ensuring compliance with the environmental management plan. The E&SS unit will oversee and provide advisory services throughout the project's construction phase. It will supervise IESCO's environmental monitors and offer guidance to GSC, TSW Planning, GSO Directorates, and other IESCO departments on environmental and social issues during the project.

7.6.2.2 Contractors and Sub-Contractors

As the EMMP is incorporated in the contract (between IESCO and the contractors), it will be a contractor's responsibility to implement the management and social management plan.

7.6.2.3 The Role of GSC Directorate and Other Arrangements in EMMP Implementation.

- GSC Directorate and E&SS section PMU will ensure implementation of the EMP and EIA throughout the Project duration.
- The Additional Deputy Director Environment/Social Impact, IESCO will monitor project activities in the project area.
- The GSC's Site In-charge, will be responsible for the environmental and social soundness of all construction activities
- The E&SS unit will coordinate with relevant government departments (Punjab EPD) and other stakeholders.
- Other Arrangements:
    - ESI and ESO: Appointment of Environmental and Social Inspectors /Officers (ESIs/ESOs) for overseeing and monitoring the entire implementation of the EMMP and EIA (IESCO Scope)
    - ESM: Each contractor will appoint a dedicated field Environmental and Social Monitor (ESM) at the project site. (Contractor Scope)

7.6.3 Operation Phase

During operation phase of the project, E&SS will oversee the timely implementation of EMP and ensure the implementation of Monitoring plan including lab analysis of Noise, Effluent, Air emissions/ambient air and groundwater with a frequency finalized by EPA in Operation Phase. E&SS will also initiate Sustainability Project such as Water Conservation, Rain Harvesting etc.

7.7 PROPOSED EMP REPORTING AND REVIEWING PROCEDURE

The EMMP will be incorporated into the contract between project contractor/s and IESCO. It will be a contractor's responsibility to implement the Environment and social management plan. IESCO's Environment and Social Safeguard (E&SS) Section will supervise all the EMP-relevant activities. However, IESCO's E&SS Section will provide support to the Contractor's team whenever required to work for a common cause.

- The contractor's field environment and social monitor (ESM) will prepare periodic progress report of EMP implementation and share with Environment and Social Inspector (ESI) of IESCO. After review, the report will be submitted to Additional Director of IESCO's E&SS Section.
- Deputy Director E&SS will review the report and assess the compliance with EMP. Dy. Director will discuss the report with internal departmental meetings.
- At the completion of project construction, the Contractor's ESM will prepare the project completion report and submit to Deputy Director E&SS for onward submission to Chief Engineer (Development).
- In case of non-compliance by the contractor, Additional Director E&SS will take proper action on non-compliance in accordance with a clause of contract and may recommend to make deductions from the payments to the contractor.
- Change of management plan will be implemented to incorporate any change required in the EMP during design and construction stage.

7.8 ENVIRONMENT TRAININGS

IESCO provides periodic Environmental and HSE trainings to their permanent and Contract Employees. A comprehensive annual training calendar is also developed for the employees whose trainings are organized based on Training Need Analyses. Environment, Health and Safety (EHS) are considered to have a high weightage in their performance evaluation process.

7.9 GRIEVANCE REDRESS MECHANISM (GRM) SUMMARY

"A Grievance Redress Mechanism is a system by which queries or clarifications about the project are responded to, problems that arise out of implementation are resolved and grievances are addressed efficiently and effectively" The GRM has been established to address potential grievances from stakeholders, particularly communities near the project sites and transmission line routes, regarding project activities and their impacts. The main objectives of the GRM are to mediate conflicts and minimize lengthy litigation that can delay infrastructure projects.

Key features of the GRM include:

1. **Social Complaint Register (SCR):** The contractor will maintain an SCR at project sites to document all complaints from Project Affected Persons (PAPs) and local communities. This register will include details such as the date of the complaint, complainant information, grievance description, actions to be taken, responsible parties, follow-up requirements, and target implementation dates.

2. **Complaint Resolution Process:**
    - Upon receiving a complaint, the contractor will record it in the SCR and attempt to resolve it. If unresolved, it will be referred to the concerned SDO/XEN, who will respond within 15 days.
    - If the issue remains unresolved, it will escalate to the Project Director, who will address it within another 15 days.
    - Further unresolved issues will be taken to the Chief Engineer Development, with a resolution time frame of one month.
    - If the complainant is still dissatisfied, they have the right to pursue legal action.
3. **Documentation and Communication:** Proposed remedial actions will be documented in the SCR, along with implementation responsibilities and schedules. Complainants will be informed of the proposed and actual actions taken, and their feedback will also be recorded.
4. **Review Process:** The SCR will be reviewed in fortnightly site meetings to monitor the progress of remedial actions.

Overall, the GRM aims to provide a structured approach for addressing grievances, ensuring community concerns are managed effectively throughout the project life-cycle.

7.10 ENVIRONMENT BUDGET

IESCO is committed to creating and promoting an environmentally sustainable and responsible culture and foster continuous improvement in its performance in terms of its environmental footprint. Its Environmental & Social Safeguard (E&SS) Section of PMU, oversee all the environment and social activities of in-progress as well as fully operational projects of IESCO. However, excluding expenditures of E&SS Unit, the cost required to effectively implement the mitigation measures for the sustainability of the Project are summarized in Table 7.4.

Table 7.4: Environment Budget for Environmental Mitigation and Monitoring

Activity	Description	Cost (PKR)
Environment Monitoring Cost	Analyses of Noise, ambient air, Effluent and Water Quality	300,000
HSE Management	Construction Phase (up to 35 persons, I to 2 year)	1,500,000
Plantation Plan	Tree Plantation	500,000
Training Program	Trainings	200,000
	Grand Total	2,500,000

8. CONCLUSION AND RECOMMENDATIONS

The Environmental Impact Assessment (EIA) for the proposed project, "Construction of 132 kV Grid Station and Its Feeding Transmission Line Project at DHA ROSE PHASE-VII, District Rawalpindi," has been conducted to meet the mandatory requirements of Section 12 of the Punjab Environmental Protection Act 1997 (amended 2017) and the PEPA (Review of EIA/IEE) Regulations 2022.

8.1 Conclusion

Major conclusions of the EIA study are:

- The construction of the 132 kV grid station at DHA ROSE PHASE-VII, along with a 15 km long feeding transmission line, is a viable and sustainable option form environmental perspectives.
- This project serves a purpose, aimed at enhancing the efficiency and reliability of electricity supply to DHA ROSE PHASE-VII. The estimated cost of the project is Rs. 2700 million, with a projected timeline of 24 months.
- DHA has allocated a total of 28.6 Kanals of land for the grid station within its Complex, at no cost. The land already is located within secured premises. It is classified as barren and broken, eliminating the need for acquisition or resettlement. The project site is not situated in any environmentally sensitive area and is not prone to floods or landslides.
- Based on the Environmental Impact Assessment (EIA) study, it has been concluded that the proposed project is unlikely to cause any significant adverse effects on the physical, biological, or socioeconomic environment, provided that the proponent adheres to the Environment and Social Management and Monitoring Plans throughout the pre-construction, construction, and operational phases.
- The majority of stakeholders have welcomed the project due to its national significance. Concerns and suggestions raised by stakeholders and the public have been incorporated into the EIA. However, local communities along the right-of-way may still have concerns regarding construction activities near their land. To address these potential issues, a Grievance Redress Mechanism (GRM) has been established to mediate conflicts and reduce the need for lengthy litigation.

8.2 Recommendations

It is therefore recommended that the Punjab Environmental Protection Agency grant Environmental Approval for the Construction of the 132 kV grid station at DHA ROSE PHASE-VII, along with a 15 km long feeding transmission line, provided that the suggestions made by participants during the public hearing are incorporated into the Environmental Impact Assessment (EIA).

Additionally:

- The proponent must ensure compliance with the Environment and Social Management throughout the project's lifecycle.
- DHA should launch Corporate Social Responsibility (CSR) initiatives for the surrounding communities.
- A budget should be designated for sustainability projects, including, but not limited to, water conservation, rainwater harvesting, and tree planting, among others.
- Assurance should be provided that local community members will be prioritized for employment opportunities.
- Training on Health, Safety, and Environmental (HSE) practices and community services is recommended.

ANNEXURES

ANNEXURE I: GLOSSARY

Aesthetic Value	The value derived from the beauty, visual appeal, and experiential qualities of a landscape or place
Ambient air quality	Ambient air quality refers to the quality of outdoor air in our surrounding environment.
Archaeology	The study of human history and prehistory through the excavation of sites and the analysis of artefacts and other physical remains.
Biodiversity	The variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable.
Climate.	The weather conditions prevailing in an area in general or over a long period
Conservation	Official supervision of rivers, forests, and other natural resources in order to preserve and protect them through prudent management
Construction Waste	Waste generated from the buildings and construction industry and includes material like bricks, concrete, tiles, debris, ceramics and more.
Consultant	A person who provides professional advice or services to companies for fee
Cultural Heritage	Valued objects and qualities such as historic buildings and cultural traditions that have passed from previous generations.
Demographic	A single vital or social statistic of a human population, as the number of births or deaths
Ecology	The branch of biology that deals with relations of organisms to one another and to their physical surroundings
Effluent	Liquid wastes such as sewage and liquid waste from industries
Electromagnetic Field (EMF)	Electromagnetic fields are a combination of invisible electric and magnetic fields of force. They are generated by natural phenomena like the Earth's magnetic field but also by human activities, mainly through the use of electricity.
Environment	Relationship of natural world (human beings, animals and plants) with physical surroundings (air, land, water).
environmental impact assessment (EIA)	(EIA) is an analytical process that systematically examines the possible environmental consequences of the implementation of projects, programs and policies
environmental management plan	(EMP) is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.
Excavation	The act or process of digging, especially when something specifics being removed from the ground.
Fauna	The animals of a particular region, habitat, or geological period.
Flora	The plants of a particular region, habitat, or geological period.

Framework	A real or conceptual structure intended to serve as a support or guide for the building of something that expands the structure into something useful
Grid Station	An interconnection points between two transmission ring circuits, at two geographic regions having a transformer, to adjust voltage levels. To step down and step up the electricity.
Hazardous Waste	Waste that poses substantial or potential threats to public health or environment
Impact	The action of one object coming forcibly into contact with another.
Livelihood	A set of activities involving securing the basic necessities –food, water, shelter and clothing of life.
Peak ground acceleration	Peak ground acceleration (PGA) is equal to the maximum ground acceleration that occurred during earthquake shaking at a location
Policy	A policy is a deliberate system of principles to guide decision and achieve rational outcomes
Proponent	A person who advocates a theory, proposal, or course of action.
Rehabilitation	To restore to a condition of good health, ability to work, or the like
Resettlement	The settlement of people in a different place
Resource	A stock or supply of money, materials, staff, and other assets that can be drawn on by a person or organization in order to function effectively.
Sanitation	Conditions relating to public health, especially the provision of clean drinking water and adequate sewage disposal
Seismic Hazard.	A seismic hazard is the probability that an earthquake will occur in a given geographic area, within a given window of time, and with ground motion intensity exceeding a given threshold.
Seismology	The branch of science concerned with earthquakes and related phenomena.
Stakeholder	A stakeholder is a party that has an interest in a company, and can either affect or be affected by the business. The primary stakeholders in a typical corporation are its investors, employees and customers.
Topography	Topography is the study of the shape and features of the surface of the Earth and other observable astronomical objects including planets, moons, and asteroids
Vegetation	Plants considered collectively, especially those found in a particular area or habitat.
Wetland	A wetland is a land area that is saturated with water, either permanently or seasonally, such that it takes on the characteristics of a distinct ecosystem.

ANNEXURE II: ABBREVIATIONS & ACRONYMS

AIS	Air Insulated Station
CO	Carbon Monoxide
CSR	Corporate Social Responsibility
dB(A)	Decibel- A
ERP	Emergency Response Plan
EHS	Environmental Health & Safety
EMF	Electromagnetic Force
E&SS	Environment and Sustainability Safeguard
ESMMP	Environmental and Social Management and Monitoring Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
GIS	Gas Insulated Station
GSC	Grid Station Construction
HSE	Health Safety & Environment
GRM	Grievance Redress Mechanism
IEE	Initial Environmental Examination
IFC	International Finance Corporation
ILO	International Labor Organization
IESCO	Islamabad Electric Supply Company
LAA	Land Acquisition Act
LST	Land Surface Temperature
LULC	Land Use and Land Cover
MSDS	Material Safety Data Sheets
MTAs	Medical Technology Areas
MW	Megawatt
NCSW	National Commission on the Status of Women
NEC	National Electrical Code
NEMA	National Electrical Manufacturer Association
NFPA	National Fire Protection Association
NOC	No Objection Certificate

OSHA	Occupational Safety & Health Administration
NOx	Oxides of Nitrogen
ROW	Right of Way
SOx	Oxides of Sulfur
PM	Particulate Matter (2.5 or 10)
PGA	Peak Ground Acceleration
PPE	Personal Protective Equipment
PEPA	Punjab Environmental Protection Act
PEPC	Punjab Environmental Protection Council
PEQS	Punjab Environmental Quality Standards
3R	Reduce, Reuse & Recycle
SEAL	Solution Environmental & Analytical Laboratory
SF	Square Foot
SOPs	Standard Operating Procedures
WASA	Water and Sanitation Agency
WHO	World Health Organization

ANNEXURE III: REFERENCES

1. IFC, 2007, "Environmental, Health, and Safety Guidelines Electric Power Transmission and Distribution", International Finance Corporation, World Bank Group, April 30, 2007.

2. EPA Official website, Checklist (EIA), "Pak EPA Guidelines for Preparation and Review of Environmental Reports, 1997",Https://epd.punjab.gov.pk

3. USAID, EIA, "EIA Technical Review Guidelines: Energy Generation and Transmission Volume I", USAID Environment and Labor Excellence for CRAFTA – DR Program, EPA/315R11001 July 2011

4. IESCO official website, https://www.iesco.com.pk/

5. Maan. Z. M., "Rawalpindi Regional Development Plan" -Water Resources and Irrigation Section Irrigation Department, 2023

6. SMEDA 2022, "District Economic Profile Rawalpindi", Small & Medium Enterprises Development Authority, Punjab, April, 2022

7. PSB Fire Engineers, "Substation Fire Suppression System Operation and Maintenance Not to Be Neglected", PSB, Feb 23, 2023, https://www.psbfireengineers.com/post/substation-fire-suppression-system-operation-and-maintenance-not-to-be-neglected

ANNEXURE IV: TERMS OF REFERENCE (TOR)

PURPOSE: TERMS OF REFERENCE (TOR) FOR APPOINTMENT OF CONSULTING FIRM FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT (EIA) STUDY FOR THE PROJECT "CONSTRUCTION OF 132 KV GRID STATION DHA ROSE SECTOR PHASE-VII AND FEEDING T/L, DISTRICT RAWALPINDI"

The Consultant will conduct the ESIA and prepare a report in accordance with guidelines of EIA set by EPA Punjab and the IEE/EIA regulations 2022.

The Consultant will:

- Review published literature and all relevant data/drawings provided by the Proponent, as well as collect additional pertinent information.
- Examine all applicable legislation, standards, and policies.
- Conduct a Baseline Environmental Study, including environmental monitoring of the project site by a field team from an EPA-certified laboratory.
- Engage in public consultations and hold meetings with stakeholders.
- Identify all potential positive and negative impacts of the proposed project during the pre-construction, construction, and operational phases.
- Recommend mitigation measures to eliminate or reduce negative impacts to acceptable levels.
- Prepare an Environmental and Social Management Plan (ESMP) and a Monitoring Plan.
- Finalize the ESIA report in collaboration with IESCO.
- Assist the proponent (until obtaining the NOC) with:
    - Submission of the report to the Punjab EPA for review.
    - Addressing all queries raised by the EPA following their review of the report.
    - Arranging the public hearing.
    - Delivering a presentation at the public hearing and during meeting with the Expert Committee.

The **Consultant EIA Team** will consist of environmentalists, ecologist, sociologist (as a minimum requirement), all possessing relevant academic qualifications and experience.

ANNEXURE V: ENVIRONMENT MONITORING REPORTS (BY EPA CERTIFIED LAB)

SOLUTION ENVIRONMENTAL & ANALYTICAL LABORATORY

EPA CERTIFIED

AMBIENT AIR MONITORING REPORT

Client Name:	M/s Sustainable Solution Consultant International, Islamabad.	**Address:**	132KV Grid Station DHA Rose, Phase-VII Rawalpindi.
Monitoring Point:	Mid of Site	**Monitoring Duration:**	24 Hour
Monitoring Date:	29-07-2026	**Reporting Date:**	05-08-2026
Monitoring By:	SEAL	**Reference No.:**	SEAL/LAB/2026/AA/003

Results:

Sr. No.	Time (Hours)	CO (mg/m3)	NOx (µg/m3)	SO_2 (µg/m3)	PM_{10} (µg/m3)	$PM_{2.5}$ (µg/m3)	Ozone (O_3) (µg/m3)
1.	06:00 AM	1.8	4.61	2.7	96	15	57
2.	07:00 AM	1.9	4.68	3.1	93	17	62
3.	08:00 AM	2.0	3.32	4.4	92	14	60
4.	09:00 AM	2.6	2.16	8.5	116	19	64
5.	10:00 AM	2.1	0.05	4.5	116	22	62
6.	11:00 AM	2.0	0.96	3.6	119	28	60
7.	12:00 PM	2.8	1.7	2.3	128	32	61
8.	01:00 PM	3.2	2.5	2.9	113	31	67
9.	02:00 PM	3.7	2.8	3.6	104	37	69
10.	03:00 PM	4.3	2.4	3.8	101	30	73
11.	04:00 PM	4.0	2.6	4.2	108	39	78
12.	05:00 PM	3.9	2.2	4.9	100	33	80
13.	06:00 PM	2.1	3.9	5.7	99	31	84
14.	07:00 PM	2.8	3.5	5.0	96	27	89
15.	08:00 PM	2.9	5.8	5.9	91	23	73
16.	09:00 PM	2.5	5.0	6.7	83	35	78
17.	10:00 PM	2.3	5.2	6.3	80	28	81
18.	11:00 PM	2.6	5.5	6.9	78	24	93
19.	12:00 AM	2.1	5.9	7.1	70	34	103
20.	01:00 AM	2.5	6.3	7.8	65	28	109
21.	02:00 AM	3.2	6.7	7.5	63	32	113
22.	03:00 AM	3.7	6.5	6.0	60	30	98
23.	04:00 AM	3.3	6.0	4.5	61	29	95
24.	05:00 AM	3.0	5.7	4.2	69	26	83
Average		**2.80**	**3.99**	**5.09**	**91.71**	**27.67**	**78.83**
PEQS		**10**	**80**	**120**	**150**	**35**	**130**

PEQS: Punjab Environmental Quality Standards

Note:

- Quality was assured through self-calibration of the instrument.
- The measurements were carried out on client request.
- The client is responsible lawful usage of reported data in future.
- The report is not valid for any negotiations.

ANALYZED BY	REVIEWED BY	APPROVED BY
Lab Analyst	Assistant Lab Manager	Lab Manager

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SOLUTION ENVIRONMENTAL & ANALYTICAL LABORATORY

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NOISE LEVEL MONITORING REPORT

Client Name:	M/s Sustainable Solution Consultant International, Islamabad.	**Address:**	132KV Grid Station DHA Rose, Phase-VII Rawalpindi.
Monitoring Point:	Mid of Site	**Monitoring Duration:**	24 Hour
Monitoring Date:	29-07-2026	**Reporting Date:**	05-08-2026
Monitoring By:	SEAL	**Reference No.:**	SEAL/LAB/2026/AA/003

Results:

Sr. No.	Time	Noise dB(A) Leq	Day/Night	PEQS
1	06:00 AM	50.6	Day Time	65
2	07:00 AM	54.1		
3	08:00 AM	58.5		
4	09:00 AM	56.3		
5	10:00 AM	50.8		
6	11:00 AM	51.6		
7	12:00 PM	55.2		
8	01:00 PM	55.7		
9	02:00 PM	52.6		
10	03:00 PM	55.9		
11	04:00 PM	50.4		
12	05:00 PM	55.9		
13	06:00 PM	62.0		
14	07:00 PM	59.6		
15	08:00 PM	55.2		
16	09:00 PM	52.0		
17	10:00 PM	55.9		
18	11:00 PM	40.1	Night Time	55
19	12:00 AM	40.5		
20	01:00 AM	41.9		
21	02:00 AM	45.0		
22	03:00 AM	48.9		
23	04:00 AM	40.1		
24	05:00 AM	48.9		
Average Noise Level		**51.57 dB(A) Leq**		

PEQS: Punjab Environmental Quality Standards

Note:

- The average noise levels describe the overall ambient noise levels of the points.
- Selected measurement units were dB (A) otherwise stated.
- Quality was assured through self-calibration of the instrument.
- The measurements were carried out on client request.
- The client is responsible lawful usage of reported data in future.

ANALYZED BY	REVIEWED BY	APPROVED BY
Lab Analyst	Ass. Lab Manager	Lab Manager

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SOLUTION ENVIRONMENTAL & ANALYTICAL LABORATORY

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GROUND WATER ANALYSIS REPORT

Client Name:	M/s Sustainable Solution Consultant International, Islamabad.	**Address:**	132KV Grid Station DHA Rose, Phase-VII Rawalpindi.
Sampling Point:	Tap	**Nature of Sample:**	Ground Water
Monitoring Date:	29-07-2026	**Reporting Date:**	05-08-2026
Sampling By:	SEAL	**Temp. & Humidity:**	23-27 C^0 & 50-70 %
		Reference No.:	SEAL/Lab/2026/GW/003

Results:

Sr. No.	Parameter	Method	Unit	Result	PEQS
1	pH	APHA 4500-H^+ B	--	7.14	6.5-8.5
2	Total Dissolved Solids (TDS)	APHA 2540 C	mg/l	252	1000
3	Chloride	4500- APHA Cl^- B	mg/l	7.63	250
4	Fluoride	APHA 4500-F^- D	mg/l	0.0	1.5
5	Taste	APHA 2120 B	Obj./Unobj.	Unobj.	Unobj.
6	Odour	APHA 2120 B	Obj./Unobj.	Unobj.	Unobj.
7	Colour	APHA 2120 B	TCU	0.12	15
8	Nitrate (as NO_3^-)	APHA 4500-NO^{3-} E	mg/l	0.2	50
9	Nitrite (as NO_2^-)	APHA 4500-NO^{2-} B	mg/l	0.004	3
10	Lead	APHA-Pb B	mg/l	BDL	0.05
11	Total Hardness as $CaCO_3$	APHA 2340 C	mg/l	159.96	500
12	Turbidity	APHA 2130 B	NTU	1.0	5
13	Zinc	APHA 3500-Zn B	mg/l	0.0	5
14	Aluminum	APHA 3111 D	mg/l	0.0	0.2
15	Chromium	APHA 3500-Cr B	mg/l	0.0	0.050
16	Cadmium	APHA 3500-Cd D	mg/l	0.0	0.01
17	Copper	APHA 3500-Cu C	mg/l	BDL	2
18	Boron	APHA 4500-B C	mg/l	0.0082	0.300
19	Barium	APHA 3111 B	mg/l	0.0126	0.700

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SOLUTION ENVIRONMENTAL & ANALYTICAL LABORATORY

EPA CERTIFIED

Client Name:	M/s Sustainable Solution Consultant International, Islamabad.	**Address:**	132KV Grid Station DHA Rose, Phase-VII Rawalpindi.
Sampling Point:	Tap	**Nature of Sample:**	Ground Water
Monitoring Date:	29-07-2026	**Reporting Date:**	05-08-2026
Sampling By:	SEAL	**Temp. & Humidity:**	23-27 C^0 & 50-70 %
		Reference No.:	SEAL/Lab/2026/GW/003

Results:

Sr. No.	Parameter	Method	Unit	Result	PEQS
20	Antimony	APHA 3114 C	mg/l	0.009	0.020
21	Manganese	APHA 3111 B	mg/l	0.0629	0.5
22	Cyanide	APHA 4500-CN^- D	mg/l	0.0032	0.05
23	Sodium	APHA 3111 B	mg/l	84.09	200
24	Nickel	APHA 3111 B	mg/l	0.0	0.020
25	Residual Chlorine	APHA 4500-Cl_2	mg/l	0.301	0.2 – 0.5
26	Total Coliform	APHA 9222 B	Number/100ml	0	0/100 ml
27	Thermo Coliform	APHA 9222 B	Number/100ml	0	0/100 ml
28	E. coli	APHA 9222 C	Number/100ml	0	0/100 ml

PEQS = Punjab Environmental Quality Standards
BDL = Below Detection Limit
APHA = American Public Health Association

Note:

- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client.
- Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The left-over samples (if so available) shall be retained for 10 days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiation.

ANALYZED BY	REVIEWED BY	APPROVED BY
Lab Analyst	Ass. Lab Manager	Lab Manager

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ANNEXURE VI:

LIST OF INDIVIDUALS AND ORGANIZATIONS CONSULTED ALONG WITH THEIR FEEDBACK

Name & Designation	Location	Opinions/Concerns/Issues/Suggestions
Mr. Mohammad Iqbal GM Electrical DHA	DHA, Rawalpindi-Islamabad.	▪ He explained how this project is important in future as the load will be increased up to 20 MW. ▪ Looking forward to early completion of the project as it will also facilitate the society to establish more quickly.
Mr. Sher Afzal, Deputy Director Environment and Social Safeguard Section, IESCO	IESCO, Islamabad	▪ The project is a part of positive approach for community living in the project area to provide them reliable power supply. IESCO will make every effort to make the project sustainable and green as possible. ▪ There will be no harm to general public living in the vicinity of the project location as the grid station is quite far away from public activities area. ▪ The project site has been established considering important factors like land use, ecological environment and nearby settlements.
Muhammad Tayyab, Project Incharge	IESCO	▪ He pointed towards the electricity need for this area and appreciated the initiation of this project. ▪ Construction of new Grid Station and its allied infrastructure should be carried out keeping in mind the safety of community.
Mr. Arslan	DHA Resident	▪ Showed no concern over the execution of the project. ▪ The selected sites are quite distant from public and have minimal impacts on community.

Mr. Muhammad Bilal **Sub-engineer**	IESCO	▪ The grid station will ensure best practice use of energy resources, provide greater power supply capacity, and make power system operations more economical and reliable.
Mr. Usama Ghazi	DHA Resident	▪ Concerned about the structure of the grid station and towers of transmission line. ▪ It will be good for the growing of society.