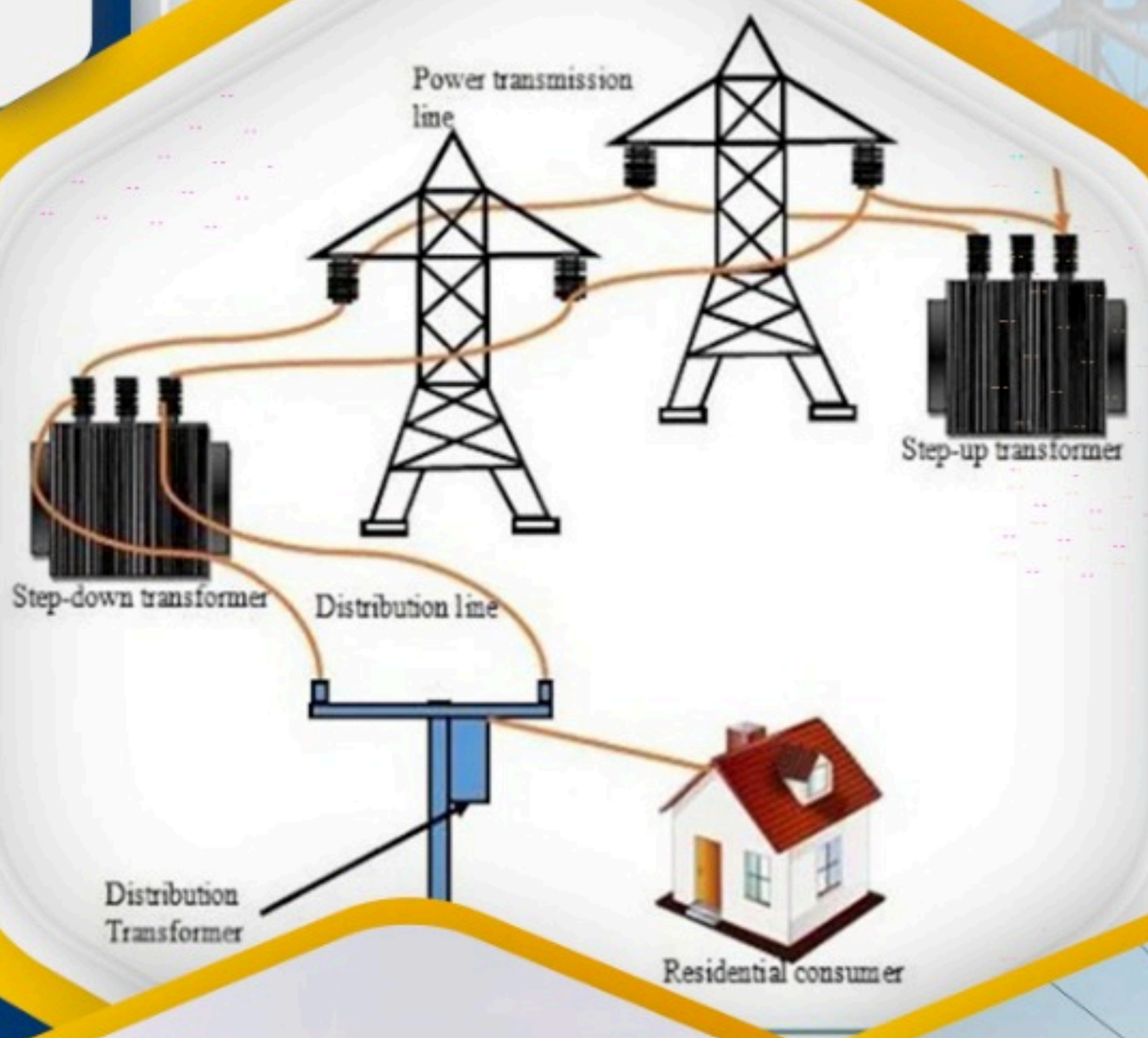
ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

OF EMAAR EDIL 132 KV GRID STATION
AND TRANSMISSION LINES AT EMAAR CANYON VIEWS,
DHA PHASE V, ISLAMABAD

FINAL REPORT
JULY 2023



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Executive Summary

Emaar Pakistan is pioneering the concept of master-planned communities that integrate residential amenities with schools, healthcare, shopping malls, hotels, dining and entertainment, to bring a world-class lifestyle to Pakistan. EMAAR, Canyon Views offers superb villas, town homes and apartments with the finest architecture, facilities, security, views and green open spaces available in the Islamabad. A subsidiary of Emaar Properties PJSC, the UAE-based property developer, Emaar Pakistan is fast becoming the property developer of choice for the Pakistan. EDIL, while identifying the right resource for a particular task and ensuring the enabling environment for execution of different activities, mainly involved in concept design of the project and monitoring of different activities to ensure timely completion and environmental sustainability. The EMAAR Canyon Views is an exclusive gated community offering exquisitely designed homes and the finest leisure facilities with luxurious homes designed with care and attention, and find anyone to own Mediterranean sanctuary at the heart of Islamabad. The No Objection Certificate (NOC) of Canyon Views Emaar Islamabad is allegedly approved by Defense Housing Authority (DHA)

Project Concept:

With every passing movement and increasing residential and commercial consumers in Canyon Views, the EMAAR management forecast more than 22 MW electricity demand in near future and planning to provide maximum voltage and un-interrupted power to its inhabitants. The EMAAR Canyon-View Housing society, DHA V Islamabad decided to construct a dedicated 132KV Grid Station with the bound of EMAAR canyon view, DHA-V sector E, Islamabad. The grid station solely supplies electricity to the existing residential and commercial consumers within the boundary of EMAAR canyon view, DHA-V, Islamabad.

Islamabad Electric Supply Company (IESCO) intends to construct a new 132 KV Grid Station and 1.65 km feeding transmission line with 9 poles in the EMAAR Canyon Views, DHA Islamabad. The main objective of the project is to increase the efficiency, reliability and quality of the electricity supply in Canyon Views at EMAAR, DHA-V. This Air Insulated Station (AIS) 132 KV Grid Station will be built on 18.5 kanal of land provided by the DHA together with feeding 1.65 km Transmission Line will consist of only 9 towers. The total estimated cost of the project is Rs 700 million and will be completed in two years. The proposed project is being implemented to expand generation capacity through installation of clean and more energy efficient gas-fired combined cycle units at existing thermal power stations on a fast-track basis and up gradation /rehabilitation of existing transmission and distribution (T&D) assets in order to reduce the energy losses.

This Environmental Impact Assessment (EIA) study covers the 132 KV Grid station will maintain consistent energy supply to the consumer through voltage

stabilization and further transmission. Overhead transmission will be for transmission and distribution of electricity. The line will pass from a scarcely populated area of the Emaar Canyon Views where insulation to the electromagnetic field will be provided by air. The power line will be suspended by just 9 high towers or poles, each installed at a distance of 250 meter between the transmission lines. The project once functional will support of power transmission and distribution network IESCO and facilitate the supplies by reducing loss of electricity during transmission.

Project Location:

The proposed location for EMMAR grid station is inside the EMAAR Canyon view, Housing Society, Islamabad 1.3 Kms away from Expressway Islamabad. The coordinates of the grid station site are as follows 33º31'31.1''N and 73º11'09.3''E near the Institute of Space & Technology and Islamabad Expressway. The Grid station is within the canyon views and only 1.65 km transmission line passes along EMAAR Canyon Views. Hence no community, no any sensitive zone nor any large building affecting due to the transmission line, as the entire structure of grid station and its feeding transmission line is located within EMAAR Housing Society in DHA V.

Need of the Project.

As per National Electric Regulatory Authority (NEPRA) Consumers Service Manual, 2021 a Housing society/scheme exceeding electric load demand above 10 mega Watt (MG) requires dedicated grid station. The NEPRA manual description is reproduce in following paragraph "Dedicated grid station and associated transmission line. OR DISCO/IESCO may provide connection from its own grid station subject to availability of capacity / load in its grid and with mutual consent. In such case DISCO/IESCO shall recover 100% grid sharing charges including transmission line charges and a piece of land i.e. minimum 12 Kanal for GIS and 20 Kanal for AIS at any suitable place". OR A Housing Society/Scheme exceeding electric load more than 20 MW, it should construct its dedicated grid station to provide better and uninterrupted electricity to its residential and commercial consumers. Thus, as per the rationale behind the project is to improve the voltage, reduce line losses and meet the demand of electricity in EMAAR housing society, DHA Phase V.

Legislative Requirements.

According to Pakistan Environmental Protection Act 1997 each new development project has to undertake Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) in order to predict and mitigate the impacts of the development at an early stage. Hence, this EIA study aims at the identification of the possible environmental and social impacts of the proposed project on its

immediate surroundings on both short and long-term basis, suggesting mitigation measures and identifying the responsible agencies to implement those measures.

This report presents the findings of "Environmental Impact Assessment (EIA) of 132 KV Grid Station at EMAAR EDIL at Canyon Views DHA-V and its Feeding Transmission Lines. The EIA process of the project started with the identification of potential environmental and social impacts resulting from the proposed project's activities their rating as slight, moderate and negligible with the aid of an Environmental Management Plan. Project activities that were likely to result in high impacts were investigated further to validate the anticipated impact and an alternative project activity was determined that has a medium or low-level impact. For project activities with moderate and minor level impacts, suitable mitigation measures are proposed to reduce the impact to a low category impact or as low as reasonably possible. Finally, for insignificant impacts, no alternatives or mitigation measures were explored, as it is expected that the environmental management systems in place will be sufficient to avoid or reduce those impacts.

Analysis of Alternatives.

a. No Project Option

The proposed project seeks to upgrade the secondary transmission and grid network of the IESCO system in EMAAR Canyon View, DHA-V, Islamabad 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.

b. Technical Alternatives.

Route Alternative for Transmission Lines: The Grid Station Construction (GSC) Department along with Environment & Social Safeguard Department of IESCO after detailed survey has come up with the selected route. The parameters considered were, nearby settlements, frequency of mobility of people along the route, ecological environment and ease of access. After careful analysis of the above-mentioned parameters, the survey team has decided to lay the transmission line starting from proposed EMAAR Grid station to the new rawat-

sawan circuit. Therefore, no alternative route was considered, and the selected route is the best possible option.

Type of Grid Station: There are two types; (i) Gas Insulated Station (GIS) and the (ii.) Air Insulated Station. GIS is costly option whereas AIS is conventional type. Therefore, AIS grid station is the preferred option.

Type of Circuit Breakers: Two types of circuit breakers are available; SF-6 circuit breakers for 132-KV and above, and vacuum circuit breakers for the 11-KV system which are very effective as compared to the old oil-type breakers. Hence modern circuit breakers are the preferred option for the proposed project.

Type of Transformer Oil: IESCO's technical specifications for the procurement of transformers clearly mention that the transformer oil should be Poly Chlorinated Biphenyl (PCB) free. Hence, all the equipment to be procured as part of this project would be PCB-free.

Transmission Line Towers: For 132-KV transmission lines, there are two possible tower options: single circuit vs. double circuit towers. The cost of the double circuit towers is slightly higher than the single circuit variants, however, in view of IESCO expansion capacity, greater reliability, enabling transfer of more power over a particular distance, double circuit towers are the preferred ones in this project.

Tower vs. Tubular Pole: The base of the transmission line towers is about $10m^2$, which can create a big problem in congested urban areas whereas, the tubular poles requires considerably less space. To this aspect, IESCO has been using tubular steel poles in urban areas and T/line towers in rural areas where there is no issue of space. The transmission line passes through entirely EMAAR Canyon View and there is no issue of space; therefore, transmission line towers have been proposed.

METHODOLOGY OF EIA STUDY.

The Environmental Impact Assessment of proposed project has been performed in following phases:

SCOPING.

In scoping exercise of EIA, Sectoral guidelines and checklists of likely impacts and mitigation measures contained in Sectoral guidelines, proponents and reviewer of EIA project are considered against adopting a mechanistic approach. Scoping is a vital early step, which identifies the issues that likely to be important during the environmental assessment, and eliminates those that are not. In this way, time and money are not wasted on unnecessary investigations. Scoping is a process of interaction between the interested public, government agencies and the proponent. Scoping refers to the process of identifying, as early as possible:

- ✓ The appropriate boundaries of the environmental assessment;

- ✓ The important issues and concerns;
- ✓ The information necessary for decision-making; and
- ✓ The significant impacts and factors to be considered.

In scoping phase, Environs Tech Pvt Ltd has compiled a generic description of the proposed activities relevant to environmental assessment with the help of the proponent and project implementer. Information on relevant legislation, regulations, guidelines, and standards were reviewed and compiled. Furthermore, potential environmental issues were identified.

BASELINE DATA COLLECTION.

The change caused by a particular environmental impact can be evaluated by comparing the expected future state of environmental components with the predicted state of those components if the project does proceed. Therefore, one of the first tasks involved in the detailed analysis of an impact is the collection of information that will help to describe the baseline situation at the expected time of implementation. Specialized knowledge usually required to specify, and set appropriate limits on, the data collection required to meet the needs of any analysis and ongoing monitoring programs that may be established. Environmental and Socio-economic experts were used by Environs Tech for collecting the considerable amount of baseline information on the project area. Available literature and other studies already conducted close to the project area were also used for gathering of baseline formation. In field visits, Environs Tech's Experts verified this information and collected some other information about the socio-economic status of project site surrounding area, environmental baseline i.e flora and fauna, ground water quality, ambient air and other issues.

PHYSICAL ENVIRONMENT.

The project area lies under one of the sporadically populated areas of Emaar Housing Society. The area is completely under urbanized and no natural terrains are found. However, adjacent to the Canyon View, a natural drain is present which carries storm water and domestic effluents which drains into a nearby nullah. No proper ground or surface water resources were found justifiable. Moreover, the outer edge of Canyon Views area almost has touch to the Institute of Space and Technology, Islamabad.

BIOLOGICAL ENVIRONMENT.

Data for the EIA was gathered from both primary and secondary sources. Baseline field survey was conducted in May to June 2023. No endangered or threatened species were found within the project areas. Since the areas represent urban environment within the society, minimal floral habitat was found that may need

special attention, the project will be carefully executed to eliminate unnecessary damage to vegetation. No need of cutting or clearance of trees was envisaged during the surveys.

SOCIOECONOMIC ENVIRONMENT.

The proposed project falls under two major administrative area of DHA and EMAAR Housing Society. Mostly are under the management of DHA and is considered as a residential area. The major landmarks which lie within the close proximity of the project area are DHA Phase-II. The proposed project area falls under one of the finest residential areas. It has good business systems with respect to Government as well as Private institutions, adequate health facilities and security. The area is however, thinly populated and may not face issues during commissioning of the project.

PUBLIC CONSULTATION.

During this EIA process, consultations were held with the community living within the project area. Different aspects and impacts of the proposed project were highlighted regarding their impacts on the physical, biological, and socio-economic environment of the project area. Stakeholders concerns regarding various aspect, existing environment, and impacts of the project were noted in the EIA report.

Generally, the community within the project area is in favor of the project that it will enhance electricity supply in EMAAR Housing Society. However, majority of the people were concerned about aesthetic impacts of the grid station as well as of overbilling, power shutdown, continuous load shedding, and low voltage in the area. The People appreciated the project activities for up-gradation of existing electricity system in EMAAR, DHA V. According to their perception the project will also create employment opportunities for local people. They also argue that proper mitigation plans should be adopted to safeguard environment during construction phase of the project.

POTENTIAL IMPACTS IDENTIFICATION.

The EIA study has identified potential impacts that are likely to arise during design, construction and operational phases of proposed Project. The EIA has examined in detail both negative and positive impacts of the project. The environmental, socio-economic, and project information collected was used to assess the potential impacts of the proposed activities. The issues studied include the potential project impacts on:

a. Ambient air quality and ambient noise levels.
b. Soil and Ground water quality.
c. The ecology of the area, including the flora and fauna.

d. People living in the Emaar Housing Society as well as immediate neighbouring.
e. Natural terrain, Sensitive Zones, Archaeological sites, or any natural habitat

Wherever possible and applicable, the discussion covers the present baseline condition and the potential change in environmental parameters likely to be affected by project related activities considered as;

a. Identification of potential impacts;
b. Mitigation of the likelihood and significance of potential impacts;
c. Defining of mitigation measures to reduce impacts to as low as practicable;
d. Monitoring of environmental impacts including residual impacts.

IMPACTS ASSESSMENT & MITIGATION.

One of the main tasks of impact assessment is to predict and prevent unacceptable adverse effects through the implementation of appropriate project modifications also known as mitigation measures. The transmission line project is not an air, water polluting and resource intensive project. Installation of conventional underground cables typically involves permitting, working around traffic and other surface activity, trenching, laying cable and avoiding other underground utilities, such as gas pipelines and telecommunication cables.

Construction phase impacts are usually temporary and localized phenomenon, except the permanent changes that might be introduced in the local landscape and land use patterns along the Right-of–Way. Construction of underground transmission lines may have substantially greater impacts to soils and associated resources than construction of overhead lines. However, these impacts are given due consideration, wherever applicable. The mitigations for these impacts are summarized in the Environmental Management Plan.

The construction works would require excavation of the entire length of the line, resulting in large areas of disturbance from the excavation and associated activities, such as heavy equipment use and soil storage. During the operation phase, most of the construction phase impacts will get stabilized and the impacts will be restricted only to the operation and maintenance of the project.

Look for better ways of doing things so that the negative impacts of the proposal are eliminated or minimized, and the benefits are enhanced; and make sure that the public or individuals do not bear costs which are greater than the benefits which accrue to them.

1. In mitigation measures for proposed project, close consultation with IESCO was carried out to ensure that any significant adverse or potentially adverse impacts identified in the project. The Consultants have considered the best available techniques and practicable environmental options in the EIA Report.
2. Identified measures were discussed with IESCO, Islamabad's Management to

ensure that their implementation is technically and economically feasible.

DOCUMENTATIONS.

This report documents the environmental impact assessment process and results are prepared according to the relevant guidelines set by the Pakistan Environmental Protection Agency and other international guidelines.

LIMITATIONS.

The EIA document has been prepared by drawing inferences from site visits, primary data and secondary information. The study has been conducted by the consultants in a manner consistent with the level of care and skill ordinarily exercised by members or environmental scientist and consulting profession. The conclusion in this study is based on the primary and secondary data, results derived from earlier studies, and a subjective evaluation of the possible environmental aspects that may influence the existing environmental status of the site during construction and operations of the proposed project. Opinions relating to the specific conditions are based upon information that existed at the conclusions were formulated. The mitigation measures and other recommendations put forth in this report are of the level of conceptual design and implementation framework.

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (EMMP).

An environmental management plan is a document designed to ensure that the commitments in the Environmental report, subsequent review reports, and environmental approval conditions are fully implemented. It is the technically comprehensive document, which is usually finalized during, or following detailed design of the proposal, after environmental approval of the development application. For EMAAR 132 KV Grid Station and Transmission lines, separate Environmental management plan for smooth and effective implementation has developed and included in EIA report. The scope of environmental management and monitoring plan is in accordance with national regulatory requirement and severity of environmental and social impacts. The purpose of the Environmental Management and Monitoring Plan (EMMP) is to minimize the potential environmental impacts due to the project. The EMMP reflects the commitment of IESCO to safeguard the environment as well as the surrounding population. The EMMP provides a delivery mechanism to address the adverse environmental impacts, to enhance the project's benefits and to introduce standards of best practices to be adopted for all phases of the project.

CONCLUSION AND RECOMMENDATIONS.

On the basis of the overall impact assessment, more specifically, nature and magnitude of the residual environmental impacts identified during present EIA based on the following facts:

1. Identification of national environmental regulatory requirements that apply to the proposed project activities;
2. Identification of the environmental features of the project area including the physical, biological and social strata and likely impact of the project on the environment;
3. Recommendation of appropriate mitigation measures that IESCO will incorporate and ensure as per this EIA into the project to minimize the adverse environmental impacts.

It is concluded that the EMAAR 132 KV Grid Station and its feeding transmission line is likely to cause minor environmental impacts mainly during its construction phase. The project will directly improve electricity supply to EMAAR Housing Society and other areas in the vicinity of the project target area. There are no remaining issues that warrant further investigation. This EIA is considered as adequate for the environmental and social justification of the project.

Table of Contents

List of Tables

List of Figures

List of Abbreviation

ADB	Asian Development Bank
AEBs	Area Electricity Boards
AES	Area Electricity Supply
AJK	Azad Jammu and Kashmir
AM	Assistant Manager
Amsl	Above Mean Sea Level
BOD	Biological Oxygen Demand
CEO	Chief Executive Officer
CED	Chief Engineer Development
CITES	Convention on International Trade in Endangered Species
COD	Chemical Oxygen Demand
DC	Deputy Commissioner
DCO	District Coordination Officer
DISCO	Distribution Company
EA	Environmental Assessment
EDO	Executive District Officer
EIA	Environmental Impact Assessment
ELR	Energy Loss Reduction
EMP	Environmental Management Plan
EMMP	Environmental Management and Monitoring Plan
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
ESG	Environmental and Social Guidelines
ESI	Environmental and Social Inspector
E&SS	Environmental and Social Safeguard
GIS	Geographical Information System
GIS	Gas Insulated Substation
GoP	Government of Pakistan
GRM	Grievance Redressal Mechanism
GSC	Grid Station Construction (Department)
GSO	Grid Station Operation (Department)
GS	Grid Station
GT Road	Grand Trunk Road
Ha	Hectare
HSE	Health Safety and Environment
HT	High tension
ICT	Islamabad Capital Territory
IEE	Initial Environmental Examination

IESCO	Islamabad Electric Supply Company
NTDC	National Transmission and Dispatch Company
OP	Operational Policy
O&M	Operation and Maintenance
PAPs	Project Affected Persons
PCB	Poly Chlorinated Biphenyl
PCRWR	Pakistan Council for Research on Water Resources
PEPA	Pakistan Environmental Protection Act
PM	Particulate matter
POP	Persistent Organic Pollutants
P&DD	Planning and Development Department
RoW	Right of Way
RP	Resettlement Plan
RPR	Resettlement Policy Register
RPF	Resettlement Policy Framework
SCR	Social Complaint Register
SDO	Sub Divisional Officer
SE	Senior Engineer
STG	Secondary Transmission line and Grids
SUPARCO	Space and Upper Atmosphere Research Corporation
T/L	Transmission Line

1 Introduction

1.1 Background

This chapter of the report describes the purpose of the EIA study including a brief description of nature, size and location of the project. A defined scope of study, magnitude of efforts and concise description of project proponent is also included in this chapter. The EIA document presents the findings of an Environmental Impact Assessment (EIA) carried out for the construction / installation of EMAAR EDIL 132 KV grid stations and its feeding transmission lines by IESCO. Presently, this site is owned by the EMAAR and NOCs & Approvals have been obtained from DHA. In compliance of the Federal Environmental Protection Act, 1997 this EIA report is submitted to the Federal Environmental Protection Agency for environmental approval/NOC.

In last few years Pakistan has faced the great energy crisis. Being an electric supply and distribution company in the North Region, the IESCO has found few solutions in order to overcome energy problems. One of this solution is the IESCO “System Stabilization, Rehabilitation and Loss Reduction Program” which is being implemented to expand generation capacity by adding clean and more energy efficient gas-fired combined cycle units at existing thermal power stations on a fast-track basis and upgrade/rehabilitate the existing transmission and distribution (T&D) assets in order to reduce the energy losses.

In order to meet the increasing electricity demand per capita, the existing electricity network (Secondary Transmission and Grid System) of IESCO needs to be expanded. The project will ensure supply of electricity to EMAAR Housing Society in DHA Phase-V load reduction on currently overloaded grid stations and transmission lines, and improvement in the voltage profile as well as the system reliability.

1.2 IESCO (Implementers of the Project).

In 1958, WAPDA was established, having two wings: Water Wing and Power Wing. The Water Wing was (and still is) responsible for developing and managing large water reservoirs (Dam) and barrages to store water for country's agriculture demand and inter-like with all other sectors (social to industrial sector and production of hydroelectricity), while its Power Wing was a vertically integrated utility, responsible for generation, transmission and distribution of electricity throughout Pakistan (except for the City of Karachi, where the Karachi Electric Supply Company - KESC - performed a similar function). Under its un-bundling and restructuring program, WAPDA's Power Wing has been divided into nine distribution companies collectively called DISCOs, three generating companies collectively called GENCOs and a transmission company called National Transmission and Dispatch Company (NTDC). IESCO is one of the nine DISCOs.

IESCO is a public utility company, providing electricity to the Islamabad Capital Territory (ICT), Northern districts of the Punjab Province (Rawalpindi, Attock, Jhelum and Chakwal) and southern area of Azad Jammu and Kashmir (AJK). IESCO was registered in April 1998 under the Companies Ordinance 1984, Pakistan. Initially, it was working as one of the eight Area Electricity Boards (AEBs) of the Water and Power Development Authority (WAPDA).

IESCO: Islamabad Electric Supply Company for Rawalpindi, Attock, Jhelum and Chakwal district of Northern Punjab and Southern area of Azad Jammu and Kashmir (AJK).

1.2.1 Technical Profile of the IESCO

The area within the IESCO network comprises of the following distinct administrative units:

- Islamabad Capital Territory (ICT),
- Rawalpindi District,
- Jhelum District,
- Attock District, and
- Chakwal District
- Parts of AJK

Mianwali is included in IESCO-T&G Division network for construction works but for operational and commercial work, it falls in FESCO network. Similarly, Nathiagali is included in T & G Division of IESCO and is under the operational division of PESCO.

Table 1: IESCO'S Technical Profile

Description	Unit	Qty
Grid stations (Including NTDC)	Nos.	116
132 KV Grid stations	Nos.	88
66 KV Grid stations	Nos.	1
33 KV Grid stations	Nos.	2
Customer Grid stations (IESCO Maintained)	Nos.	14
Customer Grid stations (Customer Maintained)	Nos.	1
NTDC Grid stations	Nos.	5
Peak load demand – Recorded on 04-07-2019 (1100hrs)	MW	2,718
Power transformers (Numbers)	Nos.	274
Power transformers' installed capacity (MVA)	MVA	6,3979
Transmission line	Km	3,869
HT lines	Km	27,084
LT lines	Km	28,234
11 KV feeders	Nos.	1,275
Distribution transformers	Nos.	54,305
Distribution transformation capacity	MVA	4,456

Source: *IESCO, 2023*

1.2.2 Existing Transmission Lines

The IESCO system comprises of the two 220-KV double circuit, seven 132-KV double circuit, thirteen 132-KV single circuit and four 66-KV single circuit transmission lines. A list of these transmission lines is provided the following table.

Table 2:List of IESCO Transmission Lines

No	Transmission Lines in IESCO's Region		
	Capacity	From	To
Double Circuit Transmission Lines			
1	220 KV Transmission Lines	Mangla	Burhan
		Tarbela	Burhan
2	132 KV Transmission Lines	Burhan	i) New Wah, ii) Zeropint, iii) Rawal & iv) AEC
		Mangla	AEC
		New Wah	Attock
		Attock	HIT
		HIT	Fecto

No	Transmission Lines in IESCO's Region		
	Capacity	**From**	**To**
		Old Rewat	New Rewat
Single Circuit Transmission Lines			
3	132 KV Transmission Lines	Burhan	i) KTM, ii) Bakra Mandi, iii) Rewat, iv) Dina, v) Gujar Khan, vi) Jhelum, vii) Saragodah, viii) Mangla (R), ix) Mangla, x) Faqirabad, xi) Kamra and xii) Sanjwal
		Bakra Mandi	Attock Refinery
		AEC	i) Kahuta and ii) Rewat
		Kahuta	i) Kahuta City and ii) Azad Pattan
		Gujar Khan	Jatli and Chakwal
		Q.A University	Murree
		New Wah	i) POF East, North and West, ii) Taxila Cement Factory, and iii) Tarbela R & NC.
		Taxila	Fecto Cement
		Mangla	i) Mirpur and Kotli, ii) Mangla (L), iii) Rajar iv) Kharian and iv) Old Rawat
4	66 KV Transmission Lines	New Wah	i) Fateh Jang, ii) Pindi Gheb, iii) Kalar Kahar, iv) Basal, v)Jand, vi) Lakarmar, and vii) Old Wah
		Chakwal	i) Chua Saidan Shah, ii) Dandot, ii) Noorpur Sethi, and iii) Talagang
		Mianwali	i) Danda Shah Balawal, ii) Talagang, iii) Basal, iv) Tamman, v) Fateh Jang and vi) Ahmadal

Source: *IESCO, 2021*

1.2.3 Energy Generation, and Per Capita Consumption

Pakistan's Power Sector is, and has been for many years, beset by significant challenges. These include limited availability of reliable and affordable electric power, aging and inadequate transmission and distribution networks, and utility policies and practices that badly lag behind those of modern utilities elsewhere in the world. Moreover, a current-day, technology infrastructure that can enable efficient, Backoffice operations such as handling customer service requests is not in evidence. For a major electric distribution utility like the Islamabad Electric Supply Company (IESCO), these deficiencies translate into a level of financial performance that cannot be considered self-sustaining. **Table-3** shows the energy generation, sold and per capita consumption in Pakistan.

Table 3: Energy Generation, Sold & Per Capita Consumption

Fiscal Year	Population of PEPCO	Number of Customers	Computed Peak Demand PEPCO	System Input Energy (Purchased by CPPA-G)	Energy Sale (Consumption)	Per Capita System Input Energy	Per Capita Consumption	Units Per Consumer	
								System Input Energy (kWh)	Sale (kWh)
	(In Million)		(MW)	(MkWh)	(MkWh)	(kWh)	(kWh)		
1981	79.04	3,269,945	2,473	12,862	9,068	163	115	3,933	2,773
1982	87.54	3,588,250	2,846	14,315	10,288	164	118	4,007	2,867
1983	90.30	3,901,419	3,163	16,093	11,587	115	128	4,125	2,970
1984	92.96	4,231,536	3,295	17,655	12,762	190	137	4,172	3,016
1985	95.67	4,523,970	3,791	18,376	13,756	192	144	4,062	3,041
1986	98.41	4,876,157	3,933	20,656	15,504	210	158	4,236	3,179
1987	101.18	5,215,686	4,325	23,228	17,405	230	175	4,400	3,362
1988	103.99	5,779,623	5,031	27,002	20,702	260	199	4,672	3,582
1989	106.84	6,419,167	5,440	28,410	21,982	266	206	4,426	3,424
1990	109.71	6,870,679	5,680	30,809	24,121	281	220	4,484	3,511
1991	112.61	7,260,721	6,090	33,580	26,585	298	236	4,625	3,662
1992	115.54	7,736,241	6,532	37,143	29,267	321	253	4,801	3,153
1993	118.50	8,175,750	7,522	39,854	31,272	336	264	4,875	3,825
1994	121.48	8,592,042	8,067	41,289	32,131	340	264	4,805	3,400
1995	124.49	9,067,276	8,252	44,932	35,032	361	281	4,955	3,864
1996	127.51	9,481,731	8,215	47,434	36,925	372	290	5,003	3,894
1997	130.56	9,868,612	8,552	49,564	38,529	380	295	5,022	3,904
1998	124.14	10,217,072	8,877	52,192	39,422	420	318	5,108	3,858
1999	125.59	10,799,635	9,191	52,752	38,900	420	310	4,885	3,602
2000	128.55	11,584,657	9,289	54,672	40,910	425	318	4,719	3,531
2001	131.58	12,166,344	9,628	57,282	43,384	435	330	4,708	3,566
2002	134.65	12,615,022	10,099	59,545	45,204	442	336	4,697	3,566
2003	137.75	13,318,233	10,484	62,694	47,421	455	344	4,707	3,561
2004	140.89	14,091,338	11,015	67,697	51,492	480	365	4,804	3,654
2005	144.07	14,896,242	12,035	71,670	55,215	497	384	4,811	3,711

2006	147.29	15,911,161	13,212	80,404	62,405	546	424	5,053	3,922
2007	150.53	16,986,554	15,138	85,987	67,480	571	448	5,062	3,973
2008	153.82	17,955,366	16,838	84,584	66,539	550	433	4,711	3,706
2009	157.14	18,640,114	17,325	82,702	65,286	526	415	4,429	3,496
2010	160.49	19,582,224	17,847	87,115	68,815	543	429	4,449	3,517
2011	163.86	20,309,483	17,901	89,775	71,672	548	437	4,420	3,529
2012	167.24	21,046,611	18,280	88,987	71,368	532	427	4,228	3,391
2013	170.65	21,875,600	18,227	87,080	70,508	510	413	3,981	3,223
2014	140.09	22,587,870	19,966	93,777	76,543	539	440	4,152	3,389
2015	177.54	23,519,247	21,031	96,463	15,113	543	440	4,101	3,321
2016	180.99	24,516,699	22,559	100,871	81,737	557	452	4,114	3,334
2017	184.44	25,571,803	25,117	106,796	86,763	579	470	4,176	3,393
2018	186.05	27,016,545	26,031	120,062	97,197	645	522	4,444	3,598
2019	187.72	28,473,069	25,627	122,302	99,046	652	528	4,295	3,479
2020	190.89	29,957,422	25,622	122,451	98,407	641	516	4,088	3,285
2021	194.01	31,529,604	27,193	130,060	99,370	670	512	4,125	3,152

Source: Power System Statistics 46th Edition-2022 (NTDC)

1.3 The Proponent (EMAAR-Pak)

EMAAR Islamabad is a housing society located in DHA-V, formally known as DHA II extension Islamabad, on Islamabad Expressway and opposite to the Institute of Space & Technology (SUPARCO). The Canyon Views is considered to be an exclusive residential community that offers all the 21st-century amenities. The gated community is completely safe for investment. The Villas and homes in the society are designed while keeping in view the modern necessities and facilities that are eco-friendly and efficient. The construction process of the infrastructure is also carried out in a manner to reduce the carbon footprint.

Due to rapid increase in urbanization, population and subsequent increase in electric demand which is 22 MW, and to meet the future demand of electricity the EMAAR, Canyon-View Housing society, decided to construct a dedicated 132KV Grid Station with the bound of EMAAR canyon views, DHA-V in the Sector E, Islamabad. The grid station solely supplies electricity to the existing residential and commercial consumers with the boundary of EMAAR canyon view, DHA-V, Islamabad. Hence, on this requirement, EMAAR Pakistan has requested IESCO, Islamabad to construct a grid station and transmission line as per demand and all the expenses of construction will be bear by EMAAR Pakistan.

1.4 Details of Consultant.

Environs Tech Pvt. Ltd (ET) is an environmental and management consultancy firm which is operating in the field of environment for the last 10 years. ET has completed more than 100 environmental studies (EIA & IEEs) of different development projects in four provinces. M/s Environs Tech engaged a team of experts for conducting EIA study, which includes the following professions:

- Environmental Experts
- Wildlife and Biodiversity Expert
- Social Organizers/Specialist
- Hydrologist
- Civil Engineers

1.4.1 Contact details.

In case of further details or information regarding to this EIA report, please contact the proponent's representative or the consultant at the addresses provided below:

Table 4: Contacts Details (Implementers, Proponent & Consultant)

IESCO	**EMAAR Pakistan**	**EIA Consultant**
General Manager (Development), Project Management Unit (PMU**)** IESCO Head Office, St 40, G-7/4, Islamabad, Pakistan Tel:051-9252519	**Mr. Habibullah Alizai** Project Manager **T** + 92 51 2096036 Ext. 8441 **M** + 92 321 5383300 www.emaarpakistan.pk EMAAR Islamabad	**Miss. Ukkasha Meraj** Suit # 04, Ground Floor, Green Trust Tower, Blue Area, Islamabad. Email: ukkasha.meraj@gmail.com Tel: 03171315197

1.5 The proposed Project.

Islamabad Electric Supply Company Limited intends to establish a 132 KV Grid Station and it's feeding transmission line within EMAAR Housing Society on the request of EMAAR Pakistan. The grid station will be 132 KV Air Insulated Sub-station on 18.5 kanal of land, providing efficient and undisturbed supply of electricity to its residents. There are 9 poles to be erected from New Rawat-Sawan to proposed Grid Station in EMAAR Canyon Views, Islamabad. In this report, the 132 KV Grid Station will be referred as "EMAAR Grid Station".

DHA management has allocated a fixed route for feeding Transmission line to the proposed EMAAR 132 KV Grid Station and the feeding transmission line will be connected to already existing New Rawat-Sawan Transmission Line with in the premises of EMAAR housing society. The Transmission line route is selected by the team of experts of IESCO and the Consultant after taking the environmental and ecological sensitiveness in mind. The major stakeholder of the width and length of the transmission line is EMAAR Society, No private land owners involved in the grid station site as well as Transmission line route/corridor. Therefore, there is no issue of land acquisition or resettlement of community due to the project. The compensation for the damage of infrastructure, crops, trees, etc is not involved.

1.6 Objective of the EIA Study

In order to comply with the regulatory requirement, IESCO directed EMAAR, Islamabad to hire a consultant to conduct impact assessment of the proposed Grid Station and Transmission lines. Hence, the M/S EMAAR, EDIL has acquired the services of M/s Environs Tech Pvt. Ltd an environmental consultancy firm, to carry out the Environmental Impact Assessment (EIA) of the project. The EIA study of proposed project is being prepared with a number of following specific objectives:

a. Collection of baseline information/data for assessment of impacts;
b. Ordering of information collected during previous investigations into a

comprehensive environmental document;

c. 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.
d. The basic guiding principles of the Environmental Impact Assessment have been:
e. To inform decision makers and result in appropriate levels of environmental protection and community well-being;

This report gives an overview of project description, potential environmental and social impact, their mitigation measures, enlists environment management plan and environment monitoring plan along with budgetary requirements.

1.7 Process of Environmental Impact Assessment (EIA).

As per the Pakistan Environmental Protection Act 1997 “No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an initial environmental examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Provincial Agency approval in respect thereof”.

1.7.1 Purpose of the Report

The aims and objectives of the EIA of purposed project are as follows:

- Identification of all significant potential impacts that may require detailed assessment,
- Identification and assessment of all potential major and minor impacts during pre- construction, construction and operational phases, conservation and sustainable use of natural resources,
- To assess the compliance status of the proposed activities with respect to the national environmental legislation,
- Propose mitigation measures to minimize, eliminate or to compensate the potential adverse impacts of the project that identified during assessment, promotion of public awareness on environmental issues,
- To carry out a social assessment, identify potential impacts and suggest mitigation measure.
- To prepare an Environmental Management Plan, and; and make part of the EIA document to mitigate any potential impact.

1.8 Approach and Methodology.

A kick off meeting was held with the officials of EMAAR Pakistan, together with IESCO's Environmental & Social Management Unit to discuss and clarify issues, objectives, and scope of the study as well as the consultant's approach and methodology.

The following methodology was recommended for purposed project:

- Review of governing legislation and statutory requirements,
- Description of the proposed project,
- Baseline environmental data collection,
- Stakeholder Consultations at various levels (institutional, NGOs, corporate sector and Grass root level i.e., affected peoples),
- Identification of potential environmental impacts,
- Evaluation of the significance of environmental impacts,
- Recommended mitigation measures and monitoring requirements,
- Development of Environmental Management and Monitoring Plan (EMMP); and Preparation of EIA report.

1.8.1 Secondary Data Collection.

Detailed review of the literature was carried out with the focus primarily on existing environmental conditions in the project locations and impacts of such projects on the biotic and abiotic environment. The secondary data was collected for assessing the environmental conditions and trends for identifying the following:-

a) Physical Conditions: topography, geology, soils, surface and groundwater resources and climate.

b) Ecological Resources: flora and fauna, (particularly in respect of rare or endangered species), protected areas or other areas of significant environmental importance.

c) Human and Economic Development: settlements, socio-economic conditions, infrastructure and land use.

d) Heritage Aspects: sites of cultural, archaeological or historical significance.

e) IESCO provided all available relevant documents for review and clear understanding of the project activities.

1.8.2 Field Visits and Base Line Data Collection

The consultant visited the project site for collection of base line data. The Rapid Social Appraisal method was applied to discover the facts (empirically verifiable observations or verifying the old facts) of the prevailing socio economic and cultural conditions of the project area.

The data of flora and fauna of the project site was obtained during field visits. Meetings were held with expert Environmentalists from public and private institutions/organizations.

1.8.3 Pubic Consultation

Community consultations were held within the EMAAR Housing Society. Meetings were held with the stakeholders such as IESCO, DHA, Environmental Practitioners, Institute of Space & Technology and their opinions and concerns regarding the project were solicited.

1.8.4 Review of Legal and Administrative Framework.

A review on all existing environmental legislative and administrative framework like relevant policies, rules, regulations, guidelines and standards of national, international and provincial and local levels were compiled and their implication on the project activities was identified.

1.8.5 Identification and evaluation of Impacts.

The environmental impacts are broadly classified as physical, biological and socio-cultural, and then each broad category has been evaluated against its significance in terms of its severity and likelihood of its occurrence. The significance of the impacts has been assessed in terms of the effects on the natural ecosystem, level of public concern and conformity with legislative or statutory requirements The potential impacts thus predicated are further divided/categorized based on their duration (short and long term), reversibility, likelihood, consequence (minor, moderate or major) and significance (Low, medium or high). The aim of this task was to assess all associated risks with these impacts.

1.8.6 Identification of Mitigation Measures.

The objective of identification of mitigation measures is i) to identify practices, technologies or activities that would prevent or minimize all significant environmental impacts and ii) propose physical and procedural controls to ensure that mitigation is effective. Based on the impact evaluation performed, changes or improved practices have been suggested, to prevent (where practical), and control unacceptable adverse impacts resulting from normal or extreme events.

1.8.7 Environmental Management and Monitoring Plan (EMMP)

An Environmental Management and Monitoring Plan (EMMP) has been developed for effective implementation of the recommended mitigation measures of negative

impacts during pre-construction, construction and operation phase. The EMMP also lays down procedures to be followed during the operation of the project and identifies roles and responsibilities of all concerned personnel, including reporting in the operational phase.

1.9 Document Structure.

The Environmental Impact Assessment study report presents findings and compiles all information into one document that includes introduction of the project; policy, legal and administrative framework; project description; analysis of alternatives; existing environment, public consultation and communities concerns regarding the project, and Environmental Management and Monitoring Plan (EMMP).

Chapter 1 – Introduction gives an overview of the proposed project and EIA process along with highlighting the methodology that will be followed during the study;
Chapter 2 – Policy, Legal & Administrative Framework gives an overview of applicable national and environmental policies, and legislations with international guidelines relevant to EIA of proposed project;
Chapter 3 - Project Description provides the description of the proposed project, its layout plan and associated activities, and utility requirement;
Chapter 4 - Analysis of Alternatives provides a discussion of the different alternatives considered for the project;
Chapter 5 -Stakeholders Consultations provides the details of stakeholder consultation methodology and relevant concerns regarding the project;
Chapter 6 -Impact Assessment & Mitigation; This chapter gives a detailed impact identification and its best available mitigation measures.
Chapter 7 - Environment, Management & Monitoring Plan describes the potential environmental and social impacts of proposed project on the different features of the micro and macro-environment; The chapter also explains the mitigation measures proposed for the project in order to minimize the impacts to acceptable limits.
Chapter 8 – Conclusion Recommendation; presents conclusion of EIA study and followed by series of Annexes for provision of supporting information. Environmental Examination Report presents the results and conclusions of Environmental Assessment Examination for the construction of 132 KV In / Out Construction at 132 KV EMAAR GS Transmission Line project, proposed by IESCO to act as the Executing Agency (EA) and being the Implementing Agency (IA) for work in its own area.

2 Policy, Legal and Administrative Framework

2.1 Introduction

Pakistan being a signatory of multilateral international treaties has a comprehensive set of environmental legislation covering multiple environmental issues facing Pakistan like pollution of freshwater bodies, air pollution, deforestation, loss of biodiversity, lack of proper waste management and climate change issues. The basic policy and legislative framework along with detailed rules, regulations and guidelines required for the implementation of the policies and enforcement of legislation for the protection of the environment and overall biodiversity are in place.

The compliance status of the construction of EMAAR Grid Station and transmission line was reviewed with reference to the legislation and existing legal framework on the environment in Pakistan and International level as described henceforth.

2.2 Laws and Regulations

Pakistan has several laws and regulations regarding the conservation and protection of the environment. However, the enactment of comprehensive legislation on the environment, in the form of an act of parliament, is a relatively new phenomenon. Most of the existing laws on environmental issues were enforced over an extended period of time and are context-specific. The laws relevant to the developmental projects are briefly reviewed below.

2.3 Pakistan Environmental Protection Ordinance, (PEPO) 1983

The Pakistan Environmental Protection Ordinance 1983 was the first piece of legislation specifically established to tackle the issue of environment. This Ordinance provided for the establishment of a Council to frame policies on standards for the environment, and the establishment of an agency to implement the policies and enforce the standards.

As a result, the Federal Government of Pakistan established the Pakistan Environmental Protection Council and the Pakistan Federal Environmental Protection Agency (FEPA). The Ordinance permitted FEPA to delegate powers to any Government agency and it is understood that under this power the KPK EPA and Punjab EPA were set-up in 1989. One particular task of the FEPA was to set national policy and standards.

Under the provisions of the 1983 Ordinance, the FEPA established the National Environmental Quality Standards (NEQS) that were gazette as a Statutory Notification on 29 August 1993. These standards are to be applied to any project development through all phases of construction and operation. NEQS's have been

issued for liquid effluents and for industrial gaseous emissions. The former will restrict disposal of any liquid from flushing of the pipeline; the latter maybe relevant to pumping or generating plant. NEQS also cover municipal effluents, motor vehicle exhausts and noise.

In December 1997 the Pakistan Environmental Protection Act was introduced to provide for the protection, conservation, rehabilitation and improvement of the environment, for prevention and control of pollution and promotion of sustainable development. The Act is much more detailed than the 1983 Ordinance and includes the following additional clauses that are pertinent to the products pipeline project: S.R.O. 339 (1)/2001 – In case of the powers referred by Section 33 of the PEPA 1997 (XXXIV of 1997), Pak – EPA, with the approval of the Federal Government has introduced "Pak-EPA (Review of IEE and EIA) Regulations, 2000.

2.4 National Conservation Strategy

The Pakistan National Conservation Strategy (NCS) that was approved by the federal cabinet in March 1992 is the principal policy document on environmental issues in the country (EUAD/ IUCN, 1992). The NCS outlines the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment. The core areas that are relevant in the context of the proposed project are pollution prevention and abatement, restoration of rangelands, increasing energy efficiency, conserving biodiversity, supporting forestry and plantations, and the preservation of cultural heritage.

2.4.1 Pakistan Environmental Protection Act, 1997

Under Section 12 (and subsequent amendment) of the 1997 Act, a project falling under any category specified in Schedule I (SRO 339 (I0/2000), requires the proponent to file an IEE with the federal agency concerned (the Pak-EPA). Projects falling under any category specified in Schedule II require the proponent to file an EIA with the federal agency. Within ten working days of the IEE or EIA having been deposited, the federal agency will confirm that the document submitted is completed for the purpose of review. During this time, should the federal agency require the proponent to submit any additional information, it will return the IEE or EIA to the proponent for revision, clearly listing those aspects that need further discussion. The Pakistan Environmental Protection Agency Review of IEE and EIA Regulations (IEE-EIA Regulations), 2000 explained the details about the preparation, submission, and review of Initial Environmental Examinations (IEEs) and Environmental Impact Assessments (EIAs). All the other

clauses, sub-clauses, sections and sub-sections are almost same. The Pakistan Environmental Protection Act, 1997 is the basic legislative tool empowering the Federal EPA to frame regulations for the protection of the environment. The Act is applicable to a broad range of issues and extends to air, water, soil, marine and noise pollution, as well as the handling of hazardous waste.

The discharge or emission of any effluent, waste, air pollutant or noise in an amount, concentration or level in excess of the National Environmental Quality Standards (NEQS) specified by the Pak Environmental Protection Agency (Pak EPA) has been prohibited under the Act, and penalties have been prescribed for those contravening the provisions of the Act.

The requirement for environmental assessment is laid out in Section 12 (1) of the Act. Under this section, “no proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an initial environmental examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Provincial Agency approval in respect thereof”.

2.4.2 Review of IEE and EIA Regulations, 2000

Pakistan Environmental Protection Agency (Review of IEE and EIA Regulations), 2000 (the Regulations) under the powers conferred upon it by the Act, provide the necessary details on preparation, submission and review of the IEE and the EIA. Categorization of projects for IEE and EIA is one of the main components of the regulations. Projects have been classified on the basis of the expected degree of adverse environmental impacts. Project types listed in Schedule-I are designated as potentially less damaging to the environment and those listed in Schedule-II as having potentially serious adverse effects. Schedule-I projects require an IEE to be conducted, provided they are not located in environmentally sensitive areas. For the schedule-II projects, conducting an EIA is necessary. Salient features of the regulation, relevant to the proposed project are listed below:

Categories of projects requiring IEE and EIA are issued through two schedules attached to the Regulations.

- A fee, depending on the cost of the project, has been imposed for review of EIA and IEE.
- The submittal is to be accompanied by an application in prescribed format included as schedule V of the Regulations.
- The Pak EPA is bound to conduct preliminary scrutiny and reply within 10 days of submittal of the report a) confirming completeness, b) asking for additional information, or c) requiring additional studies.

- The EPA is required to make every effort to complete the review process for IEE within 45 days and of the EIA within 90 days, of the issue of confirmation of completeness.
- EPA accords their approval subject to following conditions:
- Before commencing construction of the project, the proponent is required to submit an undertaking accepting the conditions.
- Before commencing operation of the project, the proponent is required to obtain from EPA a written confirmation of compliance with approval conditions and requirements of the IEE/ EIA.
- An EMP is required to be submitted with the request for obtaining confirmation of compliance.
- The EPA is required to issue a confirmation of compliance within 15 days of receipt of the request and complete documentation.

A monitoring report is required to be submitted to the EPA after completion of construction, followed by annual monitoring reports during operations.

The project falls in Schedule-II of the regulations. Hence, this type of project needs an EIA to be conducted.

2.5 National Environmental Policy, 2005

The National Environment Policy (NEP) aims to protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development. In NEP, the further sectorial guidelines, Energy Efficiency and Renewable directly related to building energy code for newly constructed buildings were introduced.

The NEP provides an overreaching with a framework for addressing the Environmental issues facing Pakistan, pollution of freshwater bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural disasters and climate change. It also provides directions for addressing the cross-sectored issues as well the underline causes of Environmental degradation and meeting international obligations.

The NEP, while recognizing the goals and objectives of National Conservation Strategy, National Environmental Plan and other existing environment-related national policies, strategies and action plans provides broad guidelines to the Federal Government., Provincial Government, Federally Administered Territories and local Government for addressing environmental concerns and ensuring effective management of their environmental resources.

2.6 National Environmental Quality Standards (NEQS), 2000/SR0 2010

The National Environmental Quality Standards (NEQS), 2000 specify the following standards:

- ✓ Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged into inland waters, sewage treatment facilities, and the sea (three separate sets of numbers);
- ✓ Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources;
- ✓ For power plants operating on oil and coal:
- ✓ Maximum allowable emission of Sulphur dioxide,
- ✓ The maximum allowable increment in the concentration of sulphur dioxide in the ambient air,
- ✓ The maximum allowable concentration of nitrogen oxides in ambient air, and
- ✓ Maximum allowable emission of nitrogen oxide for steam generators as a function of heat input.
- ✓ Maximum allowable concentration of pollutants (two parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles;
- ✓ Maximum allowable noise levels from vehicles.

These standards also apply to the gaseous emissions and liquid effluents generated by batching plants and construction machinery. These standards will be applied during the construction as well as operation phase of the proposed project.

The NEQS for liquid effluents discharged to inland waters, gaseous emission from industrial sources and emissions from motor vehicles are provided as on the website: *Website: https://environment.gov.pk/SiteImage/Misc/files/Rules/SRO2010NEQSAirWaterNoise.pdf.*

2.6.1 NEQS for Gaseous Emission

The National Environmental Quality Standards (NEQS) for permissible limits of gaseous emission from industry are presented in **Table 5**.

Table 5: NEQS for Gaseous Emission

Parameter	Source of Emission	Standard
Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann Scale or equivalent smoke number

Parameter	Source of Emission	Standard
Particulate Matter	Boilers and Furnaces:	
	Oil Fired	300
	Coal Fired	500
	Cement Kilns	300
	Grinding, crushing, clinker coolers and related processes, metallurgical processes, converters, blast furnaces and cupolas	500
Hydrogen Chloride	Any	400
Chlorine	Any	150
Hydrogen Fluoride	Any	150
Hydrogen Sulphide	Any	10
Sulphur Oxides	Sulfuric Acid/sulphonic Acid Plants	5000
	Other Plants except power plants operating an oil and coal	1700
Carbon Monoxide	Any	800
Lead	Any	50
Mercury	Any	10
Cadmium	Any	20
Arsenic	Any	20
Copper	Any	50
Antimony	Any	20
Zinc	Any	200
Oxides of Nitrogen	Nitric Acid Manufacturing Unit	3000
	Other plants except for power plants operating on oil or coal:	
	Gas fired	400
	Oil fired	600
	Coal-fired	1200

Source: *NEQS, Pak Environmental Protection Agency, Islamabad.*

2.6.2 NEQS for Vehicular Emission

The National Environmental Quality Standards (NEQS) for permissible limits of exhaust emissions from vehicles are presented in **Table 6.**

Table 6: NEQS for Vehicular Emission

Parameters	Standards (Maximum permissible limits)	Measuring Method

Parameters	Standards (Maximum permissible limits)	Measuring Method
Smoke	40% or 2 on the Ringelmann Scale During engine acceleration mode	To be compared with Ringleman chart at a distance of 6 meters or more
Carbon Monoxide	6%	Under idling conditions: non-dispersive infrared detection through the gas analyser.
Noise	85 dB (A)	A sound meter at 7.5 meters from the source

Source: *NEQS, Pakistan Environmental Protection Agency, Islamabad*

2.6.3 NDWQS Drinking Water

The National Standards for Drinking Water Quality (NSDWQ) for drinking water quality, 2016 as presented in **Table 7**.

Table 7: NEQS for Drinking Water Quality

Parameter	Standard values	WHO standards
Biological		
All water intended for drinking (E. Coli or Thermo-tolerant Coliform bacteria)	Must not be detectable in any 100 ml sample.	Must not be detectable in any 100 ml sample.
Treated water is entering the distribution system (E. Coli or Thermo-tolerant Coliform and total Coliform bacteria)	Must not be detectable in any 100 ml sample.	Must not be detectable in any 100 ml sample.
Treated water in the distribution system (E. Coli or Thermo-tolerant Coliform and total Coliform bacteria)	Must not be detectable in any 100 ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100 ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.
Physical		
Color	≤ 15 TCU	≤ 15 TCU
Taste	Non-acceptable	Non-acceptable
Odour	Non-acceptable	Non-acceptable
Turbidity	< 5 NTU	< 5 NTU
Total hardness	< 500 mg/L	---
TDS	<1000	<1000
pH	6.5- 8.5	6.5- 8.5

Parameter	Standard values	WHO standards
Chemical		
Essential Organic	mg/Litre	mg/Litre
0Alminium	≤ 0.2	0.2
Antimony	≤ 0.005	0.02
Arsenic	≤ 0.05	0.01
Barium	0.7	0.7
Boron	0.3	0.3
Cadmium	0.01	0.003
Chloride	≤ 250	250
Chromium	≤ 0.05	0.05
Copper	2	2
Toxic Inorganic		mg/Litre
Cyanide	≤ 0.05	0.07
Flouride	≤ 1.5	1.5
Lead	≤ 0.05	0.01
Mangnese	≤ 0.5	0.5
Mercury	≤ 0.001	0.001
Nickel	≤ 0.02	0.02
Nitrate	≤ 50	50
Nitrite	≤ 3	3
Zinc	5	3
Pesticides mg/L		PSQCA No.4639-2004.page No 4 Table No. 3serial No. 20-58
Phenolic Compounds		<0.002
Polynuclear aromatic hydrocarbons		0.01
Radioactive		
Alpha emitters bq/L	0.1	0.1
Beta emitters	1	1

Source: *NEQS, Pak Environmental Protection Agency*

2.6.4 NEQS for Ambient Air and Noise

The National Environmental Quality Standards (NEQS) for Ambient Air and Noise, 2016 are presented in **Table # 8** and 9**.**

Table 8: NEQS for Ambient Air

Pollutants	Time Weighted Average		Concentration in Ambient Air (ug/m^3)
Sulfur Dioxide (SO_2)	Annual 24 hrs**	Average*	80 120
Oxides of Nitrogen gas (NO)	Annual 24 hrs**	Average*	40 40
Oxides of Nitrogen gas (NO_2)	Annual 24 hrs**	Average*	40 80

Pollutants	Time Weighted Average	Concentration in Ambient Air (ug/m^3)
Ozone (O_3)	1 hour	130
Suspended Particulate Matter (SPM)	Annual Average*	360
	24 hrs**	500
Respirable Particulate Matter (PM_{10})	Annual Average*	120
	24 hrs**	150
Respirable Particulate Matter ($PM_{2.5}$)	Annual Average*	15
	24 hrs**	35
	1 hr	15
Lead (Pb)	Annual Average*	1
	24 hrs**	1.5
Carbon monoxide (CO)	8 hrs 1 hr	5 mg/m^3 10 mg/m^3

*** Annual Arithmetic mean of minimum 1040 measurements in a year taken twice a week 24 hourly at a uniform interval*
** 24 hourly /8 hourly values should be met 98 % of the year, 2 % of the time, it may exceed.*
***Source**: NEQS, Pak Environmental Protection Agency*

Table 9: NEQS for Noise

Category of Area/ Zone	Limits in dB(A) Leq	
	Daytime	Night time
Residential area	55	45
Commercial area	65	55
Industrial area	75	65
Silence area	50	45

***Source:** NEQS, Pak Environmental Protection Agency*

2.7 National Drinking Water Policy, 2009.

During September 2009 the government approved the National Drinking Water Policy that provides a framework for addressing the key issues and challenges facing Pakistan in the provision of safe drinking water to the people by 2025.

Drinking water is the constitutional responsibility of the provincial governments, and the specific provision function has been devolved to specially created agencies in cities and Towns and Tehsil Municipal Administrations under the Local Government Ordinance 2001.

Therefore, this policy framework is intending to guide and support the provincial and district governments in discharging their responsibility in this regard. The overall goal of the national drinking water policy is the following:

- To ensure safe drinking water to the entire population at an affordable cost in an equitable, efficient and sustainable manner
- To ensure a reduction in the incidence of mortality and morbidity caused by water-borne diseases.

The policy is expected to be reviewed and updated every five years to examine its implementation and efficacy and to adapt it to the changing situation in the country.

2.8 National Sanitation Policy, 2006.

The National Sanitation Policy aims at providing adequate sanitation coverage for improving the quality of life of the people of Pakistan and to provide physical environment necessary for a healthy life.

2.9 Federal Forest Act, 2010.

The Federal Government enacted the Federal Forest Act in 2010 by making amendments to the Forest Act 1927. The Forest Act deals with the matters related with protection and conservation of natural vegetation / habitats. The Act empowers the concerned agency to declare protected and reserved forest areas and maintain these forests. In spite of the fact that Act recognizes the right of people for access to the natural resources for their household use, it prohibits unlawful cutting of trees and other vegetation. According to the provisions of Federal Forest Act, cutting of any trees during the construction of proposed Project will require prior permission from the Federal Forest Department.

The Act prohibits any person to set a fire in the forest, quarry stone, remove any forest-produce or cause any damage to the forest by cutting trees or clearing up area for cultivation or any other purpose. Much like the Wildlife Act described above, the Forest Act is also not likely to be applicable to the proposed project. No project activities will, however, be carried out in any protected forests, and no unauthorized tree cutting will be carried out for any facility expansion or waste disposal.

2.10 Pollution Charges Program.

The modalities for the implementation of pollution charges have evolved through a unique process of coordination among representatives of industry, government, environmental NGOs and academic researchers. The consensus of all

stakeholders has been to adopt a market-based approach, i.e., a pollution charge or tax combined with fiscal incentives to industries, rather than a command-and-control approach through regulations to ensure compliance with NEQS. Appreciable progress has been made towards operationalizing the process. Unfortunately, the January 1999 date for commencing the implementation was exceeded due to procedural and departmental hurdles.

The pollution charge payable by an industrial unit will be determined in accordance with guidelines to be prepared by the Pak-EPA. Industrial units liable to pay the pollution charge will themselves be responsible for ensuring the correct calculation, reporting and payment.

2.11 Pakistan Environmental Assessment Procedures, 2000.

Pursuant to the provisions of the PEPA of 1997, all Government Ministries, Departments, Agencies and Establishments and private sector project sponsors are required to prepare the Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) prior to the approval of their proposals for the projects. The primary purpose of the environmental assessment process is to provide proponents and decision makers, as well as members of the public, with an understanding of the potential environmental effects of the proposed action, so as to avoid or minimize adverse effects, bearing in mind the costs and benefits of using the environmental resource in this particular project wherever possible. The Pak-EPA has developed a complete package of Environmental Assessment Procedures.

2.12 National Environmental Action Plan (NEAP)

Environment is high on the Government of Pakistan's national Agenda. To this affect the Government priorities and strategies can be found in the recently adopted National Environmental Action Plan (NEAP). The primary objective of NEAP is to initiate actions and programs for achieving a state of environment that safeguard public health, promote sustainable livelihood, and enhance the quality of life of the people in Pakistan. The NEAP identifies four primary areas, (1) Clean air (2) Clean water (3) Management of solid waste (4) Ecosystem management. The plan also presents five additional areas of concern (i) Management of fresh water concerns (ii) Marine pollution (iii) Toxic and hazardous substances (iv) Energy conservation and management (v) Compliance with international treaties and protocol.

2.13 International Conventions

Pakistan is also the signatory/member to various international conventions on the conservation of the environment and wildlife protection. The country is obliged to adhere to the commitments specified in these treaties. The United Nations Conference on Environment and Development (UNCED), 1992[1] emphasize on Protection, rational use and development of resources; further prevention of degradation and reducing the risk of long-term irreversible effects and conservation of biodiversity, and the sustainable use of genetic resources.

The World Heritage Convention[2] obligates the states to ensure identification, protection and transmission of the natural heritage to future generations. A world heritage site is a site (natural or cultural) recognized by the international community (in the shape of the World Heritage Convention founded by the General Conference of UNESCO in 1972) as possessing universal value, and coming under a collective responsibility.

2.14 Cutting of Trees (Prohibition) Act, 1975

The Cutting of Trees Act prohibits cutting or chopping of trees without prior permission of the Forest Department. Section 3 of this Act states that “No person shall, without prior written approval of the local formation commander or an officer authorized by him in this behalf, cut fell or damage or cause to cut, fell or damage any tree growing within the five miles belt along the external frontiers of Pakistan.” There are no trees in the route of the transmission line as the route is a brownfield site and a transmission line already exists along the selected route.

2.15 Land Acquisition Act, 1894

This Act provides law for the acquisition of land needed for public purposes and for companies; and for determining the amount of compensation to be made on account of such acquisitions. The law provides details of various peculiarities involved in acquisition of land such as preliminary investigation, objection to acquisition, declaration of intended acquisition, enquiry into measurements, value & claims, taking possession, reference to court and procedure thereon, apportionment of compensation, payment, temporary occupation of land, acquisition of land for companies, disputes resolutions, penalties and exemptions etc. This Act has 55 sections addressing different areas. Such as section 4(2) mentions that it shall be lawful for any official authorized by the Collector to enter upon and survey, to dig or

[1] http://www.unep.org/unep/partners/un/unced/home.htm

[2] http://www.unesco.org/whc/intro-en.htm

to do all other Acts necessary to ascertain that whether the land is adapted for such purpose. As the DHA has provided 18.5 Kanal of land to EMAAR Pakistan for this proposed project, hence the proponent is complying with this act.

2.16 Electricity Act, 1910 & (Amendment) Ordinance, 1979

The electricity Act, 1910 relates to the supply and use of electrical energy. Supply of energy licenses and its revocation under various conditions is given in part II of the Act. This Act obligates licensee to pay compensation for any damages caused during the constructions and maintenance of any power distribution facilities. Part III of the Act discusses the supply, transmission and use of energy by non licensees. This law prohibits the generation, transmission, supply or use of energy, in any way that may injure any railway, tramway, canal or waterway or any dock, wharf or pier vested in or controlled by a local authority.

The electricity Act, 1910 is amended through the electricity (Amendment) Ordinance, 1979. Penalty of three years' imprisonment or five thousand fines or with both is prescribed for dishonest abstraction or consumption of energy.

2.17 The Telegraph Act, 1885

The Telegraph Act ensures the compensation of damages to infrastructure and other property during the construction of any development project. The compensation of damages must be paid to the people affected within a fixed period. Any person not willing to follow the rules and regulations provided by this act shall be deemed to have committed an offence under section 188 of Pakistan Penal Code.

If any dispute arises as to the persons entitled to receive compensation, or as to the proportions in which the persons interested are entitled to share in it, the telegraph authority may pay into the Court of the District Judge such amount as he deems sufficient or, where all the disputing parties have in writing admitted the amount tendered to be sufficient or the amount has been determined under sub-section (3), that amount; and the District Judge, after giving notice to the parties and hearing such of them as desire to be heard, shall determine the persons entitled to receive the compensation or, as the case may be, the proportions in which the persons interested are entitled to share in it.

2.18 Employment of Child Act, 1991

Prohibition of Employment, of this Act starts "No child shall be employed or permitted to work in any of the occupations set forth in Part I of the Schedule or in any workshop wherein any of the processes set forth in Part II of that Schedule is

carried on: Provided that nothing in this section shall apply to any establishment wherein such process is carried on by the occupier with the help of his family or to any school established, assisted or recognized by Government."

2.19 Antiquity Act, 1975

The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The act is designed to protect antiquities from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc.

The law prohibits new construction in the proximity of protected antiquity and empowers the Government of Pakistan to prohibit excavation in an area that may contain articles of archaeological significance.

Under the Act, the project proponents are obligated to:

- Ensure that no activity is undertaken in the proximity of protected antiquity, and
- If during the project an archaeological discovery is made, it should be reported to the Department of Archaeology, Government of Pakistan.

2.20 Protection of Trees and Bush wood Act, 1949

This Act prohibits cutting or chopping of trees and bush wood without permission of the Forest Department, Islamabad.

2.21 Pakistan Explosive Act, 1884

This Act provides regulations for the handling, transportation and use of explosives during quarrying, blasting and other purposes. The transmission line tower installation may need blasting at rocky/mountainous areas. Thus these regulations will be applicable to the proposed project.

2.22 Employment of Child Act, 1991

Section 3, Prohibition of Employment, of this Act starts "No child shall be employed or permitted to work in any of the occupations set forth in Part I of the Schedule or in any workshop wherein any of the processes set forth in Part II of that Schedule is carried on: Provided that nothing in this section shall apply to any establishment wherein such process is carried on by the occupier with the help of his family or to any school established, assisted or recognized by Government."

2.23 Factories Act, 1934

The clauses relevant to the proposed project are those that address the health, safety and welfare of the workers, disposal of solid waste and effluents, and damage to private and public property. The Act also provides regulations for handling and disposing toxic and hazardous substances. The Pakistan Environmental Protection Act, 1997 (discussed above), supersedes parts of this Act pertaining to the environment and environmental degradation.

2.24 Pakistan Penal Code, 1860

This outlines the penalties for violations concerning pollution of air, water bodies and land. Sections 272 and 273 of this Act deal with the adulteration of food or drink. 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 or annoyance to the public or to 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.”

The code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The code also addresses control of noise, noxious emissions and disposal of effluents. Most of the environmental aspects of the code have been superseded by the Pakistan Environmental Protection Act, 1997.

2.25 Institutional Set Up

The apex environmental body in the country is the Pakistan Environmental Protection Council (PEPC), presided by the Chief Executive of the Country. Other bodies include the Pakistan Environmental Protection Agency (Pak-EPA), and environmental tribunals.

The EPAs were first established under the 1983 Environmental Protection Ordinance; the PEPA 1997 further strengthened their powers. The EPAs have been empowered to receive and review the environmental assessment reports (IEEs and EIAs) of the proposed projects and provide their approval (or otherwise).

The construction of EMAAR Grid Station and its Transmission Line is located in DHA Phase V under ICT. Therefore, the EIA report will be submitted to Federal Environmental Protection Agency (PAK-EPA), Islamabad for obtaining environmental approval for the project.

2.26 Environmental Protection Agency's Environmental Guidelines

The Pak EPA has prepared a set of guidelines for conducting environmental assessments. The package of regulations, of which the guidelines form a part, includes the PEPA 1997 and the NEQS. The guidelines themselves are listed below:

- Guidelines for the Preparation and Review of Environmental Reports,
- Guidelines for public consultation,
- Guidelines for Sensitive and Critical Areas, Sectorial Guidelines.

It is stated in the Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000 that the EIA or IEE must be prepared, to the extent practicable, in accordance with the Pakistan Environmental Protection Agency guidelines.

2.27 The Obligation under International Treaties

Pakistan is a signatory to various international treaties and conventions on the conservation of the environment and wildlife protection. The country is obliged to adhere to the commitments specified in these treaties. The Convention on Biological Diversity (CBD) was adopted during the Earth Summit of 1992 at Rio de Janeiro. The Convention requires parties to develop national plans for the conservation and sustainable use of biodiversity and to integrate these plans into national development programs and policies.

Parties are also required to identify components of biodiversity that are important for conservation and to develop systems to monitor the use of such components with a view to promoting their sustainable use.

The Convention on the Conservation of Migratory Species of Wild Animals, 1979 requires countries to take action to avoid endangering migratory species, where the term migratory species refers to species of wild animals of which significant proportions cyclically and predictably cross one or more national jurisdictional boundaries.

The parties are also required to promote or cooperate with research into migratory species. Under the international plant protection convention, 1951, Pakistan is required to take steps to ensure the protection of certain plant species that face the extinction threat.

Pakistan signed and ratified on several international agreements and convention and bound to implement them in its territory.

These "Multilateral Environmental Agreements" or MEAs relevance for the proposed project is that, IESCO/EMAAR through the Government of Pakistan is

legally bound to commit to achieve the specific environmental goals agreed there under and reduce human impacts on the environment.

2.28 The implication of Legislations to the project

Islamabad Electric Supply Company, being the Implementer & Management of the project will ensure that construction and operational phases of the project be carried out in accordance with the EIA report and Environmental Management Plan is effectively implemented.

The project will be subjected to four basic provisions relating to pollution control under the Pakistan Environmental Protection Act, 1997, as contained in section 11, 13, 14 and 15 as follows:

- Section 11, prohibits discharge or emission of any effluent or waste or air pollutant or noise in excess of the NEQS, or the established ambient standards for air, water or land.
- Section 13, prohibits of hazardous wastes.
- Section 14, prohibits the handling of hazardous substance except under license or in accordance with the provision of any local law or international agreement.
- Section 15, prohibits the operation of motor vehicles for each air pollutant or noise is being emitted in excess of the NEQS or the established ambient standard.

3 Project Description.

3.1 Introduction

The EIA has been conducted based on the primary, secondary data, field visits and assumptions made during the site assessment between March to July 2023, when the IESCO preliminary designs for the transmission line was conceptualized and the overall requirements for installation of the equipment had been identified. The detailed designs are currently being progressed by IESCO. At this stage, the construction activities under the SP are expected to include the usual localized stringing. Impacts from construction of the 132 KV In / Out Construction at 132 KV GS Transmission Line are envisaged to be minor. Since no additional land needs to be acquired for construction of the towers because the towers will mostly be erected in the route of 132 KV In / Out Construction at 132 KV Canyon Views GS Transmission Line. The EIA Report has included field reconnaissance of the proposed site of construction of new transmission line from Sawan-Rewat to EMAAR Canyon Views at DHA V. The works area is located within IESCO Jurisdiction. Hence, this Chapter provides description of various components of the proposed project and their salient features, location, and phases.

3.2 Type and Category of the Project

According to the Pakistan Environmental Protection Act, 1997, section12 (1) "No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Federal Environmental Protection Agency or Provincial Environmental Protection Agencies, as the case may be, or, where the project is likely to cause an adverse environmental effects an environmental impact assessment, and has obtained from the Government Agency approval in respect thereof." According to the Pakistan Environmental Protection Agency (Review of IEE and EIA Regulations) 2000:

Hence, the EMAAR EDIL 132 KV Grid station & 1.65 KM Transmission lines located in canyon views, DHA Phase V is in Energy projects of Schedule II, List of projects requiring an Environmental Impact Assessment (11 KV & above and Grid stations)." The proposed project falls under the category of Schedule II as per IEE/EIA regulations 2000 and requires an EIA to be conducted.

3.3 Objective of the Project

The overarching objective of the proposed project is to increase the efficiency, reliability and quality of the electricity supply in the future. The project aims to achieve:

- Strengthening of electricity transmission network to reduce bottlenecks and improve system reliability and quality,

- Strengthening of electricity distribution network to reduce losses and improvement in supply specially in future,
- The project will ensure supply of electricity to the EMAAR Housing Society, and
- Improvement in the voltage profile as well as the system reliability.

3.4 Project Location and Accessibility

The EMAAR Grid Station is 1.3 km away from Islamabad Expressway and within the boundaries of Canyon Views of EMAAR Housing Society, DHA Phase V.

The transmission line originates from proposed EMAAR Grid Station and ends at New Rawat Sawan Circuit –Transmission Line passes through the boundaries of EMAAR property. The entirety of the grid station situated within the EMAAR society while majority of poles of transmission line is passing within the housing society, the route has been shown in below figure. The latitude/longitude coordinates of the grid station site are as follows 33°31'31.1''N and 73°11'09.3''E. The surrounding areas near the project site of 132 KV Grid Station together with transmission lines shown in Figure 3-1:

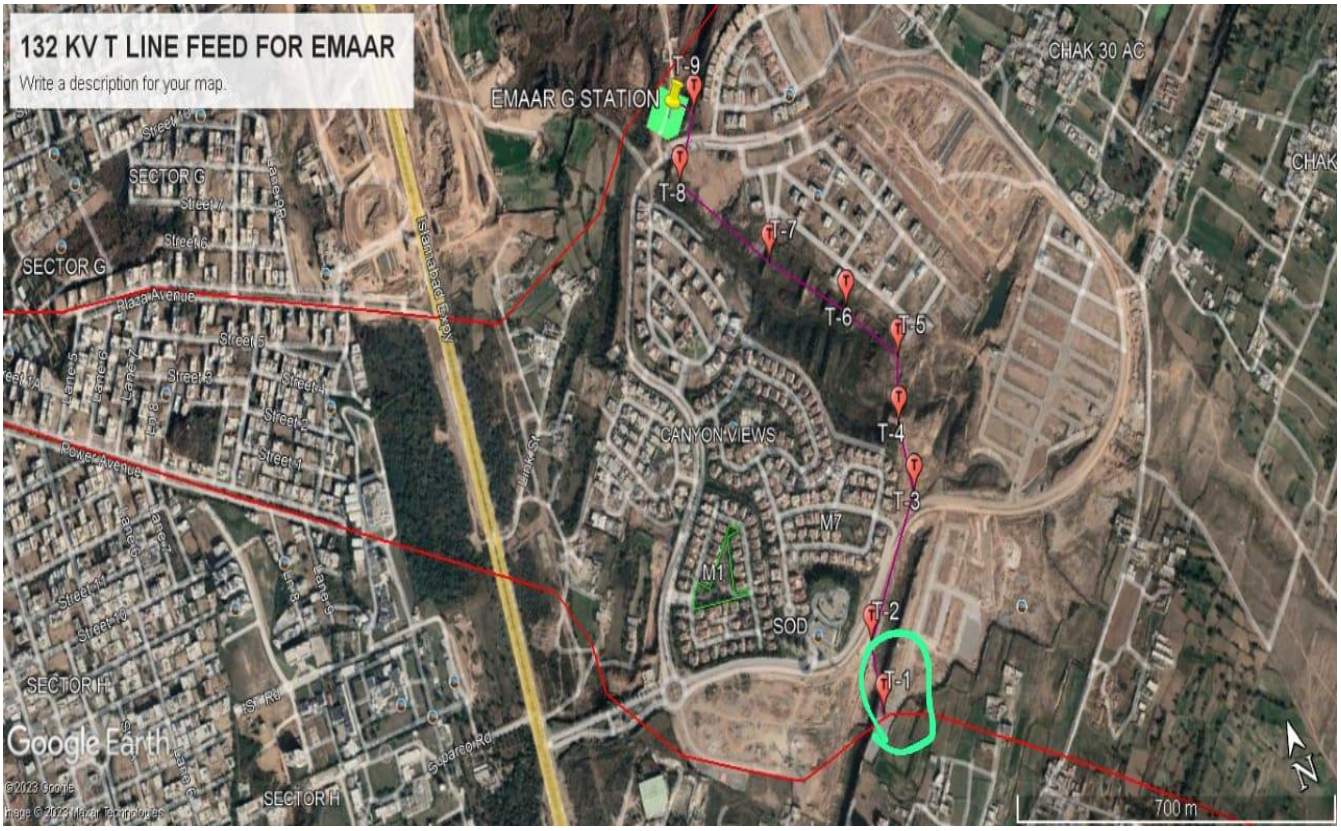

Figure 3-1*:Project Site and Route of Transmission Lines.*

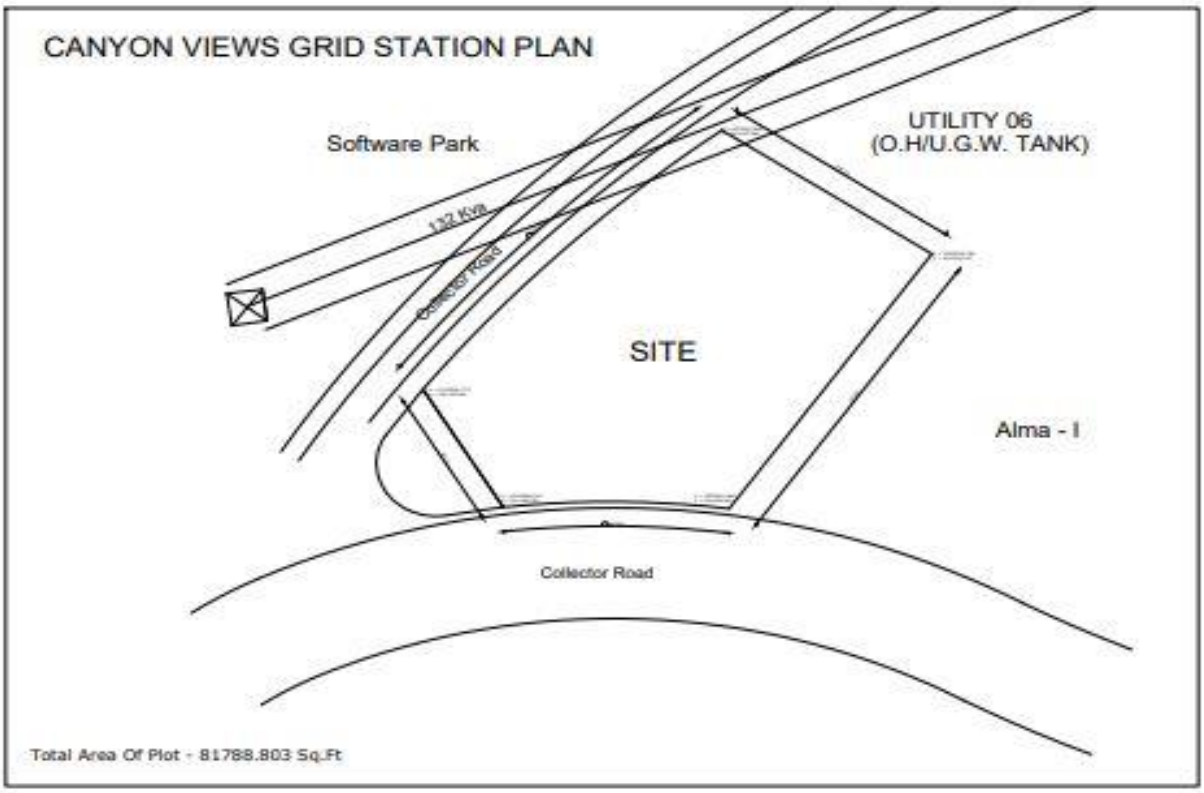

Figure 3-2: DHA Approved Grid Station Layout Plan.

Figure 3-3: Layout Plan of EMAAR 132 KV Grid Station

3.5 Brief on Proposed Project.

To satisfy the load requirement in future of EMAAR and to reduce the transmission losses, IESCO has planned to establish a 132 KV Grid Station and its Feeding Transmission Lines for EMAAR Canyon Views, DHA, Islamabad.

The proposed EMAAR Grid Station project site is spread over 18.5 Kanal and the Land has been provided by the DHA. The 132 KV Grid Station will be AIS system, with Transformer Capacity of 01 x 20/26 MVA Power Transformer, Transformer Bay x 01, Capacitor Bank x 01 and Line Bay x 02. The allied transmission line is 1.65 Km in length which is connected from New Rawat Transmission Line, comprising of a total of 9 towers.

Basic infrastructure facilities includes civil work foundations for installation of equipment, control room buildings & other associated residential & non-residential buildings and cable trenches etc will be executed by the IESCO, Islamabad.

3.6 Project Components.

3.6.1 132 KV Grid Station

A Grid station is an important element of the electricity transmission and distribution system. Its function is to transform voltages from high to low or the reverse, using transformers and other heavy-duty electrical switchgear. In Grid station, the electrical feed to the different destinations is fed into common distribution conductors called busbars. From these busbars, electricity is then fed into dedicated transmission lines running to specific geographic areas where the power is needed. Transmission requirements and lines routes initially determine the general location of a Grid station. Hybrid Grid Station is a mix of GIS (Gas Insulated Switch Gear) and AIS (Air Insulated Switchgear) technologies. It consists of bays where some are of AIS components only and some are mix of AIS and GIS technology, or where some are of GIS components only. Alternatively, and more commonly, elements of AIS and GIS technology are typically mixed in the same bay of equipment and this mixture is a hybrid of the two technologies and is applied across the complete grid station. Under the system stabilization, rehabilitation and loss reduction Program, IESCO has proposed to install 132 KV Grid Station in Canyon Views of EMAAR Housing Society to meet the future demand of electric load. Which is once completed, would be considered one of the latest and state of the art Grid station. This pre-station would require very small space, while commissioning and installation of compact machinery would be time & resource efficient. The list of equipment for EMAAR Grid Station is listed below in **Table 10.**

Table 10: List of Equipment for EMAAR Grid Station

Sr #	Description of Material	Qty:	Unit
1	20/26 MVA 132/11.5 KV Power Transformer along with all allied accessories	1	No
2	132 KV Circuit Breaker with SSS along with allied accessories & Termination Connectors	3	Set
3	132 KV Transformer C.T with SSS along with allied accessories & Termination Connectors Ratio 200:100:5/5A	3	No
4	132 KV Line C.T with SSS along with allied accessories & Termination Connectors Ratio 1200:600:300:5/5A	6	No
5	132 KV PT With SSS along with allied accessories & Termination Connectors	3	No
6	132KV Bus Isolator with SSS with allied accessories & Termination Connectors	3	Set
7	132KV Line Isolator with SSS with allied accessories & Termination Connectors	2	Set
8	132KV Lightening Arrester with SSS with allied & Termination Connectors accessories	9	No

Source: *IESCO, 2023.*

3.6.2 Accessories of Grid Station.

In Grid station, switches, protection and control equipment and circuit breakers will be installed. In Grid station, line termination structures, high voltage switchgear, low voltage switchgear and surge protection controls and metering are also installed. By using Grid station, it is possible to de-energize a transmission line or other electrical switchgear for maintenance or for new construction or installation. In this way it is possible to maintain the reliability of supply during maintenance work or during the development of any fault in transmission lines or in the associated switchgear. The brief detail of some main components of Grid station is as under:

3.6.3 Transformers.

It uses for step down the voltage. The winding of transformer is immersed in oil. It's a highly refined mineral oil that is stable at high temperatures and has excellent electrical insulating properties. Its functions are to insulate, suppress corona and arcing, and to serve as a coolant also as it provides part of the electrical insulation between the internal live parts. It must remain stable at high temperature over an extended period. Formerly, Polychlorinated Biphenyl (PCB) was used as it was not a fire hazard in power transformers and it was highly

stable. However, PCB by-products are unstable and toxic and also accumulate in the environment. Therefore, IESCO has not permitted PCB oil in transformers to use in Islamabad, and will also not be used in transformer of proposed Grid station.

3.6.4 Busbars.

After passing switching components, the lines in the Grid Station tie into a common bus. This consists of a number of heavy metal busbars, usually made of aluminium. In most cases there are three parallel busbars; since electrical power is distributed via three-phase sub-stations that require additional reliability often has a double bus or even a double ring of busbars, in which the bus system is actually duplicated. Each feeder as well as each outgoing line has a connection to each separate busbar. This is a safety measure that is required mainly for reliability so that in the case of a failure it would not cause a large part of the system to be brought down.

3.6.5 Overhead Electric Transmission Line

An overhead power line is an electric power transmission line suspended by towers or poles. Since most of the insulation is provided by air, overhead power line is generally used in scarcely populated area. The right of way of proposed 132 KV Overhead transmission line will start from already exiting Transmission line New Rawat-Sawan passing through in sight the EMAAR Canyon Views, DHA-V and will be terminated at proposed Grid Station and there will be 9 towers between EMAAR Canyon Views Grid Station and the connecting (T-Off) Transmission line. The total distance between two towers will be 250 m. The overhead transmission line has been proposed due to technical reasons.

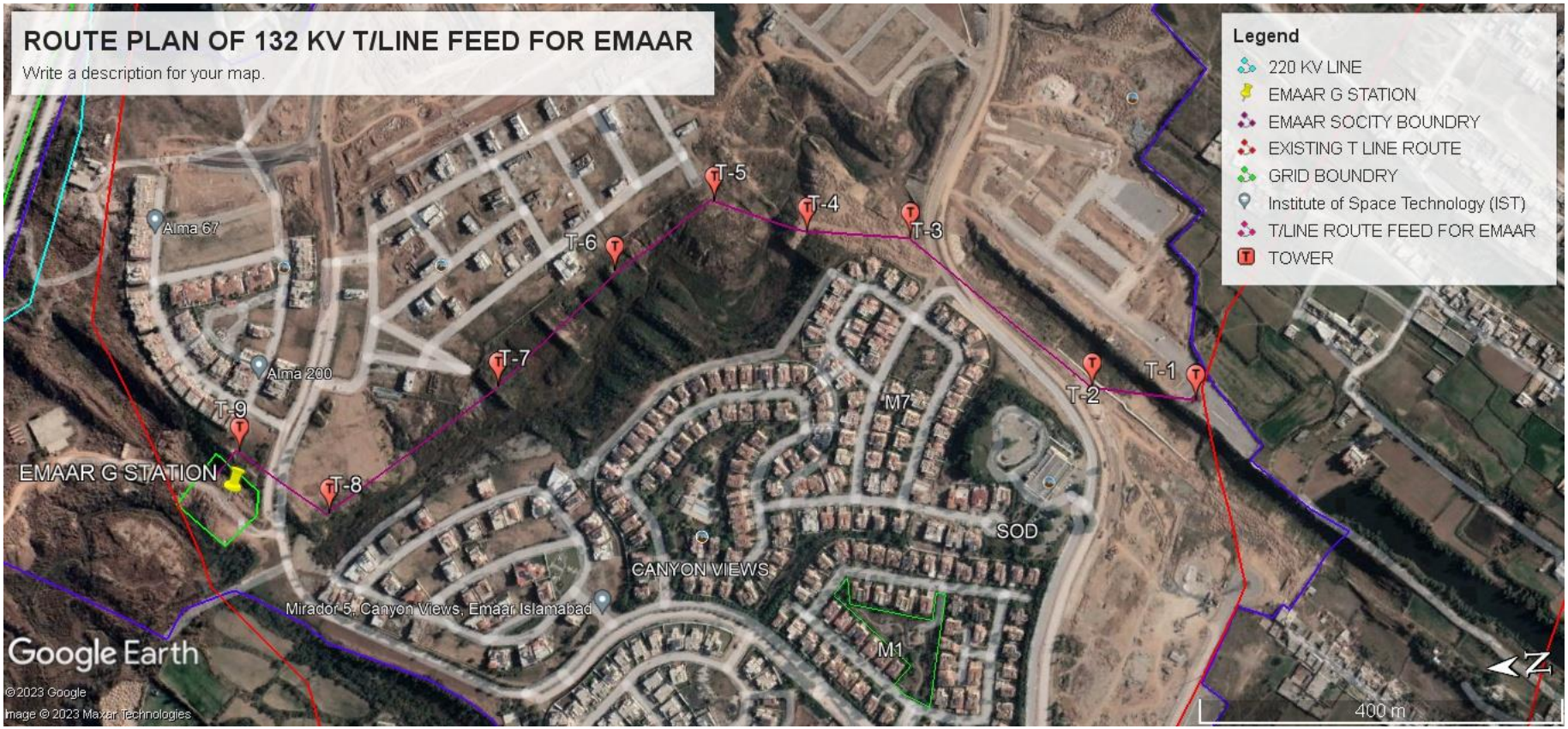

Figure 3-4: **Route of TL from GS to New Rawat Sawan Circuit.**

3.6.6 Transmission Lines.

The proposed transmission line length is 1.65 km. There will be installation of 9 towers on the line. The distance between towers is carried out as per standards of IESCO the range usually varies from 50m – 300m depending upon the site conditions. The route of transmission line is the most appropriate route to connect the proposed grid station at EMAAR, DHA with New Rawat-Sawan Transmission Line. The Grid Station Construction (GSC) Department along with Environment and Social Safeguard Section of IESCO has marked the route alignment of transmission line after careful consideration of the land use, ecological environment and nearby settlements along the route. The route alignment has limited vegetation cover; no trees will be cut down to make way for transmission line. Furthermore, the transmission line will pass through EMAAR Canyon View and connect to the existing New Rawat – Sawan within the boundary of EMAAR Canyon View. The transmission line route is shown in **Figure 3.6**.

3.6.7 Width of Right of Way (RoW)

The width of RoW for T/L considered was 8.8m, i.e., 4.4 m on either side from the center of transmission line and the area will be 70.56 m^2 (i.e., 8.4m x 8.4m) in case of tower spotting.

Table 11: **Transmission Line Equipment**

Sr. No	DESCRIPTION OF MATERIAL	QTY:	UNIT
1	132KV double circuit Tower	09	No.
2	Conductor (Rail) 6*2	12	Km
3	Disc Insulator 8*9*12 (KN)	864	No.
4	Earth wire	02	Km
5	TENSION Assembly 9*12	108	No.

Figure 3-5: EMAAR Canyon Views Approved Layout Plan.

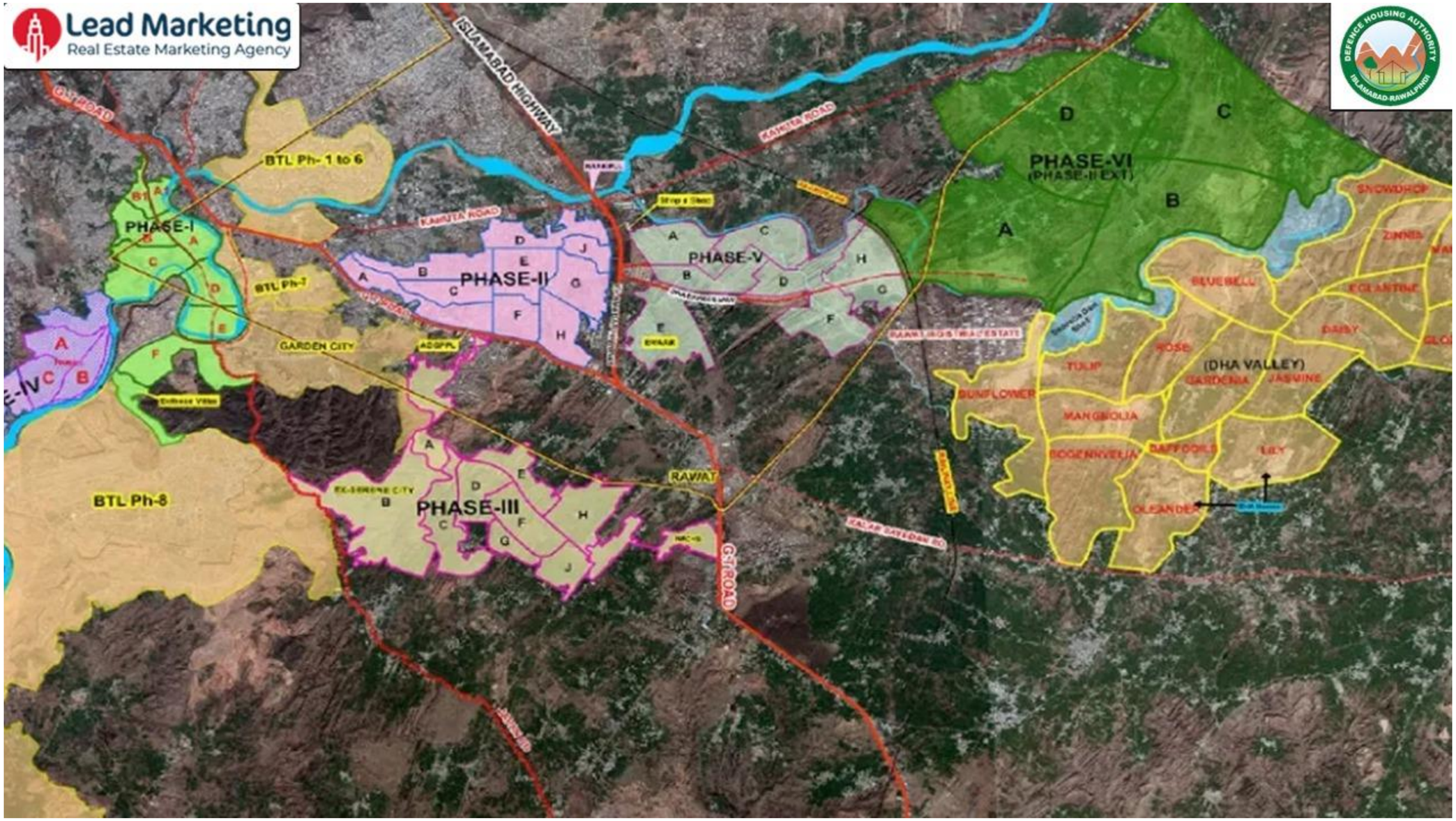

Figure 3-6:Location of the Proposed Project in DHA Phase V

Source (DHA, Lead Marketing)

3.7 Cost and Magnitude of Project

The estimated cost of the proposed project is PKR **700.** Million. The breakup of the cost estimates is provided below in **Table 12**.

Table 12: **Estimated Cost of the Project**

No.	Project Component	Tentative Cost in Rs (Millions)
1.	**New Grid Station at EMAAR**	
1.1	**PART-A (SWITCHYARD & CONTROL HOUSE BUILDING)**	**200**
2.	**Transmission lines from EMAAR – New Rawat T/Line**	
2.1	**Part-B Market Items**	497.88
3	**Part-C: Post Mitigation Measure for EMMP**	2.12
Total Estimated Cost of the Project (PKR in Million)		**700.00**

Source: *IESCO, 2023*

The proposed grid station and transmission lines are being developed in eastern parts of EMAAR Canyon Views with a total capital investment of approximate PKR 700 million has already provided to the IESCO, Islamabad for planning & implementation of Grid Station and Transmission line. This will include the installation and operation of project, associated amenities and budgetary cost for utilities, civil work and equipment/machinery purchase as well post project monitoring. In addition, this cost also includes the environmental parameters monitoring during the operational phase.

3.8 Project Process Flow/ Activities.

3.8.1 Land Acquisition for Grid Station and Transmission Lines

DHA has allocated 18.5 Kanals of communal land in the society of EMAAR for the construction of grid station. Land is taken from DHA No displacement due to the allocation of this land to the grid station. In addition, route for transmission lines is already accorded with DHA and IESCO.

3.8.2 Land for Transmission Line

The transmission route has been identified and selected by the team of experts of DHA, IESCO, EMAAR and Consultant after taking the environmental and ecological sensitiveness in mind. The major stakeholders of the width and length

of the transmission line is EMAAR Society, however other land holders have been consulted and taken in confidence following the rules and regulations laid in the Telegraph Act, 1885. The proposed project will make use of existing topography not deforming the landscape of the project area. The overhead transmission lines will be kept at a standard distance from the earth surface to reduce its impacts. The vegetation cover of the project area will be protected to the extent possible and offsets will be provided at the high-density vegetative area. Hence, there is no issue of land acquisition or resettlement of community due to the project.

3.8.3 Construction of new Grid station

The sequence of the activities which are carried out for the establishment of a new grid station are provided below:

- First of all, the location where the new grid station is to be established is identified. This is carried out based on load on the existing feeders, load on the nearby existing grid stations, trend of the load growth and future outlook of the area.
- After identification of the required location, availability of the land is determined. Usually, three candidate sites are identified at this stage. In order to make a final selection, a committee of concerned departments (usually GSO, GSC, and planning) is constituted. The committee after thorough inspection finalizes the site for purposed grid station establishment.
- The counter plan and result of the above-mentioned investigations are sent to design department, which then prepares the detailed design of the grid station, including the civil design, construction drawings, and general layout plan along with equipment detail.
- Once the civil design is available, estimates are prepared, and approvals obtained from concern authority.
- Subsequent to the above, tendering and contract awarding is carried out for the civil construction.
- After the testing, the grid station is commissioned and put into operation.

The contractor will engage a staff of up to 50 persons. The estimated demand of water supply will be 10,000 gallons during peak construction period. 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 quality of the construction, installation, and testing work.

3.8.4 Installation of New Transmission Line

The sequence of activities which are carried out for the laying of transmission lines and feeder are as follow:

- First of all, a reconnaissance site visit is carried out by the GSC Department in order to determine feasible routes for the transmission line.
- The fixed route marked on the map and sent to the Design Department for approval.
- The GSC carries out detailed survey (plain tabling as well as profiling) of the approved route.
- The results of the detailed survey are sent to the Design Department.
- The Design Department prepares the detailed design.
- Material is procured after tendering.
- Tendering for the construction works is carried out and contract awarded.
- Construction activities will be started by demarcating the Tower locations. Temporary Right of Way (RoW) is required along the transmission line route to carry out the construction activities. Additional temporary RoW is required for the route to access the transmission line corridor/tower locations during the construction phase.
- Subsequent to the above, excavation for tower foundation will be carried using appropriate machinery, such as excavator etc. Once excavation is complete, construction of the tower foundation is taken in hand and after that erection of tower is carried out followed by stringing of conductor and accessories (e.g. insulators, etc.) installation.
- After the completion of installation activities described above, testing is carried out. After that the line is commissioned and put into operation.

3.8.5 Demarcation of TL Route.

A reconnaissance site visit was carried out by the IESCO (GSC), DHA, EMAAR and the Consultant in order to determine feasible routes for the transmission line. However, in this case, the selected route is the only best possible route as it disturbs minimum flora fauna and local communities along its route. The basic considerations including land use, ecological environment and nearby settlements were taken in account while selecting the route for the transmission line. In addition, the route has been selected, keeping in view the security and defense concerns due to the geographical location of the society.

3.8.6 Restoration and Rehabilitation after completion of Project

The operation and maintenance (O&M) activities of grid stations and transmission lines are briefly described below.

3.8.6.1 Operation Activities

The grid stations are managed round the clock and important parameters (such as voltage, load and power factor) are monitored. Daily log sheets are filled, recording the key data. Any non-compliance is recorded and concerned departments are informed for taking remedial measures.

3.8.6.2 Scheduled Maintenance

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

3.8.7 Maintenance Procedure of Transformers

3.8.7.1 Power Transformer Repairs:

The minor repairs for the power transformers are carried out at the grid stations. However, for the major repairs, the transformers are transported to the HEC heavy mechanical complex Taxila by IESCO.

3.8.7.2 Distribution Transformer Repairs:

No field repair is allowed for the distribution transformers. If the transformers are damaged within two years of their delivery, they are returned to the suppliers. If damaged after this period, the transformers are sent to the Distribution Transformer IESCO Reclamation Workshop at New Wah Hasanabdal Attock and Rajjar Jhelum.

3.8.7.3 Transformer Oil Testing Procedure

The dielectric strength of the transformer oil filled in the power transformers is tested every year at the gird stations. For this purpose, a simple device called the oil testing set is used. The oil sample is taken out of the transformer and test performed. A record is maintained for these yearly tests. No action is taken if the test results are

within the prescribed limits. However, if the dielectric strength of the transformer oil is found to be less than the allowable limits, the oil is replaced.
After every five years, more comprehensive testing is carried out for the transformer oil. Three oil samples are taken from each transformer and sent to the WAPDA's High Voltage and Research Laboratory in Faisalabad. At the Laboratory, the following tests are usually carried out:

- Flashpoint
- Viscosity
- Moisture
- Gas contents
- Dielectric strength

3.8.7.4 Transformer Oil Disposal Procedure

The transformer oil is mostly recycled in the transformer workshops. The unusable waste oil is disposed through contractors. IESCO procedures include a list of approved firms for the disposal of the used transformer oil. Assessment of the waste disposal practices in the transformer maintenance workshops was not included in the scope of the present study. The information given here is partly based upon the anecdotal sources.

3.9 Government Approval

Presently, the project is in the planning phase. However, all the required government approvals have been acquired by EMAAR/IESCO. Land for EMAAR Grid Station has been purchased from DHA. While the transmission line route has been selected by GSC department of IESCO in consultation with the DHA/EMAAR.

3.10 Project Time Schedule

The construction of EMAAR Grid Station and its Feeding Transmission Line will be completed in a period of 400 to 500 Days.

3.11 Alternatives considered and reasons for Rejection

3.11.1 No Project Option

The proposed project seeks to bear the future load in EMAAR housing society. The establishment of new grid station will provide the much-needed relief to the existing over-loaded system, while also accommodating additional load in future. The new grid station will also reduce the line losses and power breakdowns, thus also resulting in the reduction of financial loss of IESCO.

In case the proposed project is not undertaken, the IESCO system will not be able to cope with the increasing 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 Utility 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

DHA has allocated a piece of land measuring 18.5 Kanals in the Society of EMAAR for the construction of grid station and its feeding transmission line.

The project site is non-agricultural with very sparse vegetation cover. The project site protected by flood protection walls and bounded with good civil work.

3.12 Route of Transmission Line

3.13 Type of Grid Station

Generally, two types of grid station designs are available, these are:

- Gas-insulated
- Air Insulated (Conventional).

3.13.1 Gas Insulated Grid Station.

The Gas Insulated Stations (GIS) employs a very compact design, and most of equipment is fully enclosed and gas insulated. This allows the entire system to be placed indoors in considerably small space compared to the conventional design. However, the cost of this grid station is several times higher than the conventional one.

3.13.2 Air Insulated / Conventional Grid Stations:

The air insulated grid stations have open yards for transformers and their accessories, and the control panels and feeder panels are placed indoors.

In view of the fact that the cost of Gas Insulated Station is higher. Hence, the conventional grid station design is the preferred option for the proposed project.

3.14 Type of Circuit Breakers

Generally, three types of circuit breakers designs are available, these are:

- Oil-filled circuit breakers
- SF-6 circuit breakers
- Vacuum circuit breakers

Traditionally, oil-filled circuit breakers used to be installed at the 132-KV and 11-KV levels. The environmental aspects of the oil-filled circuit breakers essentially pertain to the soil and water contamination caused by the possible oil leakage.

However, now SF-6 circuit breakers are available for 132-KV and above, and vacuum circuit breakers are available for the 11-KV system. These breakers have very effective arc-quenching characteristics, compared to the old oil-type breakers. Therefore, these modern circuit breakers are the preferred option for the proposed project.

3.15 Type of Transformer Oil

Traditionally, transformer oil - meant for providing insulation and cooling of the transformer windings - used to contain poly-chlorinated biphenyls (PCB), a man-made chemical known for its excellent dielectric properties. However, this chemical was then found to be highly toxic, and more importantly, chemically very stable. Hence this chemical would not decompose or disintegrate naturally. Due to this property of PCB, it was included in a group of chemicals collectively known as persistent organic pollutants (POPs).

The manufacture and procurement of PCBs containing transformers are banned in Pakistan since 2002.

IESCO's specifications for the procurement of transformers clearly mention that the transformer oil should be PCB-free (though no tests are performed to confirm this). The equipment purchased as part of this project would be PCB-free.

3.16 Type of Transmission Line Towers

3.16.1 Single Circuit vs. Double Circuit.

For the 132-KV transmission line, there are two possible options for the type of the towers: single circuit and double circuit. The single circuit towers are designed for one circuit of the transmission line only, and there is no room for the second circuit in the future. On the other hand, using the double circuit towers provides the future expansion capacity on the same towers. The cost of the double circuit towers is slightly higher than the single circuit variants, however, in view of their expansion capacity, greater reliability, enabling transfer of more power over a particular distance, double circuit towers are the preferred ones in this project.

3.16.2 Tower vs. Tubular Pole.

The base of the transmission line towers is about $10m^2$, and finding this much space in congested urban areas may be a problem. For such applications, IESCO has been using tubular steel poles which require considerably less space. Since there is no issue of space as proposed project has a plenty of land available, therefore the conventional towers are proposed at EMAAR project site.

3.17 Current Land Use Pattern.

The proposed site for Grid Station is on a barren land with no vegetation, forest, bushes or agricultural activities currently exist. The ROW of transmission line, the team observed no human settlement, buildings, or any infrastructure or sensitive zone exist.

3.18 Vegetation Features of the Site.

The proposed project consists of two main components, the grid station and its feeding transmission line. The site for the construction of grid station situated on a piece of barren land. The type of vegetation varies along the route of transmission line. Starting from EMAAR Grid station the first tower will be installed perpendicular to the New Rawat-Sawan circuit, where there is no vegetation observed along the route of towers.

3.19 Air Pollution from Earthworks and Transport.

The material (cement, sand and aggregate) requirement of a typical 132 KV substation and a Transmission Tower are not large. In transmission line construction sand and aggregate are delivered directly to the tower location from the quarry / source, there is no intermediate or bulk storage of these materials .Similarly construction materials for the substation are stored within the substation site are scheduled as per the work progress (which is staggered as the buildings which require bulk of the construction materials are built in phases over 6 to 12 months period), which means that at any given point in time the amount of construction material stored is not significant .The quantities of construction material required for a typical substation or transmission tower are not so large that they potentially represent a traffic hazard , these requirements are time dispersed in case of sub stations and time and space dispersed in case of transmission lines. Field observations indicate that ambient air quality is generally acceptable and that emissions from traffic and other powered mechanical equipment in the area are rapidly dispersed. There will be a few items of powered mechanical equipment to be used in the construction of the distribution line works that may give rise gaseous emissions. However, these should be well dissipated. The major sources of complaint will likely be any necessary earthworks and local soil compaction.

3.20 Current Site Status.

The site is almost barren and no any major sensitive zone (infrastructure, building, nullah or plantation found. The site specific pictures are given for reference in the figure 3-7 below.

Figure 3-7: Pictorial View of GS and TL of EMMAR.

4 Description of Environment

4.1 Introduction

This Chapter describes the existing environmental and socio-economic conditions of the project area. The site of proposed 132 kV Grid Station EMAAR is located within the EMAAR, DHA-IV (Housing Society), 1.3 Kms from Islamabad Express Highway/Faisal Avenue. The site can be accessed through EMAAR road.

Islamabad, the beautiful Capital of Pakistan is located on the Northwest part of the country on Potohar plateau with a total urban area of 906.50 square kilometers lies between 33o-49' North latitudes and 72o-24' East longitudes. The area is uneven, and land is gradually rising in elevation from 500 meters above mean sea level in the plains to about 1600 meters in the nearby "Margalla Hills". Islamabad has distinct seasons marked by wide variation in temperature. The coldest month is January when the mean maximum temperature is 17.7°C and the mean minimum temperature 2.6°C. June is the hottest month with the mean maximum temperature near 40°C and the mean minimum temperature 24°C. The Project Area is in Seismic Zone 2B, where 2B (upper moderate damage zone) represents peak horizontal ground acceleration from 0.16 to 0.24g.

Islamabad holds the unique distinction of being a planned, modern city and its model has been used for designing new cities in many countries. It was conceptualized as the future capital of Pakistan in the late 1960s. Dioxides Associates, a Greek firm of Architects, drew up a triangular- shaped master plan for the new city, with its apex towards the Margalla Hills. The planners envisaged Islamabad eventfully absorbing Rawalpindi entirely and stretching across the Grand Trunk Road (presently known as the National Highway)

4.2 EMAAR Canyon Views.

EMAAR Islamabad is a housing society developing EMAAR Properties located in DHA-V, Islamabad, on Islamabad Expressway and opposite to the Institute of Space & Technology (SUPARCO). The Canyon Views is considered to be an exclusive residential community that offers all the 21st-century amenities.
The gated community is completely safe for investment. Total numbers of plots in the society are 1500 in which 1300 Residential plots and 200 commercial plots are included. The Villas and homes in the society are designed while keeping in view the modern necessities and facilities that are eco-friendly and efficient. The construction process of the infrastructure is also carried out in a manner to reduce the carbon footprint.
Due to rapid increase in urbanization, population and subsequent increase in electric demand estimated by EMAAR management is more than 22 MW, and to meet the future demand of electricity the EMAAR, Canyon-View Housing society,

DHA Islamabad decided to construct a dedicated 132KV Grid Station with the bound of EMAAR canyon view, DHA-V Sector E, Islamabad. The grid station solely supplies electricity to the existing residential and commercial consumers with the boundary of EMAAR canyon view, DHA-V, Islamabad. EMAAR housing society is 4 Kms near to the T chock and Rawat.

4.3 Quality of Life Values / Socio-Cultural Environment

Following are the details of the present socio-cultural and socio-economic conditions of the localities around the project site. These are the localities which may get direct positive or negative impacts from the construction of EMAAR Grid Station.

4.3.1 Population

Total 250 to 300 Villas are built in the society. Population of 1100 to 1200 peoples are living in the society. Mostly elite class is living over there. Most of the houses are well constructed. The average household size is 3-4.

4.3.2 Ethnic Structure

EMAAR has a diverse elite ethnic population. Major casts living in the society include Malik, Khan, Sheikh, Qureshi, Butt and Jatt .

Urdu is the language spoken and understood by all. However, some of the staff people, speak Punjabi. Mostly educated elite are living in the society understand and speak English.

4.3.3 Agriculture

Entire area has been developed for urban infrastructure hence no agriculture practices nor fields available for agri purposes.

4.3.4 Transportation

Two main Roads Expressway is 1.3kms away from the EMAAR and Grand Trunk Road is 4kms away from the EMAAR.

Regular local service available running from early hours of the morning to late in the night from the gate of EMAAR. Daily routes include Rawalpindi, Islamabad, Lahore, Gujrat, Gujranwala, Sialkot, Mandi Bahauddin, Sargodha, Chakwal, Mirpur and Faisalabad.

4.3.5 Education

The literacy rate of the society is high as the elite class is living in the society. There are number of private and public schools and universities both for boys and girls and co-education institutes as well i.e. APS DHA, Beacon House School, City school, Educators school, Roots Millenium, Allied school all available on GT road., Bahria Foundation College.

4.3.6 Public Health

Near EMAAR well known private medical Centres are available i.e., U-Health, Watim medical and Dental Hospital.

4.3.7 Drinking water supply

Drinking water is supply to the society by tankers, 2 Tankers per day. Main source of water is DHA-II. 4 tube wells are present in the DHA-II. Water is stored in the holding tank within the EMAAR Housing Society.

4.3.8 Employment

More than 90% of the population is engaged with businesses and employments. Mostly people are either serving in Government, having own businesses, working in private jobs or are employed abroad.

4.3.9 Religious and Archaeological Sites

There is no any site of archaeological and cultural significance within the two kilometres radius of the project site.

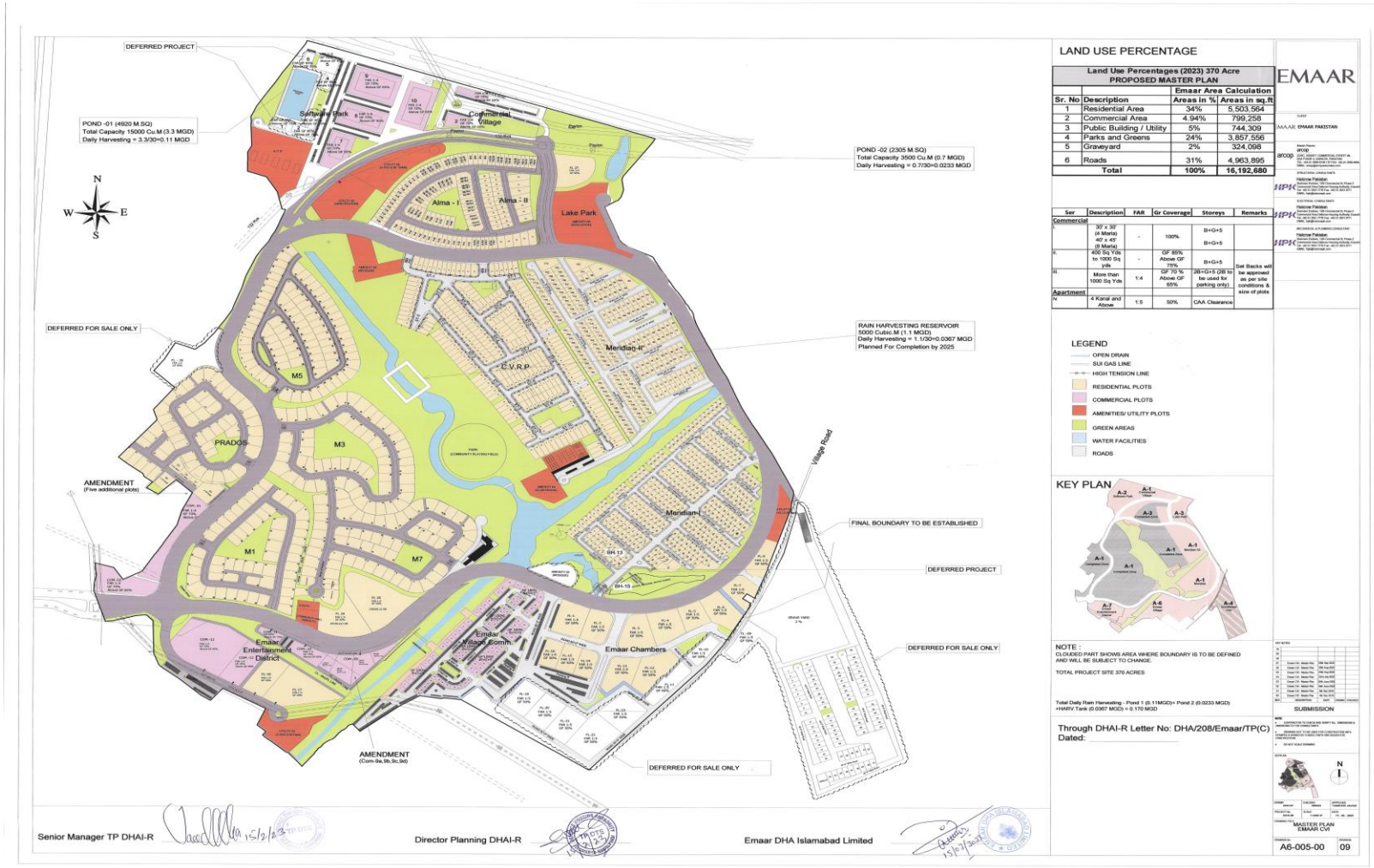

Figure 4-1: Map of Canyon Views EMAAR, DHA Phase V.

4.4 Physical Environment

4.4.1 Topography

Located in the heart of enchanting Potohar Region. The terrain surrounding this region is rolling to hilly, crisscrossed by ravines and Nullah running through Soan River. Beautifully set in an eye catching natural landscape with contoured terraces providing scenic view to residents. The natural topography has been respected to the greatest possible extent while trying to achieve a viable number of plots with an economical and well-engineered infrastructure of civic and municipal services. Elevation varies, with a maximum elevation change of 121 feet and an average elevation above sea level of 1,646 feet. Within 10 miles contains only modest variations in elevation (1,896 feet). Within 50 miles contains very significant variations in elevation (8,904 feet).

The proposed project site is located within EMAAR (Housing Society), 1.3 kms from Islamabad Express Highway/Faisal Avenue. The ground level elevation on the project site above sea level varies between 1626 ft to 1680 ft, which indicates that the project site is gently undulating.

4.4.2 Geology and Soil Texture

Geologically, DHA and Rawat are composed of tertiary sandstone, lime stones and alluvial deposits. These sand stones apparently belong to the Sirniar and Siwalik series of the sub-Himalayan system. Some of the strata yield excellent building material and are also quarried for road material. Limestone is the character of the Margalla range, and this is the main cause of fertility of villages which lies at its base. The alluvial deposits occur chiefly in the lower portion of Kahuta tehsil, in Rawalpindi tehsil, limestone crops out everywhere along with the low hills and in the plains Kankar deposits are common. The pebble ridges described as alluvial deposits in Kahuta hills are the remarkable structural features of Kahuta and Rawalpindi tehsils.

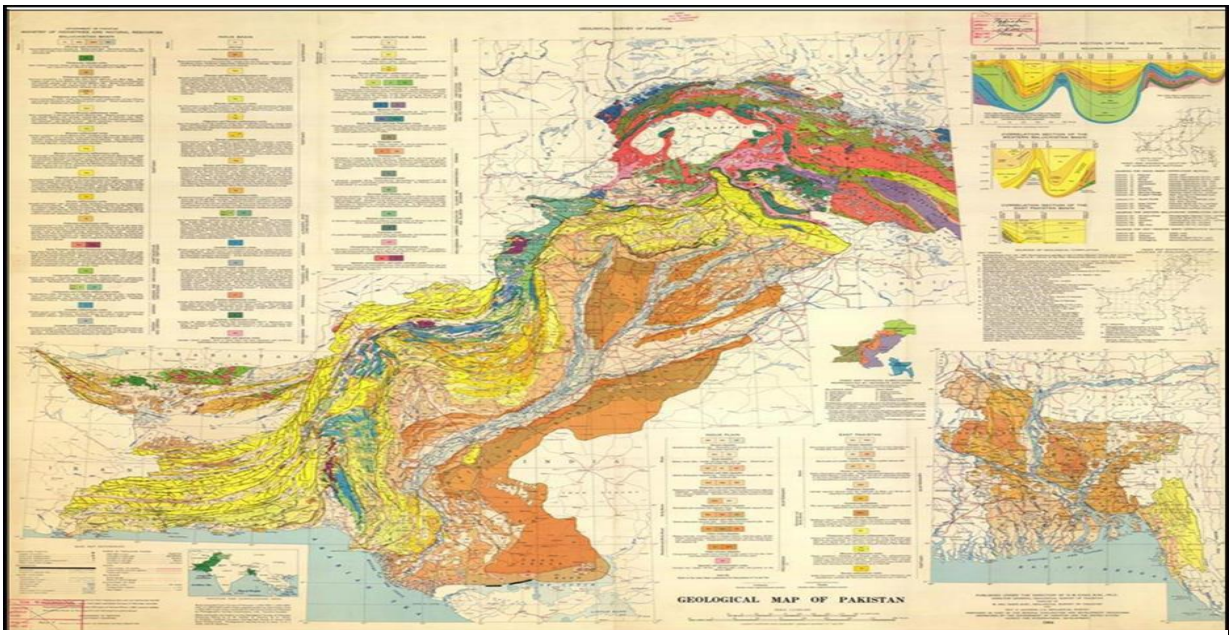

Figure 4-2: Geological Map of Pakistan

4.4.3 Seismicity.

Islamabad is on the South margin and leading edge of the Hazara fault zone. All the faults, except those South of Rawalpindi, are part of this fault zone. This zone consists of an arc of thrusted and folded rocks about 25 km wide and 150 km long that is convex to the South and extends West-South westward away from the Himalayan syntaxis. More than 20 individual thrust sheets have been identified across the 25 km wide zone, North of Islamabad, but only five major thrust lies within the area. According to Building codes for Pakistan, the project area falls in Zone 2B which corresponds to peak ground acceleration of 0.16 to 0.24g. Studies by NESPAK indicate that a realistic seismic factor for building design should be higher than that indicated on the seismic zoning map of Pakistan which is a Minor Hazard Region. Islamabad lies in a tectonically active zone, where faulting, folding and earthquake have frequently been observed in the recent geologic past. More recently, a Richter magnitude of 7.6 earthquake on 8th October 2008, 65 miles North- Northeast of Islamabad caused severe damage. Subsequently, the re-zoning of seismically active areas was carried out.

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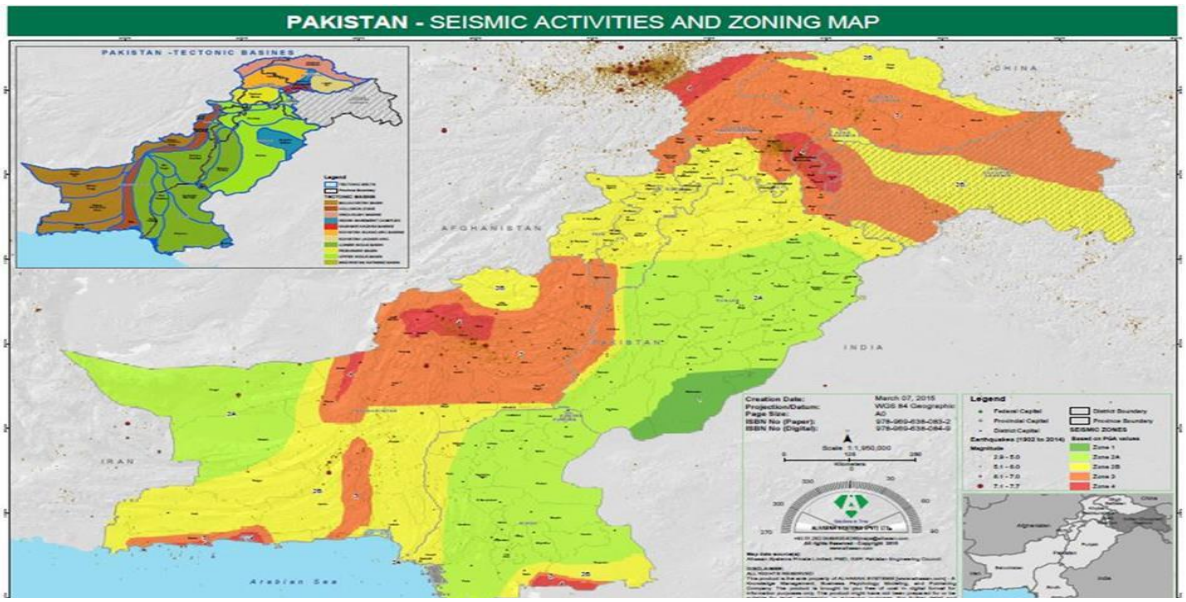

Figure 4-3. Seismic Map of Pakistan.

4.4.4 Hydrology

The important source of water in the project area is the ground water. For establishing baseline conditions, water sample were collected and analysed for microbiological and chemical parameters like Temperature, Total Dissolve solid, Electrical Conductivity, pH through EPA certified Environmental Laboratory. A seasonal nullah is following near to the proposed project. Water will be required for probable used in the foundation's construction for the Grid stations. The water will be sourced from the DHA onsite Tanker services which will be enough for construction work. In the vicinity, Ling Nullah crossing the edges of DHA 5 and 6 with the surrounding tributaries of Mohri Khumbal village, draining north westward into the Soan; Gumreh Kas, draining into the Kurang from the area between the Kurang and Soan; and Leng Nala, draining southward into the Soan from the mountain front and urban areas.

4.4.5 Ground Water

The groundwater aquifer is recharged by surface water. The sub-soil groundwater table within the immediate subproject area varies between 35-70 feet. The quality of the groundwater is such that it is suitable for domestic use. The main source of irrigation water are the tube wells and boring system.

4.4.6 Climate

Islamabad, the summers sweltering, humid, wet, and clear and the winters are 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*. The hot season lasts for 2.8 months, from May 3 to July 30, with an average daily high temperature above 93°F. The hottest day of the year is June 11, with an average high of 101°F and low of 76°F. The cool season lasts for 2.9 months, from December 3 to February 28, with an average daily high temperature below 71°F. The coldest day of the year is January 9, with an average low of 39°F and high of 63°F. A wet day is one with at least 0.04 inches of liquid or liquid-equivalent precipitation. The chance of wet days in Rawalpindi varies very significantly throughout the year. The wetter season lasts 2.5 months, from June 22 to September 8, with a greater than 30% chance of a given day being a wet day. The chance of a wet day peaks at 55% on July 26. The drier season lasts 9.5 months, from September 8 to June 22. The smallest chance of a wet day is 5% on November 7. Among wet days, we distinguish between those that experience rain alone, snow alone, or a mixture of the two. Based on this categorization, the most common form of precipitation throughout the year is rain alone, with a peak probability of 55% on July 26.

4.4.7 Ambient Air Quality.

Air quality in most of the project area appears good based on observation during the study period. Emissions should be controlled at source under the EMP. There will be a few items of powered mechanical equipment to be used in the stringing and construction of TL works that will even may not give rise to complaints of dust and other emissions because due to the abrasion and Nullas dust may not generate much. However, if there is any, these should be minor and easily dissipated. Domestic sources of air pollution, such as emissions from wood and kerosene burning stoves as well as small diesel standby generators in some households, are minor

The ambient air quality monitoring was conducted for National Environmental Quality Standards (NEQS) for Sulphur dioxide (SO_2), Oxide of Nitrogen (as NO), Oxide of Nitrogen (as NO_2), Ozone (O_3), Suspended Particulate Matter (as SPM), Respirable Particulate Matter (as PM_{10}), Respirable Particulate Matter (as $PM_{2.5}$), Lead (Pb) and Carbon Monoxide (CO) during 24 hours at the project site. The noise level monitoring was conducted during 24 hours at the project site of EMAAR Grid Station. The ambient air quality and noise monitoring was carried out by Federal EPA approved laboratory of ESPAK, Islamabad

4.4.8 Noise Levels.

Ambient noise levels were also continuously recorded at the project site for 24 hours. The sound pressure level (dB) were frequency weighted on A-curve (dB (A)) and time weighted (dB (A)) on an hourly basis.

The 24 hour monitoring period for noise with a one-hour interval is divided into two periods, i.e. daytime hours and nighttime hours. The project site is located in rural

area and there are no residential areas within 1km of the project site. The detail reports are annexed with the EIA study.

The Noise level measured at the project site was within the NEQs Limit for day time as well as night time. The test report is attached as Annex.

4.4.9 Solid Waste Generation.

EMAAR has a systematic solid waste plan of the 3Rs (Reduce, Reuse and Recycle), to incorporate in its all activities of planning, construction and operations as per the rules/guidelines for proper waste disposal. In addition, EMAAR also believes in the golden rule is – the less you cut and less to dispose-off and buy, the less there's to dispose. Solid waste will be collected from the different parts of construction site and will be stored temporarily on-site until dispose of permanently in an appropriately permitted landfill site.

4.4.10 Safe Disposal of Wastewater.

Wherever water is allowed to accumulate, in temporary drainage facilities, due to improper storm water management, or improper disposal of wastewater generated from the site, it can offer a breeding site for mosquitoes and other insects. Vectors such as mosquitoes may be encountered if open water is allowed to accumulate at the project site. Temporary and permanent drainage facilities should therefore be designed to facilitate the rapid removal of surface water from all areas and prevent the accumulation of surface water nullahs.

Hence, the main issues of concern are uncontrolled or unmanaged disposal of solid and liquid wastes into natural drains, improper disposal of storm water and black water and open defecation by construction workers. In order to maintain proper sanitation around construction sites, access to the nearby GS, septic tanks should be allowed, provision of temporary toilets should be made. Construction worker camps will not be located in settlement areas or near sensitive water resources and septic tanks for workers/labour camp with pit latrines should be provided.

4.4.11 Vibration and Blasting.

It is anticipated that powered mechanical equipment and some local labour with hand tool methods will be used to construct the subproject works. No blasting is anticipated. Powered mechanical equipment can generate significant noise and vibration. The cumulative effects from several machines can be significant. To minimize such impacts, the contractor for project should be requested by the construction supervision consultants (engineer) to provide evidence and

certification that all equipment to be used for construction is fitted with the necessary air pollution and noise dampening devices to meet NEQS requirements.

4.4.12 Local Labor/Workforce

There will be up to 50 technical and non-technical workers employed during different activities of construction phase of grid station and transmission lines. Most of the workers will be recruited from the local areas, whereas, for installation services of technical workers of contractor will be utilized. IESCO employed people will be utilized in operational phase.

4.4.13 Fuel Spills and Management

No significant impacts from oily residues such as transformer oil and lubricants are expected to arise in this subproject. However, control measures will be needed for oily residues such as transformer oil and lubricants in the case of accidental or unexpected release. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. There are facilities in some GS maintenance yards for recycling (dehydrating) oil from breakers. However, the areas upon which these recycling facilities are located have no dedicated drainage which can capture run-off. Oily residues and fuel and any contaminated soil residues should be captured at source and refuelling and maintenance should take place in dedicated areas away from surface water resources. Contaminated residues and waste oily residues should be disposed at a site agreed with the local authority.

4.4.14 Energy Requirements.

IESCO will provide the electricity during construction phase of grid station or diesel power generators will be utilized for the provision of electricity. For operation phase, electricity will be supplied by IESCO power distribution system.

4.4.15 Health Safety & Environment (HSE)

IESCO has a comprehensive Health, Safety and Environment policy as well as a protocol developed of HSE to its staff and all other parties involved in construction works of grid station and transmission line. In addition, the Occupational Safety and Health Administration (OSHA) are issuing safety and health program management guidelines for use by employers to prevent occupational injuries and illnesses. The Occupational Safety and Health representatives have noted a strong correlation between the application of sound management practices in the operation of safety and health programs and a low incidence of occupational injuries and illnesses. Where effective safety and health management is practiced, injury and illness rates are significantly less than rates at comparable worksites where safety and health management is weak or non-existent. The Occupational Safety and Health Administration (OSHA) have concluded that effective

management of worker safety and health protection is a decisive factor in reducing the extent and the severity of work-related injuries and illnesses.

4.5 Ecological Environment

4.5.1 Flora and Fauna

The area is characterized by medium rainfall, high summer and low winter temperatures and low diversity of plant species. Besides that, there exists high disturbance due to urbanization and high development rate near expressway from previous some decades that degrade the local flora of the area. Trees commonly found inside the society are Amaltas, Keekar (Acacia Arabica), Jacranda, Citrus, Olives, pine etc.

The project site has scarce vegetation in the form of shrubs with no trees at the project site as well as along the transmission line route.In its original form, the Dry Sub Tropical Semi Evergreen Scrub Forest constitutes the habitat of wild fauna consisting of a host of animals and birds.

Pine, Kai, fir and other trees like poplar, shisham, kikar, willow, walnut, ban-akhore, and mannu are found plentiful in the district. Among flowers zianna, dahlia, merrygold, cosmos, daffodil aster and rose of different kinds are found in the project area. Mostly the population of the rural areas is very much keen and eagerly devoted in plantation of fruit plants and to suffice the purpose, agriculture nurseries are affording the demand of general masses. As the disturbances increased due to urbanization of the area, maximum level with complete inhabitation, wildlife abundance and diversity decreased to a minimum degree. The faunal species found in the DHA Rawat area are:

Mammals	
Canis aureus	Asian Jackal
Rattus rattus	Rat
Felis chaus	Jungle Cat
Reptiles	
Calotes versicolor	Garden Lizard
Eschis carinatus	Saw scaled viper
Uromastix hardwicki	Spiny Tailed Lizard
Birds	
Coturnix coturnix	Quail
Centropus sinensis	Common Crow

Passer domesticus	House Sparrow

Wild life of the district is mostly confined to Margalla National Park. Various species of wildlife, include Rhesus monkeys, jackals, wild boars, porcupines, mongoose and the pangolin or scaly anteater. Leopard is less common. There are a number of species of poisonous snakes in the area, including cobras, Russell's Vipers, kraits—known in local parlance as the half-minute killer and Indian python. Birds in the park include Himalayan griffon vulture, laggar falcon, peregrine falcon, kestrel, Indian sparrow hawk, Egyptian vulture, white cheeked bulbul, yellow vented bulbul, paradise flycatcher, black partridge, cheer pheasant, Khalij pheasant, golden oriole, spotted dove, collared dove, larks, shrikes, wheatears and buntings.

4.5.2 Protected Areas / National Sanctuaries

There are several areas of land devoted to the preservation of biodiversity through the dedication of national parks and wildlife sanctuaries in Islamabad/Rawalpindi. However, there is no wetland except Sawan Nullah along the boundary of the proposed site. Similarly, there is no protected area or national Sanctuary near the area of works of the subproject.

Figure 4-4: Description Map of the EMAAR, DHA V

5 Stakeholder Consultation

The public consultation (PC) process with various stakeholders has been approached so as to involve public and other stakeholders from the earliest stages. Public consultation has taken place during the planning and design and viewpoints of the stakeholders have been taken into account and their concerns and suggestions for possible improvements have been included where appropriate. Much of the PC process to date has revolved around concerns for the mitigation of construction impacts and the possible side effects from the proximity of high voltage power lines and its equipment.

The public consultation process has commenced during EIA data acquiring in the field in order to disclose the project information to the stakeholders and record feedback regarding the proposed project and preferences. The stakeholders involved in the process were the population likely to be impacted along the route of the proposed power lines; the village leaders and school teachers.

Prior to the implementation of the consultation, feedback, etc. has been carried out to support this EIA and recorded. The focus of attention has been the population near the proposed TL that may be affected by the Subproject implementation. The level of engagement varied from the stakeholder to stakeholder with some registering no major comment but it is noted that none registered any outright opposition to the project. The construction of EMAAR Grid Station and its feeding Transmission Line in EMAAR, DHA will create both positive and negatives impacts in and around the project site that may affect the local people and other stakeholders both directly and indirectly. The EIA team has made detailed survey to find such impacts but it was necessary to involve all the stakeholders at the EIA stage.

A team of environmental & social consultants from ET organized meetings with the primary and secondary stockholders of the proposed project, including local residents, business community, civil servants and representatives of other institutions. The team visited various prominent places in the project area to meet the targeted audience. During these meetings a simple, non-technical description of the project was given, along with an overview of the project's likely environmental and socioeconomic impacts. Following the project description, a discussion was held so that the participants could voice their concerns and opinions. These concerns and suggestions were recorded in field notes and questionnaires. Participants were also asked to suggest alternatives in case of their particular concerns.

Stakeholders were divided in two categories during consultation as General Stakeholders and Administrative Stakeholders. In the first stage, meetings were arranged with the General Stakeholders at prominent locations in the surrounding areas who are engaged in various activities e.g. jobs, business, labor, households, academia and hospitals. In the second stage meetings were arranged with the Administrative Stakeholders. Project location map was shared with all

stakeholders and project description was explained in simple language. All the stakeholders were encouraged to ask questions and share their concerns related to the project.

During the stakeholder consultation process, it was conveyed that photographic evidence is necessary for reporting in EIAs, but most stakeholder representatives were reluctant to let the team take photographs or even disclose their name as a matter of authorized protocols. However, stakeholders concern regarding various aspects, existing environment, and impacts of the project were pointed out and added to this EIA report.

5.1 Objectives of Consultation

Public consultation plays a vital role in studying the effects of the project on the stakeholders and in the successful implementation and execution of the proposed projects. Public involvement is a compulsory feature of environmental impact assessment, which leads to better and more acceptable decision-making. The overall objective of the consultation with stakeholders is to verify the environmental and social issues that have been presumed to arise and to identify those which are not known or are unique to the project.

The important general objectives of the consultation process are:

- Providing key project information to the stakeholders, and to solicit their views on the project's potential or perceived impacts,
- Identification of potential problems and needs,
- To devise the way for collaborative problem solving,
- Develop and maintain communication links between the project proponents and stakeholders, providing opportunities to the public to influence the project design in a positive manner, and
- Ensure that views and concerns of the stakeholders are incorporated into the project design and implementation with the objectives of reducing or offsetting negative impacts and enhancing benefits of the proposed project.

5.2 Methodology

The consultant carried out public consultations with stakeholder of multidimensional background at various locations around the proposed Project. The stake holder's consultation during this phase of the work targeted the project area, administrative, private offices, Govt. offices, shops, stores, etc. near the Project area.

Potential stakeholders for consultation and participation were identified and initial discussions were held with the owners of the private lands falling in the ROWs,

people living in direct area of impact, EMAAR team, government and private employees, IESCO employees and local residents etc.

Appraising the targeted stakeholders initially for the purpose of consultation and working out a schedule for holding regular consultation meetings;

5.3 Stakeholders Identification

Identification of the stakeholders of the proposed project plays a crucial role in development and also assists in quantifying the role of different stakeholders involved. Impacts identified by the stakeholders are measured through matrix method and mitigation measures are proposed accordingly. Stakeholders of this project are EMAAR Pakistan and IESCO. The stakeholders contacted during the survey belonged to different categories of people as shown in the **Table 13.**

Table 13:Stakeholders of the project site

No.	Stakeholder Category
1	Local People (living in the vicinity of grid station / transmission line)
3	Government Organizations
4	Non-Governmental Organizations/ Agencies
5	Environment & Social Experts (Public and Private Institutes/Academia)

5.4 Issues Discussed

Following issues were discussed during the stakeholder consultation:

- Overall activities of the project and their possible impacts;
- Possible impacts on nearby communities, natural vegetation, flora and fauna;
- Possible mitigation measures;
- Beneficial factors and involvement opportunities of the local people in the set of activities of Project; and
- Management of traffic during construction and operational phase of the project.

5.5 Consultation Process.

There are two types of stakeholders, i.e. primary and secondary stakeholders. The primary stakeholders are the initial stakeholders, such as affected persons, general public including women resided in villages in the vicinity of the sub-project area. Accordingly, the consultations were made with all primary stakeholders for sharing the information regarding the sub-project components, i.e. construction of new grid station, spotting of towers and installation of transmission line and

community feedback regarding the project. However, the consultative meetings were also held with the secondary stakeholders including the officials/ staff involved in planning& design, and management.

Meetings with major stakeholders were organized to discuss project specific issues and its potential impacts on the local and regional environment. In these meetings, stakeholders were informed about the salient features of the project, its location, and its activities. Stakeholders consulted and their valuable suggestions and comments are described below:

Table 14:Stakeholders Opinions/Concerns/Issues/Suggestions

Name & Designation	Location	Opinions/Concerns/Issues/Suggestions
Mr. Mohammad Yasin, Addl. Director Environment and Social Safeguard Section	IESCO, Islamabad	▪ IESCO being a responsible Public Company execute its projects by taking care of environment and make the projects socially viable by complying all applicable national laws.
Mr. Sher Afzal, Addl. Deputy Director Environment and Social Safeguard Section	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.
Mr. Rajesh Kumar, Deputy Director, Technical Services Wing	IESCO, Islamabad	▪ As per customer service manual approved by NEPRA, load was sanctioned subject to installation of 132 KV Grid Station at EMAAR housing society. So it is a regulatory requirement and same was agreed by EMAAR.
Mr. Muazamm Ali	Wild Life and Agriculture Expert	▪ The forest department had no concern over carrying out this project as no trees cutting will be done on the project site.

		▪ Construction should be carried out in such a way that there is minimum disturbance to surrounding flora and fauna of the area.
Mr. Habib ullah Alizai **Project Director**	EMAAR-Pak	▪ He explained how this project is important in future as the load will be increased to 22 MW from 1300 KW. ▪ Looking forward to early completion of the project as it will also facilitate the housing society to establish more quickly.
Mr. Salman Nasir **Community Management**	EMAAR Canyon Views	▪ He pointed towards the current electricity related issues of the 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. Moqeet Ayoub **Surveyor**	EMAAR,	▪ Showed no concern over the execution of the project. ▪ The selected sites are quite distant from public and have minimal impacts on community.
Mr. AR Taimoor **Architect**	EMAAR-Pak	▪ A great initiative of IESCO to solve the current issues of the electricity and good for future as well. ▪ He was concerned about the ambience of the society as the site is inside the EMAAR so he was bit concerned about the towers as the towers will invade the serenity of the EMAAR, canyon view society.
Mr. Muhammad Bilal **Sub-engineer**	IESCO	▪ The grid station will ensure best practice use of energy resources, provides greater power supply capacity, and makes power system operations more economical and reliable.
Mr. Uzair **Engineer**	EMAAR Canyon Views	▪ Concerned about the structure of the grid station and towers of transmission line. ▪ It will be good for the growing of society.
Mr. Khalid Zubairy **Local Resident**	EMAAR, DHA	▪ Good initiative by IESCO. No issue with the initiation of project.

Mr. Hamid Umar **Local Resident**	EMAAR, DHA	▪ Good initiative by IESCO. No issue with the initiation of project.
All Local Residents	Mohri Kambal and surrounding villages	**Details given at Annexure-9**

The consultations identified some potential environmental and social impacts and perceptions of the affected communities. The male and female public consultation resulted in few responses in April 25, 2023. The community generally supports the construction of the TL. The local poor people predominantly requested for unskilled and semi-skilled jobs on priority basis with the contractors during implementation of the project. No land acquisition and resettlement is involved in this project. However, compensation will be paid to the concerned parties / owners of land under the towers and where the loss of trees/ damage to crops which is too minimal.

On the basis of the consultations so far, it appears that the project will have no insurmountable environmental and social impacts but IESCO will have to make sure that compensation and assistance amounts are assessed justly and that skilled and unskilled employment should be preferentially given to the local people/labour as far as is reasonably practicable.

5.5.1 General Consultation

The discussions were held with the communities living in the vicinity of Grid Station site as well as along the transmission line route, i-e EMAAR Housing Society DHA-V.

A summary of discussions held along with comments and suggestions are as follow:

- 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.
- The area will be benefited with upgraded system because the existing quality of the electricity will be enhanced.
- Frequent load shedding and low voltage/ voltage fluctuation problems during the whole year, especially in summers and at night times.
- People complained that utility bills of electricity are very high as compared to the consumption.
- 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.
- The grid station site should be declared as No Go Area for general public.
- 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 affects.

5.6 Concerns Regarding the Project

Based on the consultations residents of canyon vies and general public, the following major concerns/ feedback were documented.

- 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.

- Vegetation clearance for installation of towers and transmission line conductor should be minimum at the best possible extent.

Exhibit 5.1: Stakeholder Consultation in EMAAR office

Exhibit 5.2: Stakeholder consultation with EMAAR team

Exhibit 5.3: Public Consultation at Project site

Exhibit 5.4: Public Consultation at EMAAR (T-off point of feeding T/L)

6 Screening of Impacts and Mitigation Measures.

6.1 Introduction.

The location and scale of the works are very important in predicting the environmental impacts. Therefore, it is essential that a proper analysis is carried out during the subproject planning period. This process of impact prediction is the core of the EIA process and it is critical that the recommendations and mitigation measures are carried out according to, and with reference to the conditions on the ground in the affected areas in the spirit of the environmental examination process (Figures 3.1 shows the Site & route of the proposed project). In this chapter the potential environmental impacts are reviewed. Where impacts are significant enough to exceed accepted environmental standards, mitigation is proposed in order to reduce residual impact to acceptable levels. In this regard, the impact prediction plays a vital role as these predictions are used for developing mitigation measures and any alternative options, if appropriate. When the detailed designs are completed the impacts and mitigation measures will need to be further reviewed to take account of how the contracts are set up and in the light of any fine tuning of the subproject proposals. The below sections cover;

a. screening of the potential environmental and social impacts of the proposed project to assess the significance of the potential impacts of the project on the physical, biological and social environment of the project area, and

b. Propose mitigation measures to minimize if not eliminating the potentially adverse impacts.

c. Assessment of impacts depends on the nature and magnitude of the activity being undertaken and also on the type of pollution control measures that are envisaged as a part of the project proposal.

6.2 Impacts Assessment Process.

This section provides the environmental impacts assessment process that was employed during the present EIA study. Work on the tower sites could cause some generation of air borne dust, but any nuisance from this is likely to be very localized and temporary. Other project activities, e.g. movement of heavy vehicles on unpaved tracks during the works, could generate considerable dust. Water is available in the study area, although surplus water may not always be available to suppress dust at vulnerable locations in the dry season. Therefore as a general approach it is recommended that where works are within 15m of any residential sensitive receivers, the contractor should install segregation between the works and the edge of the sensitive receivers. The segregation should be easily erectable 2.5m high tarpaulin sheet and designed to retain dust and provide a temporary visual barrier to the works. Where dust is the major consideration the barrier can take the form of tarpaulins strung between

two poles mounted on a concrete base. These can be moved along from tower base to tower base as the work proceeds. Based on these facts, this EIA study, identifies the potential impacts that are likely to arise during design, construction and operational phases of proposed project were identified.

The potential impacts thus predicted were characterized as follows:

- High negative (adverse) impact,
- Low negative impact,
- Insignificant impact,
- No impact.
- Low positive impact, and
- High positive (beneficial) impact.

6.2.1 Impact Characterization.

Once the potentially adverse impacts were identified as discussed above, these impacts were characterized. Various aspects of the impact characterization included:

- Nature (direct/indirect)
- Duration of impact (short term, medium term, long term)
- Geographical extent (local, regional)
- Timing (project phase: before, during and after construction)
- Reversibility of impact (reversible/irreversible)
- Likelihood of the impact (certain, likely, unlikely, rare)
- Impact consequence severity (severe, moderate, mild)
- Significance of impact (high, medium, low).

6.2.2 Identification of Mitigation Measures.

Subsequent to the impact characterization, appropriate mitigation measures were identified, in order to minimize if not completely eliminate the adverse impacts associated with project activities. Finally, the residual impacts were identified. The negative impacts predicted in this manner were the 'unmitigated' impacts.

Appropriate mitigation measures were recommended as part of this EIA, thus reducing the likelihood of occurrence and severity of the potentially adverse impacts. The negative impacts identified through this process are discussed below.

6.3 Design Phase Potential Impacts.

The decisions made at the design phase of any project can be quite far reaching. For the proposed project, the aspects which can be significant with respect to the environmental impacts include:

- Site selection for grid stations
- Route selection for transmission lines
- Type of equipment.

The design phase activities can potentially cause the following environmental impacts:

- Electromagnetic Field near Transmission Line may cause effects on human health.
- Land use change
- Soil and water contamination
- Loss of floral and faunal resources

These concerns and the measures to avoid/minimize them are discussed below.

6.3.1 Effects of Electromagnetic Field (EMF) near Transmission Line

A magnetic field is created when electric current flows through any device including the electric wiring in a home. Every day we are exposed to many sources of EMF from vacuum cleaners, microwaves, computers, and fluorescent lights. Electric and magnetic fields do induce voltage and currents in the human body but even directly beneath a high voltage transmission line, the induced currents are too small compared to the threshold for producing electrical effects in the human body.

The World Health Organization (WHO) has also concluded that the evidence from scientific research does not confirm the existence of any health consequences from exposure to low level of EMF. Every day human body is exposed to various sources of EMF and the induced levels of currents are too small to produce health effects.

The research to date has uncovered only weak and inconsistent associations between exposures and human health. To date the research has not been able to establish a cause-and-effect relationship between exposure to magnetic fields and human disease, nor a plausible biological mechanism by which exposure to EMF could cause disease. The magnetic fields produced by electricity do not have the energy necessary to break chemical bonds and cause DNA mutations.

Magnetic fields can be measured with a gauss meter. The magnitude of the magnetic field is related to current flow and line voltage. A 345-kV line will have a higher magnetic field than a 69-kV line. Furthermore, the magnetic fields quickly dissipate with distance from the transmission line.

The strength of both electric and magnetic fields is a function of the voltage, distance from the conductors to the ground and the lateral distance from the line to the receptor. However, the EMF decrease very rapidly with distance from source and there should be no potential health risks for people living outside the 30 m (98 ft.) wide way leave corridor.

A common method to reduce EMF is to bring the lines closer together. This causes the fields created by each of the three conductors to interfere with each other and produce a reduced total magnetic field. Magnetic fields generated by double-circuit lines are less than those generated by single-circuit lines because the magnetic fields interact and produce a lower total magnetic field. In addition, double circuit Towers/poles are often taller resulting in less of a magnetic field at ground level. The proposed 1.65 km feeding transmission line originates from proposed EMAAR Grid Station and will connect to existing New Rawat-Sawan Transmission Line within the bound of EMAAR Canyon view. Electric and magnetic fields are produced by any wiring or equipment carrying electric current. This includes overhead and underground power lines carrying electricity, wiring in buildings, and electrical appliances. The strengths of the fields decrease rapidly with increasing distance from the source. Electric and magnetic fields are fundamentally different, in their physical nature and in the way they interact with the body, from true electromagnetic radiation such as radio waves and microwaves. Typical magnetic field levels found in various locations are presented in table.

Table 15: Typical Magnetic Fields in Various Locations

S/no	Source	Electric Field (kV/m)	Magnetic Field	
			μT	mG
1	High Voltage Transmission line (Direct beneath line)	0.3–3	0.5–5	5-50
2	High Voltage Transmission line line (40 metres from line)	0.01–0.1	0.1–1	1-10
3	Near street distribution lines	0.01–0.1	0.05–2	0.5-20

4	Substations Electric fields: generally, less than 0.1 kV/m	Generally, less than 0.1 kV/m (Where overhead supply lines enter or leave the station.)	Generally, decrease to around 0.1 Within 5 metres of equipment except near where supply lines enter or leave the station.	Generally, decrease to around 1 Within 5 metres of equipment except near where supply lines enter or leave the station.

Source: IESCO.

6.3.1.1 Mitigation Measures

No part of the feeding transmission line passes through any residential area and the transmission line will consist of 09 towers which are taller resulting less of a magnetic field at ground level. The height of towers is more than 70 ft.

6.3.2 Change of Land use

The proposed grid station site is on a barren land. While the route for the 1.65 km transmission line has been selected, keeping in view the current land of the areas through which it will pass has no trees or buildings. The land space under transmission line towers usually remains un-occupied and barren.

6.3.2.1 Mitigation Measures

The negative environmental impacts related to the land use change could be effectively minimized by making provisions for plantation of trees and landscaping of the surrounding areas.

6.3.3 Loss of Trees

The project site of the grid station has no trees except few self-grown shrubs.. Though there is no major cutting of trees observed for construction of this project but still, a tree plantation plan is proposed, which will be implemented towards the end of the construction phase. No trees are to be cut along the transmission line.

6.3.3.1 Mitigation Measures

The grid station and transmission line route doesn't involve in cutting of trees. However, the EMAAR and IESCO both are vigilant to avoid any tree or vegetation clearance along the route. The EMAAR has its own plantation plan to make the society clean and green.

6.3.4 Soil Erosion and Degradation

The slope un-stability, steep slopes, poor site selection and soil contamination, Land erosion may lead to loss of soil fertility and loss of biodiversity, eroded material causes the siltation of the water bodies etc. However, for EMAAR grid station there isn't steep slope or any unstable land may be damaged as the area is completely urbanized and ardent for societies.

6.3.4.1 Mitigation Measures

The soil erosion and degradation impact can be minimized by adopting Standard Operational Procedures (SOP's) of IESCO.

6.4 Construction Phase Potential Impacts

The construction of EMAAR Grid Station is the most significant part with respect to environmental considerations, since most of the impacts are likely to take place during construction. The construction activities can potentially cause the following environmental impacts:

6.4.1 Physical Environment

i. Soil erosion, degradation, contamination soil mixing and compaction
ii. Air quality deterioration
iii. Water contamination and consumption

6.4.2 Biological Environment

iv. Damage to the natural vegetation of the area
v. Damage to the wildlife of the area.
vi. Loss of biodiversity from the specific area.

These impacts and their respective mitigation measures are discussed below.

6.4.3 Soil Erosion, Degradation and Contamination.

Soil erosion is likely to take place in the slopy areas due to land clearing for grid stations and transmission line towers; the subsequent construction activities; and the vehicular traffic on unpaved roads. Since the site for the new grid station is located in plain area, the possibility of soil erosion is minimized. In addition, cconstruction activities and vehicle operation in such areas can potentially cause soil erosion and landslides. Land erosion may lead to loss of soil fertility and loss of biodiversity and eroded materials causes the siltation of water bodies etc. In addition, soil may be contaminated as a result of fuel/oils/chemicals spillage and leakage, and inappropriate waste (solid as well as liquid) disposal.

6.4.3.1 Mitigation Measures.

The following mitigation measures can be applicable to minimize the impact of the project on the topography during the construction phase.

- Cut and fill at the proposed grid station site will be carefully designed, and ideally should balance. The extracted soil/material will be used to fill and level the grid area towards the nullah.

- Ditches or burrow pits that cannot be fully rehabilitated will be landscaped to minimize erosion and to avoid creating hazards for people.
- Embankments and excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken per the design (e.g. stone pitching).
- Vehicular traffic on unpaved roads will be avoided as far as possible. Operation of vehicles and machinery close to the water bodies will be minimized.
- Appropriate measures will be taken to avoid soil erosion during the excavation of transmission line tower foundations, particularly in areas where electricity poles are near Nullah and where the route passes through agricultural land.
- After the completion of pole foundation stone pitching around the foundation will be carried out, where required, to avoid any subsequent soil erosion.
- The construction work will not be undertaken during the rainy season.
- After the completion of the construction works, the transmission line route, and other construction sites will be completely restored. No debris, surplus construction material or any garbage should be left behind.
- Photographic record will be maintained for pre-project, during-construction and post-construction condition of the site (grid station and transmission line).
- Vehicles and equipment will not be repaired in the field. Similarly, for the domestic sewage from the construction workers, appropriate treatment and disposal system, such as septic tank with soakage pit, will be constructed having adequate capacity.
- Waste oils will be collected in drums and sold to the recycling contractor.
- The inert recyclable waste from the site (such as cardboard, drums, broken/used parts, etc.) will be sold to recycling contractor.
- The hazardous waste will be kept separate and handled according to the nature of the waste.

6.4.4 Air Quality Deterioration

Construction machinery and project vehicles will release exhaust emissions, containing carbon monoxide (CO), sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM). These emissions can deteriorate the ambient air quality in the immediate vicinity of the project site. Furthermore, construction activities such as excavation, levelling, filling and vehicular movement on unpaved tracks may also cause fugitive dust emissions. Noxious vapors from oils, glues, thinners, paints, treated woods, plastics, cleaners and

other hazardous chemicals that are widely used on construction sites, also contribute to air pollution.

6.4.4.1 Mitigation Measures

The following mitigation measures will minimize the emissions and their impacts:

- Air quality analysis of the site has been conducted well before mobilization of the construction crew, to establish baseline data of the ambient air quality.
- Construction machinery, generators and vehicles will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions.
- There will be no unnecessary mobility of the project vehicles and if unavoidable, speed will be reduced to 15 km/h to avoid excessive dust emissions.

6.4.5 Noise Pollution and Vibration.

Noise is perceived as one of the most undesirable consequences of construction activity. Though the level of discomfort caused by noise is subjective, the most commonly reported impacts of increased noise levels are interference in oral communication and disturbance in sleep, headache, fatigue etc. Due to the various construction activities, there will be short-term noise impacts in the immediate vicinity of the project site and also on workers. The construction activities include:

Since the project site include mostly open areas, the impact of noise pollution is perceived to be minimum. The unmitigated impacts related to noise pollution are characterized below.

6.4.5.1 Mitigation Measures

Noise abatement measures will be implemented to achieve 55 dB(A) to 65 dB(A) during Day and night times respectively national and international guidelines for communities. The construction machinery and trucks used in the project needs to be properly tuned and serviced to avoid undue noise hazards.

- Providing the construction workers with suitable hearing protection like earmuffs and training them in their use.
- Heavy machinery like percussion hammers and drills will not be used during night without prior approval of the client.
- Contractor will comply with submitted work schedule. Keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures.

- Low vibration level machinery will be used, and a system of regular maintenance and repairs needs to be employed.

6.4.6 Surface Water and Groundwater Contamination

The project activities that can contaminate soil may also contaminate the surface water and groundwater. These include:

- Disposal of construction waste, or Waste effluents disposal,
- Equipment/vehicle maintenance together with Spillage/leakage of fuels, oils and chemicals.

In addition, vehicles and construction machinery operation near water bodies can potentially contaminate the surface water. There is a manual hand pump installed at the project site, which is the only source of water available as of now. The only surface water body near the project site is the seasonal drainage nullah.

6.4.6.1 Mitigation Measures

The mitigation measures recommended to avoid any soil contamination will also prevent water surface and groundwater contamination. The groundwater quality analysis of the grid station site was conducted to establish baseline conditions of the water quality.

6.4.7 Water Availability & Consumption.

Water consumption during the construction phase (workers and construction activities) can reduce the water availability, particularly in water-scarce areas. Heavy vehicles and machinery movement near groundwater wells can potentially damage them.

6.4.7.1 Mitigation Measures

Sustainable planning given in the environmental management plan to conserve water at the construction site. DHA will provide water with least affects to the local communities.

Wastewater recycling will be carried out for water sprinkling and gardening purposes.

- Extreme care will be taken when working close to wells and water courses; crossing of heavy machinery and vehicles will be allowed only if this is safe.

phase. The significance of this impact is expected to be from low to medium.

6.4.8 Loss of Natural Vegetation

The site selected/identified for the grid station has no vegetation cover except for a few shrubs and seasonal vegetation. Moreover, the transmission line

passes through scarce vegetation areas and no trees will be cut down along the transmission line. These include:

6.4.8.1 Mitigation Measures

The following mitigation measures will minimize negative impacts on the floral resource of the area:

- Clearing of natural vegetation will be minimized as far as possible during the transmission line works.
- It will be ensured to reach the transmission line poles location without developing any new tracks. The existing tracks within the housing society will be used to transport equipment, material and personnel, and vehicles will not be operated off-track in this area.
- Tree plantation plan has been discussed in Chapter 7 which will be implemented at EMAAR Grid Station. Indigenous tree species will be selected for plantation.

6.4.9 Damage to Wildlife

The possible impacts of the proposed project on the wildlife resources are mostly associated with the damage to the natural vegetation. The proposed project activities may have adverse effects on the wildlife especially along the drainage Nullah, having some wildlife species still surviving despite severe pressures from increasing human habitation, deforestation and solid waste disposal. Damage to the vegetation and other construction activities can potentially cause disturbance to the wildlife of the area, causing them to leave the area or move other areas.

6.4.9.1 Mitigation Measures

- Vehicle movement will be limited to the existing tracks in the above area.
- The measures to prevent soil and water contamination will forestall any adverse impact on the faunal resources of the area.
- Garbage will not be left in the open places.
- The project staff will not be allowed to indulge in any hunting or trapping activities.

6.4.10 Pressure on Local resources / Infrastructure

During the construction stage, demand for basic amenities such as water and power for the construction labor along with the requirement of construction activities will put pressure on the existing recourses and infrastructure. Considering the nature and the magnitude of the project, impact shall be short term and low magnitude and are limited to construction phase only.

6.4.10.1 Mitigation Measures.

EMAAR with close coordination of IESCO will engage skilled and unskilled personnel during construction activities (where required and possible) from the local communities of each project site to reduce the pressure on local infrastructure.

6.4.11 Construction and Waste.

Improper stacking and disposal of construction waste is likely to adversely affect the aesthetic value of the project area. The severity of such impact will depend upon the magnitude and type of construction waste and can be minimized by exercising proper waste disposal mechanisms. During the grid station and transmission lines construction / erection phase this impact is very likely.

6.4.11.1 Mitigation Measures

- Stacking of construction materials will be confined to the project site only and suitable enclosure will be provided, hence no impacts on surrounding areas are envisaged.
- To avoid waste, reduce, reuse and recycle policy shall be adopted.
- Construction waste material dumping at proper site. Contractor(s) must remove all construction waste and dispose that properly.
- Re-plantation and landscaping of disposal sites consistent with acceptable aesthetic values for the surrounding landscape.

6.4.12 Public Health and Safety

During construction activities, the public health is of major concern. At the project sites, the working staff and residents of EMAAR Canyon View may encounter physical injuries, noise impacts and exposure to dust and chemicals, improper waste disposal, improper hygiene and sanitation. This impact will be of concern at the project site.

6.4.12.1 Mitigation Measures

The mitigation measures during the construction phase will include:

- The contractors should provide proper occupation health and safety training before starting the construction activities.
- Provision of first aid box at all the project and provision of first aid training to specified work staff to counter emergency situations.
- Contractor(s) shall inform IESCO about safety measures taken by them including firefighting equipment's placed, safe storage of hazardous material, availability of first aid, security fencing and contingency measures in case of accidents.

- Work safety measures and good workmanship practices are to be followed by the contractor to ensure on health risks for labors.
- IESCO shall ensure that each labor has provided proper PPEs to the workers and that the PPEs are properly utilized during the work.
- Protection devices will be provided to the workers operating in the vicinity of high noise generating machines.
- Provision of adequate sanitation, washing, cooking, and dormitory facilities to workers.
- Provisions of protective clothing for laborers handling hazardous material e.g. hard hats, adequate footwear for bituminous pavement works etc and follow the IESCO safety code.
- Timely public notification on planned construction work.
- Removing hazardous conditions on construction site that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, or locked storage of hazardous materials.
- To prevent communicable diseases, the contractor's staff will be restricted from un-necessary mobility in the communities. IESCO shall also arrange awareness regarding the communicable diseases.
- Initiatives to involve a combination of behavioral and environmental modifications in the workers to address social and environmental aspects that can potentially have impact on the local communities.

6.4.13 Traffic Issues.

During construction phase of the proposed project, there will be movement of light and heavy vehicles to the proposed grid station and transmission line route.

6.4.13.1 Mitigation Measure

Some best available mitigation measures are provided in the following bullets.

- Coordinated planning of traffic diversions in accordance with the construction program with advance warning to the affected residents and road users will be ensured.

6.5 Operational Phase Impacts

The O&M activities of the electricity network are environmentally begin by nature, and result in very few impacts, which may be;.

- Contamination of soil and water as a result of inappropriate waste disposal at the grid stations (domestic solid waste, sewage, repair and maintenance waste, waste oils and chemicals, etc.)
- Damage to natural vegetation and wildlife during the transmission line patrolling and maintenance activities.

6.5.1 Soil and Water Contamination.

The O&M activities of the grid station generate several types of wastes, which can cause soil and water contamination. These are listed below.

- Domestic solid waste from the grid station.
- Sewage from the grid station.
- Wastes from the repair and maintenance activities (discarded equipment and parts, packing materials, used oils and chemicals, cotton rags and the likes).

In addition, leakage and spillage of transformer oil can contaminate soil, surface water and eventually, groundwater.

6.5.1.1 Mitigation Measures.

The following mitigation measures will greatly minimize, if not prevent, the impacts of the proposed project's O&M activities on the soil and water resources of the area:

- The grid station will have appropriate solid waste collection and disposal arrangement. The domestic solid waste will be brought to a collection point and will be disposed of at designated disposal site by the IESCO/EMAAR.
- The grid stations will have appropriate sewage handling system. The grid stations sewage collection system will be connected to the Primary Treatment Plant which is under planning phase to be completed soon, if available. Otherwise, grid stations will have their own septic tanks and soakage pits.
- Waste oils and chemicals will be disposed in accordance with their respective Material Safety Data Sheet (MSDS). MSDS will be made available at the grid stations and maintenance workshops.
- Non-toxic recyclable waste (such as cardboard) will be given away for recycling.
- Toxic waste will be stored separately; such areas will be marked and incinerated at an appropriate double chamber incinerator.
- Grid stations will have channels and drainage pits to collect any leaked oil from the transformers in the grid stations. This oil will be sent back to the workshop for recycling.

6.5.2 Impacts on Biological Resources

The grid station O&M activities will not have any interaction with the biological resources of the project area. However, the transmission line maintenance activities, particularly along the drainage Nullah, agricultural land and forest area, can potentially damage natural vegetation and habitat. The potential impacts of the O&M activities on the wildlife resources of the area are essentially of two types: damage to the habitat as a result of loss of vegetation; and direct disturbance/threat to the wildlife species as a result of human presence, equipment/vehicle operation and noise.

6.5.2.1 Mitigation Measures.

The following mitigation measures will greatly minimize, if not prevent, the impacts of the proposed project's O&M activities on the biological resources of the area:

- IESCO will use special towers and pass the conductor above the trees, although there isn't any tall tree exist in the route of transmission lines to EMAAR. This will prevent the electrocution hazard for the people passing by; and wildlife, while also avoids any forest fires that can be caused by the sparking between the live transmission line and tree branches.
- The nighttime maintenance works will be avoided as far as possible.

6.5.3 Maintenance of Plantation.

EMAAR Housing society has its own plantation plan and hundreds of trees have been planted so far in and around the society. This plantation plan includes the local species of Neem, Sheesham, Kahu, Orange, Guava, Lemon, Beri and other local fruit bearing trees have already planted. However, a detail plantation plan for the land proposed for the grid station will also be developed to develop aesthetic values of the surroundings. It is properly ensured that there isn't any tree cutting neither along the transmission line nor at the site of grid station.

6.5.4 Employment

The operation of the proposed project will accelerate the business activity in the project area and will provide employment to locals that will have positive impact on the local economy thereby improving the quality of life in the project area.

6.6 Socio-Economic Impacts Assessment

Screening of the socioeconomic impacts of the proposed project was carried out during the EIA, using the framework and the social screening checklist provided by EMAAR/IESCO in TORs**.** Much like the environmental concerns, the socioeconomic impacts were also characterized using the same method.

6.6.1 Construction Phase Impacts

The key socioeconomic concerns of the construction phase as identified with the help of the screening process are as follows:

- Land acquisition for transmission line route
- Damage to infrastructure
- Blocked access
- Noise and vibration
- Safety hazard
- Public health
- Gender issues
- Impacts on archeological, cultural, historical or religious significance.

6.6.2 Land Acquisition

DHA has allotted a piece of land measuring 18.5 Kanals for construction of the Grid Station within the boundaries of EMAAR Canyon Views, and fixed corridor for 132 KV Feeding Transmission Line. The EMAAR has obtained possession of the land.

6.6.2.1 Mitigation Measures

The following mitigation measures are proposed to avoid potential losses due to land acquisition:

- EMAAR has already obtained formal allotment letter from Defense Housing Authority and placed at Annexure at the end of this report.
- Operation of project vehicles and construction machinery outside the RoW will be avoided. Damage to flora will be compensated by implementation of the plantation plan.

6.6.3 Damage to Infrastructure

The construction of grid station and laying of transmission lines do not require removal of any existing infrastructure, tree or crossing any building nor passing through a sensitive zone. Based on the facts the potential impacts related to the damaged infrastructure are characterized as very 'low' in the case of EMAAR Grid and transmission lines.

Mitigation Measures

There will be negligible level of impacts. The social monitoring will ensure compliance to the mitigation measures and their adequacy.

6.6.4 Noise and Vibration

The construction activities and project vehicle movement at the project site can cause noise and vibration. The grid station site and all the transmission line tower locations are away from the communities, hence issues related to noise and vibration are not expected to arise.

6.6.4.1 Mitigation Measures

- Vehicle speeds will be kept low, and horns will not be used together with vehicles will have exhaust silencers to minimize noise generation.
- Movement of all project vehicles and personnel will be restricted to within work areas, to avoid noise disturbance.
- Working hours for construction activities will be limited to between 8 am and 6 pm.
- Grievance redressal mechanism will be put in place to address the community complaints.

6.6.5 Safety Hazards.

The construction activities will involve operation of heavy construction machinery, vehicular traffic, excavation and filling operations. These activities may pose some safety hazards to the people passing by and living in the immediate vicinity. The fuel storage at the project site may also pose safety hazards for the surrounding population. During the testing and commissioning of the grid station and transmission line, the people living nearby will be exposed to the electrocution risk.

6.6.5.1 Mitigation Measures

- The construction site will have protective fencing to avoid any unauthorized entry and the project drivers will be trained for defensive driving skills.
- Vehicular speeds within the project area will be kept low to minimize safety hazards together with safety precautions to transport, handle and store hazardous substances, such as fuel.
- Liaison with the EMAAR and IESCO will be developed before commencing the testing commissioning of the system. Protective fencing will be used where appropriate/possible.

6.6.6 Public Health Issues

The public health concerns to be addressed during the design phase of the proposed project at all of the project site, particularly the grid station.

6.6.6.1 Mitigation Measures

The following mitigation measures will minimize the public health concerns during the construction phase of the project:

- The construction crew will be provided awareness for the transmissible diseases (such as HIV/AIDS, hepatitis B and C).

6.6.7 Gender Issues.

The project works to be carried out within or near the communities may cause disturbance to the women and children. Similarly, the vehicular traffic may also cause some hindrance to women mobility. In particular, these issues can potentially arise at the locations near by the grid station.

6.6.7.1 Mitigation Measures.

The nearest community living to proposed EMAAR Grid Station is almost 500m away, however during labor work or hiring local labor may create some sort of gender issues between the locals. In addition to this preventive measure some other steps may be;

- Strict code of conduct will be maintained by the construction crew. Local norms will be respected.
- Monitoring will ensure compliance to the above mitigation measures and their adequacy, as well as significance of the residual impacts.

6.6.8 Child Labor

Although the use of child labor is not prevalent in the construction works such as those involved in the proposed project, however, the provisions of the Child Labor Act will still be made part of the construction contracts, in order to ensure that no child labor is employed at the project site.

6.6.9 Historical, Cultural, Archaeological Sites.

As the location of grid station is within privately owned EMAAR Housing Society, hence no sites of Historical, Cultural, Archaeological or Religious significance are known to exist at or in the immediate vicinity of the project site.

6.6.9.1 Mitigation Measures

- As there is not any sensitive zone exist thus this impact is already mitigated by site visits and ownership of private society.

6.6.10 Operational Phase

Much like the environmental issues associated with the O&M activities; there are very few socioeconomic concerns which are expected during the operational phase of the proposed project. These concerns are listed below.

- Safety hazards
- Public health
- Loss of agriculture.

6.6.11 Safety Hazard.

The grid station, transmission line will pose electrocution risk to the IESCO staff as well as the people living in the EMAAR Society and close to the grid station and transmission line route.

6.6.11.1 Mitigation Measures.

Design aspects of this issue have been discussed earlier, which will forestall major causes of electrocution. Additional measures are provided below.

- IESCO's O&M staff will be provided with essential protective gears and equipment.
- IESCO's O&M staff will be provided safety training. Refresher courses will be arranged on regular basis.
- Firefighting equipment will be made available at the grid stations.
- The Emergency Response Plan (ERP) will be made available for the grid station. Its salient points will be displayed at prominent places within the grid station. The O&M staff will be given training on the ERP. The Environmental and Social Safeguard (E&S) Section of IESCO will review the ERP with respect to the environmental and social considerations, and recommend changes if needed. The ERP will include procedure to inform the nearby communities in case of fire in the grid station.
- Appropriate signage on safety precautions will be installed at the key locations.
- IESCO SOPs will be followed and work will be carried out in line with IESCO Safety Code.
- The trees under the transmission lines will be regularly trimmed in order to maintain 7 m clearance.

6.6.12 Public Health Issues

There are the following three distinct types of public health concerns associated with the operation of the proposed project:

- Inappropriate solid waste and sewage disposal from grid station.
- Electromagnetic (EM) radiation caused by the high-tension transmission line.

6.6.12.1 Mitigation Measures

- The concerns associated with the waste disposal and transformer oil leakage and their mitigation measures have been adequately discussed and addressed in above few sections. All these measures need to be adopted to avoid public health issues.
- Studies have shown that there is a weak evidence of health risk associated with the exposure to power frequency fields. However, since the proposed transmission line route has been selected to ensure maximum clearance

from nearby settlements, there will not be any significant risk of EM radiation exposure.

With the help of the above mitigation measures, the concerns associated with the loss of agriculture will be reasonably addressed and there will be negligible residual impacts.

The Environmental baseline and biological environment of the project area was evaluated by both primary and secondary means. Surveys were conducted in June 2023. Sampling locations for the identification of floral and faunal assemblages were carefully selected so that the maximum number of species could be observed and significant ecological baseline was generated for the project area.

The project site is located in completely urbanized setup while on the other hand harsh environmental conditions and overgrazing activities does not allow floral species to flourish. Moreover, the species observed are of less ecological importance. No cutting of trees or clearance of vegetation is envisaged at any location of the project. However, in case of cutting of trees, one plant should be replaced by 1:3 for immature plants and 1:6 for mature plants. Project activities will be started by low intensity jobs, which will serve as early warning system for reptiles and mammals of the project area.

7 Environmental Management and Monitoring Plan (EMMP).

This Chapter presents the implementation mechanism for the environmental and social mitigation measures identified during the present EIA study. This Environmental Management & Monitoring Plan (EMMP) is a framework for the implementation and execution of mitigation measures and alternatives. It covers all phases of the project, right from pre-construction to the operation and maintenance phases of the grid station and transmission line. The plan outlines mitigation measures that will be undertaken to ensure compliance with environmental laws and regulations and to eliminate or reduce adverse impacts. The EMMP reflects the commitment of the proponent EMAAR Pakistan and the implementer (IESCO) to safeguard the environment as well as the surrounding population during the execution of proposed project.

7.1 Purpose and Objectives of EMMP

This EMMP provides the delivery mechanism to address the adverse environmental as well as social impacts of the proposed project during its execution, to enhance project benefits, and to introduce standards of good practice to be adopted for all project works.

The primary objectives of the EMMP are to:

- To ensure that mitigation measures are implemented;
- To establish systems and procedures for this purpose;
- To monitor the effectiveness of mitigation measures;
- To ensure compliance with environmental laws and regulations;
- To take any necessary action when unforeseen impacts occur;
- To facilitate the implementation of the earlier identified mitigation measures,
- To develop a proper monitoring mechanism and identify requisite monitoring parameters to confirm effectiveness of the proposed mitigation measures,
- To ensure the complete implementation of all mitigation measures and ensure the effectiveness of the mitigation measures.
- To define the responsibilities of the project proponent (EMAAR) and the implementer IESCO, Project engineers and contractors, and provide a means of effectively communicating environmental issues among them, and to;
- Identify environmental as well as social training requirements at various levels.

7.2 Management Approach

IESCO has established a Project Management Unit (PMU) with Environmental and Social Safeguard (E&S) section within its Organization, as its part to handle the environmental and socio-economic matters during the proposed project, other future projects as well as its routine operations. The E&S will provide advisory services to the project and other IESCO departments/division/directorate. Currently, the E&S has one Additional Dy. Director Environment and one Additional Dy. Director Social Impact under the supervision of Additional Director, Environmental and Social Safeguard (E&S). The strength can be increased in future as required.

7.2.1 Pre-Construction Phase

7.2.1.1 Approvals

The EMAAR Pakistan will obtain all the relevant clearances and necessary approvals required by the Government of Pakistan prior to commencing the project activities, including obtaining No Objection Certificate (NOC) from the Federal-EPA before initiation of civil work.

7.2.1.2 Contractual Provisions.

Adherence to the requirements of the EIA and EMMP in terms of environmental mitigation will be required from all project contractors and thus EMMP will be part of contract documents. The organizational roles and responsibilities are summarized below:

7.2.2 Environmental and Social Safeguard (E&S) Unit

The E&S unit will provide overall supervision and advisory services during the construction phase of the project. The E&S unit will supervise the IESCO's environmental monitors (discussed below) and will also advise GSC, T&G Division and other IESCO departments on environmental and social matters during the project.

7.2.2.1 Engineers, Contractors/Sub Contractors

The contractor(s) will be responsible for the construction activities of the project. The contractor(s) will be responsible for the complete implementation of the EMMP and the mitigation measures detailed in the EMMP and EIA. The contractor(s) will also be subjected to certain liabilities under the environmental laws of the country, and under its contract with IESCO.

The GSC directorate of IESCO will monitor the contractors and ensure implementation of the EMMP and EIA.

- IESCO, through the E&S section, will cooperate with regulatory agencies and other stakeholders who may want to send their own teams to monitor the project activities and IESCO will facilitate them during their visits.

7.2.3 Federal-EPA

The Environmental Protection Agency, Government of Pakistan, will periodically visit the project site to monitor the compliance of environmental protection measures detailed in the EIA report.

7.2.4 Operation Phase

During the operation phase of the proposed project, environmental and socioeconomic management will become a routine function, as an integral part of the O&M activities. The E&S section will be the focal point for all matters relating to environmental and socioeconomic issues during the routine operations of the Organization. The E&S section will advise various departments within IESCO for environmental and socioeconomic issues. The E&S section will develop an environmental and socioeconomic management system for the Company, defining roles and responsibilities of various departments and their respective staff.

7.3 Role and Responsibilities.

7.3.1 Primary Responsibilities.

The primary responsibilities for the environmental performance of the project proponents (EMAAR-Pak) and the Implementers (IESCO), the engineering consultant section, and the contractors will be assumed by their respective highest-ranking officers during the project construction and operational phases.

- The General Manager / Chief Engineer (Development) of the proponents will be responsible for the company's compliance with the EIA and EMMP throughout the project
- The GSC Directorate and E&S section PMU will be responsible for the project's compliance with the EIA and EMMP throughout the project.
- The Addl. Deputy Director Environment / Social Impact, IESCO will have to monitor project activities in the project area.
- The GC & T&G Divisions (or the Supervision Consultant, if IESCO chooses to employ one) will be responsible for ensuring that the contractors adhere to the quality requirements and other commitments including implementation of the EMMP and EIA.

7.4 Implementation of EMMP

The purpose of the EMMP is to minimize the potential environmental and social impacts due to the proposed project. The EMMP reflects the commitment of the proponent to safeguard the physical, ecological and socio-economic environment as well as the surrounding population. The EMMP lists all the potential effects of each activity of the project and their associated mitigation measures identified in the EIA. For each project activity, the following information is presented in the plan:

- A listing of the potential impact associated with that project activity,
- A comprehensive listing of mitigation measures (actions),
- The person(s) responsible for ensuring the full implementation of the action,
- The person(s) responsible for monitoring the action,
- The timing of the implementation of the action to ensure that the objectives of mitigation are fully met.

It should be emphasized that the mitigation measures will have to be translated into environmental as well as social requirements and specifications to be made part of the contracts for the construction activities, with legal binding.

Solid Waste Management Plan

Construction Phase: Solid waste bins will be placed at site for the collection of solid waste. IESCO will collaborate with the local solid waste management authority for collection, transportation and disposal of solid waste generated by EMAAR Grid Station Project.

Empty chemical drums, iron cuttings, etc. will be collected separately at the project site within an area marked as "Scrap Yard". After suitable time frame, scrap will be sold to recycling contractor.

The construction waste generated will be recycled to the extent possible. Open burning of solid waste will not be allowed. The waste will be transported to the nearest waste disposal site, allocated by the DHA.

Operational Phase: The internal collection of solid waste will be carried out by IESCO in colour coded bins. IESCO will contract with a waste management company for collection, transportation and disposal of solid waste generated by IESCO Project.

The internal collection of waste will be carried out by IESCO Management. The waste will be collected daily and stored at a designated site, from where, the solid waste management company collection crew will take the waste. The solid waste will be segregated into three categories.

- Refuse suitable for preparation of compost
- Recyclable and reusable
- Remaining

The solid waste will be temporarily stored in the colour coding bins placed outside the building premises at a designed place.

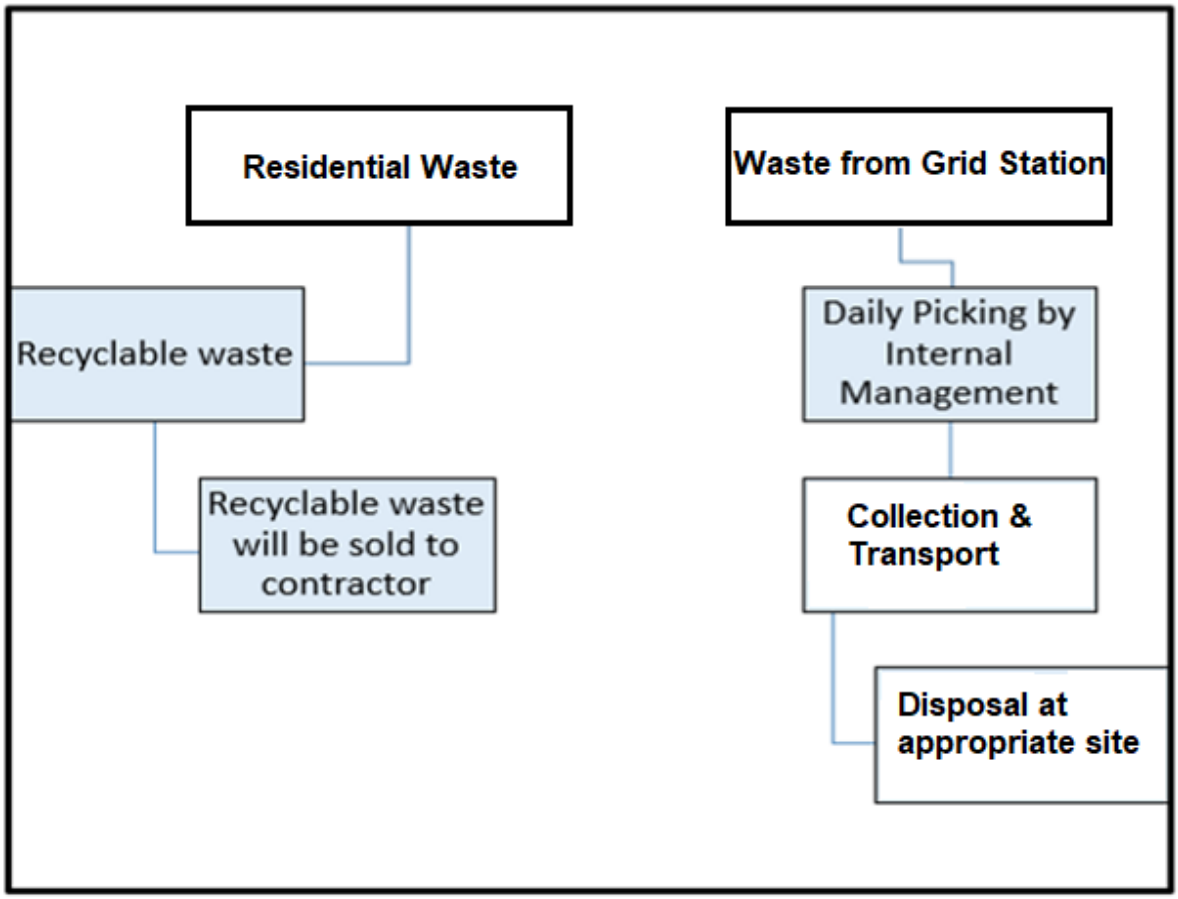

Figure 7-1: Flow Diagram of Solid Waste Management System

7.5 HSE Management Plan

- Health Safety and Environment (HSE) induction/orientation will be provided to all workforce at the project site.
- Assembly point will be established for the gathering of workforce regarding daily HSE Toolbox Talk at the project site.
- HSE Toolbox Meeting will be held by HSE Manager on a weekly basis.
- Special education sessions will be conducted properly at the site.
- Daily walkthrough will be conducted at the project site.
- All the Mandatory PPE's (Safety Helmet, Safety Jacket, Safety Shoes, Coverall, Full body Harness, Safety Goggles, Earplug, Earmuff, Dust mask/Special, Safety Gloves, Masks etc.).
- Proper and safe scaffolding will be provided at the site for safe work at height.
- All the heavy machinery will be inspected properly at the site.

- All Cranes and lifting gears will be inspected/checked on regular basis.
- Inspection & Tagging system will be maintained at the project site.
- Safety signage will be provided at the project site.
- Fire posts will be established at the project site at easy approach location.
- Waste will be maintained properly.
- HSE Sign board will be installed at the project site for an Emergency response.
- Rest area & smoking zones will be established at the site.
- Regular First Aid Center along with all required medicines 24/7 will be available at the project site.
- Paramedic (dispensers) will be deployed at first aid post for day & night shift
- In-house training will be conducted at the project site.

The contractor will develop his HSE policy, roles and responsibilities of HSE Manager and staff. It also provides information about HSE objectives, Personal Protective Equipment (PPE's) to be used at the site, first aid training and communication and documentation regarding HSE.

- First Aid Boxes: First aid boxes will be provided at all active construction sites to cope up the emergency situations. Usually, a typical first aid box mainly contains antibiotics, basic medicines, cotton, bandages, sunny plast, healing balms, pyodine, spirit, pain killer, etc.
- PPEs: Site Engineer and HSE Manager will be responsible for providing PPEs to all workers.
- Safety Signs: Relevant safety sign boards will be displayed on the work sites Mainly safety signs include signs of speed limits, electric spark, etc.
- TBTs: Tool Box Talks (TBTs) will be delivered on a regular basis and when a new team of workers start a new activity like shuttering, steel fixing, steel cutting, steel bending, scaffolding, concrete pouring, mechanical works, electrical works, etc. at sites to promote safety culture.
- Water Sprinkling: Dust pollution will be controlled with water sprinkling and minimizes the risk of adverse impacts of dust on workers and surrounding areas. Water sprinkling will be carried out regularly to minimize dust pollution and avoiding creating slush.
- Barricading: The IESCO will put up barricade tape at all the active work sites. Hard barricading (scaffolding pipes) will be used to cover exposed areas where excavation is more than 10 feet. Training: Safety training will be delivered by HSE Manager to achieve its objectives. Trainings will be conducted for capacity building of employees / workers / labour / sub-contractors to make them well effective to respond in any kind of emergency.

The breakup cost for the safety of workers is described in Table 16.

Table 16: **Estimated Cost for the Environmental Monitoring Plan**

Sr No	Item	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Personal Protective Equipment (A)				
1	Dust Masks	4800	10	48,000
2	Safety Shoes	200	2000	400,000
3	Gloves	2400	200	480,000
4	First Aid Box	1	3000	3,000
5	Ear Plugs	1200	50	60,000
6	Safety Helmets	100	1000	100,000
7	Safety Jackets (Hi Vis)	200	500	100,000
Others (B)				
8	Provision of Dust Bins	15	1000	15,000
9	Warning Tape	25	500	12,500
10	Safety Cones	10	1000	10,000
11	Safety Sign Boards	20	1500	30,000
12	Raincoat	50	1000	50,000
			Total (A + B)	**1,308,500**

- Time Required for Construction Period = 12 Months
- Number of Labor Required for Construction = up to 50
- Personal Protective Equipment PPEs
- Dust Musk: 1 Dust Mask to be used in a week by each labourer
- Safety Shoes: 1 Safety shoe for six months for each labourer
- Gloves 2 pairs of gloves for each labourer for a month
- First Aid Box 1 first aid box for every 50 laborers'
- Ear Plug 1 set of earplug to be used for 1 month for each laborer
- Safety Helmet 1 safety helmet for each labourer for 12 months
- Safety Jackets 2 safety Jackets (Hi-Vis) for each labourer for 12 months
- Dust Bin: Rough estimate

7.6 Traffic Management and Transportation Plan

- 15 km/h speed limited should be maintained at the project site.
- All the light vehicles like cars, jeep etc. should be parked in a designated area.
- Speed breakers will be followed properly.
- All the experienced and license holders (drivers & operators) will be hired for transportation.
- All the heavy machinery will be checked properly and inspected on a regular basis.
- Speed limit sign boards must be installed at the project site.

- All the (head lights, backlights, Indicator etc.) will be checked and maintained regularly.
- All the warning lights, reverse back alarms will be maintained properly.
- All the routes within the project site will be marked and designated properly.

7.7 Emergency Preparedness, Response and Site Evacuation Plan

- The Contractor will always be ready for response in any kind of emergency at the project site.
- Special assembly points will be established at the project site (offices & site).
- The emergency siren will be installed at assembly points.
- Contact numbers of emergency response team will be circulated at the project site.
- Close coordination will be carried out with 1122 in the case of any serious injury/accident.
- Close coordination will be carried out with all law enforcement agencies (police) in case of an aggressive mob of people in the shape of any kind of protest.
- Emergency response drill will be carried out once in a month for provision of awareness to the workforce at the project site.
- First Aid Boxes will be available at project site around the clock.
- Experienced and qualified paramedic staff will be available at First Aid Post at the site under the command of HSE Manager.
- Fully equipped Ambulance will be available at the project site along with all mandatory items (Oxygen cylinder, Statures & First Aid Box)
- All the new entrants will be oriented by HSE Manager regarding the required awareness towards the hazardous and risky situation and control.
- The entire workforce will be provided with the all-mandatory PPEs for the risk-free environment.
- Proper water sprinkling will be carried out at service road along with the project site for dust control to avoid any hazardous and risky situation which can be a cause of transport emergency.

7.8 Fire Fighting Plan

The Project site will be equipped with fire extinguishers as well as communication equipment for contacting the appropriate emergency response teams.
At all the Project site should be equipt with emergency alarms. Persons will be nominated to ring the emergency alarm in case of any emergency or any emergency risk.

All the workers will be trained and well communicated how to respond to the emergency alarm and reach assembly point immediately. Workers will be trained to respond an emergency alarm as discussed below:

- If the alarm rings for 20 seconds, only once, then it is less severe emergency;
- If it rings for 20 seconds thrice after intervals, then it is medium to severe high emergency, but it can be much severe; and
- If it rings for 60 seconds or more continuously, then the emergency is most severe so, everyone should respond to it immediately, evacuate the workplace and move towards the assembly point.

Proper evacuation routes will be designated, nominated and well communicated to all. All the workers will be trained to follow the evacuation routes and reach the assembly point in case of an emergency.

7.9 GS Plantation Plan

In order to improve the environment and aesthetical essence of the project site; a plantation plan is being recommended. According to the plantation plan, 450 mature plants (shady, flowering & fruit trees) having 4-5 feet height and 1.0 to 1.5 inches stem diameter will be planted along eastern, northern, western boundaries and designated areas inside the premises of the EMAAR grid station.
The practice of plantation of mature plants will be an effective compensation against the expected damages to the existing vegetation. The IESCO will ensure the provision of staff and budget for the implementation of plantation plan.

The plantation of recommended indigenous species will be planted in pits at spacing 7ft x 7ft. The recommendations about the new plantations are based upon the calculations that these will not be less than hundred times than the cut trees during the developmental phase; as no trees will be cut during the whole process of this project.

The plantation plan consists of trees, shrubs and indoor plant which are recommended. It is recommended that IESCO should consult Parks and Horticultural Authority, before implementation of plantation plan.

Table 17: **Recommended Plant Species to be Planted at the Project Site**

Sr.#	Local Name of Plant	Scientific Name	Taxonomy / Family	Total Saplings to be planted
1	Chir Pine	*Pinus roxburghii*	Pinaceae	Lump Sum
2	Kikar	*Acacia nilotica*	Fabaceae or Papilionoideae	

3	Ber	*Zizyphus maurishiana*	Rhamnaceae.	
4	Mulberry	*Moris alba*	Moraceae	
5	Shisham	*Dalbargia sissoo*	Fabaceae	
6	Neem	*Azadirachta indica*	Meliaceae	
7	Semal	*Bombax ceiba*	Bombacaceae	
8	Kachnar	*Bauhinia varigata*	Fabaceae	
9	Siris	*Albizia lebbek*	Mimosaceae	
10	Alstonia	*Alstonia scholaris*	Apocynaceae	
11	Other indigenous / local fruit trees			
	Total Saplings			**450**

Plantation Plan Cost

A total number of 450 trees will be planted. The cost of plantation includes the cost of equipment, labour, and plants purchase and maintenance cost for first three months of plantation. The total estimated cost of implementation of plantation plan is Rs.350,000. The tentative cost of equipment for is given below in **Table 18 and** maintenance plan for three month is given in **Table 19.**

Table 18: **Tentative Cost of Equipment**

Sr. #	Description	Qty.	At Rate (PKR)	Cost in PKR
1	Grub hoe (earth digging tool) and others	Lump sum	Lump sum	50,000
2	Cost of Plantation on bare slopes	Lump sum	50 per plant	250,000
3	Maintenance Cost	Lump sum	Lump sum	50,000
	Grand Total Cost			**350,000**

Table 19: **Maintenance Plan for first three months**

Sr. #	Description		February	March	April
1	Layout/ pits formation/clearing site	250 pits			
2	Planting of Saplings	250			
3	Weeding/maintenance	3 months			

7.10 Environmental Monitoring Plan

In this section, the mitigation measures that are required for the 132 KV EMAAR GS Transmission Line to reduce residual impact to acceptable levels and achieve the expected outcomes of the project, are discussed. The Environmental Management Plan is based on the type, extent and duration of the identified environmental impacts. The EMP has been prepared following best practice and by reference to the IEE/EIA Guidelines 2000 of Pak EPA.

It is important that the recommendations and mitigation measures are carried out according to the spirit of the environmental examination process and in line with the guidelines. The EMMP matrix is presented as Table 20. The impact prediction has played a vital role in reconfirming typical mitigation measures and in identifying any different approaches based on the feasibility and detailed design assumptions and any alternatives available at this stage.

In order to facilitate the implementation of the EMMP, during the preparation for the construction phase the IESCO must prepare the future contractors to cooperate with all stakeholders in the mitigation of impacts. Furthermore, the contractor must be primed through the contract documentation and ready to implement all the mitigation measures. The effective implementation of the EMMP will be audited as part of the midterm review of loan conditions and the executing agency must prepare for this at the inception stage.

The EMMP will ensure that mitigation measures are being implemented and that these are effective to provide a delivery mechanism to address the adverse environmental impacts of the proposed project during its execution and operation phases of the project.
The Monitoring plan will be a monitoring tool for the mitigation measures to be implemented during the different phases of project. The primary objectives of the EMP are to:

- Ensure that the mitigation measures included in the EIA are being implemented completely,

- Ensure the effectiveness of the mitigation measures in minimizing the project's impacts on social and environmental resources.
- Timely identification of any undue/ unanticipated adverse impact, so that a remedial action is taken

The IESCO will make necessary arrangements to monitor the key environmental parameters during the construction and operational phase against the standard parameters, It will include

- Quantity of water used,
- Monitoring of water quality in project area and sites respectively,
- Air quality monitoring in project area,
- Record of waste produced, record of waste disposal, and;
- Project-related vehicular traffic.

The key responsibilities are;

- The Addl. Director E&S, IESCO will make necessary arrangements to monitor the key environmental parameters during the construction and operation phases.
- The Addl. Deputy Director Environment/Social Impact, IESCO will have to monitor project activities in the project area.
- They should keep a record of all non-conformance observed and report these along with actions to the IESCO management for further action.
- They will also have to report any impacts anticipated along with his recommendations for further action.

7.10.1 Compliance Monitoring

The compliance monitoring of the project activities is principally a tool to ensure that the environmental and social control measures required in the EIA are strictly adhered to, during the project activities.
Various aspects of the EIA compliance monitoring will be to:

- Systematically observe the activities undertaken by the contractors (and sub-contractors) or any other person associated with the project.
- Verify that the activities are undertaken in compliance with the EIA and EMMP.
- Document and communicate the observations to the concerned person(s) of the contractors, GSC Department and E&S Section unit, so that any corrective measures, if required, can be taken in a timely fashion.
- Maintain a record of all incidents of environmental and social significance and related actions and corrective measures.

- Maintain contact with the communities, solicit their views and concerns, and discuss them during the project progress meetings.
- Prepare periodic reports of the environmental and social performance of project.

The mitigation plan will be used as a management and monitoring tool for compliance monitoring. Inspection will be done using checklists prepared by the respective contractors, on the basis of the EMMP.

Compliance monitoring will be the responsibility of all organizations involved in the field activities. It will be carried out by the following:

- Grid Station Construction (GC) Division of IESCO,
- Transmission & Grids (T&G) Division of IESCO,
- Contractors of the Project,
- Environmental and Social Inspector (ESI) of Contractor(s),
- Environmental and Social Monitor/Officer (ESM/ESO) of GSC Directorate, IESCO.
- Environmental Officer of the Consultant

7.10.2 Effects Monitoring.

The EIA predicts the impacts of the proposed project on the basis of information available at the time of conducting the assessment and the natural processes that link various environmental and social parameters. Based on this prediction, mitigation measures are introduced such that the predicted residual effects do not exceed acceptable levels. However, there is always an element of uncertainty in such predictions due to an insufficient grasp of the processes, limitations in prediction techniques, or inadequate data on the environment. This is true for the physical, biological, as well as socioeconomic environment. Consequently, it is possible that even if the mitigation measures are implemented fully, the negative impacts of the project may exceed acceptable limits.

In order to address the above concerns, effects monitoring will be undertaken during the project activities, with the overall objective of proper management of environmental and social risks and uncertainties. Broadly, effects monitoring has the following objectives:

- To verify that the impacts of the proposed project are within acceptable limits, thus establishing credibility (public assurance)
- To immediately warn the project proponents (and the regulatory agencies, if required) of unanticipated adverse impact or sudden changes in impact trends so that corrective actions can be undertaken, which may include modifications in the proposed activities, or the inclusion of modified or additional mitigation measures

- To provide information to plan and control the timing, location, and level of certain project activities so that the effects are minimized.
- To facilitate research and development by documenting the effects of the proposed project that can be used to validate impact-prediction techniques and provide a basis for more accurate predictions of future projects.

The monitoring will be done during construction and operational phase comprising of the following parameters:

- Soil erosion
- Water quality
- Water consumption and availability
- Air quality
- Noise
- Socioeconomic aspects
- Grievance Redressal Mechanism

7.11 Communication and Documentation

An effective mechanism for storing and communicating environmental and social information during the project is an essential requirement of EMMP. The key features of such type of a mechanism are:

- Recording and maintenance of all information generated during the monitoring in a predetermined format.
- Communicating the information to a central location.
- Storing raw information in a central database.
- Processing the information to produce periodic reports.

A description of the various components of the communication and documentation system is given below.

7.12 Grievance Redressal Mechanism.

An attempt has been made during the present EIA to identify all potential impacts of the proposed project, to identify all Project Affected Persons (PAPS), to provide mitigation measures to address the potential impacts, and to chart out a mechanism to implement these mitigation measures.

However during the project implementation, the stakeholders (mostly the communities in the vicinity of the project sites/transmission line route) may still have some grievances with respect to the project activities, their impacts and other mitigation measures.

In order to address the above eventualities, the Grievance Redressal Mechanism (GRM) has been devised. The main objective of the GRM will be to provide a mechanism to mediate conflict and cut down on lengthy litigation, which often delays the infrastructure projects such as the present project. It will also facilitate people who might have objections or concerns about their assistance, a public forum to raise their objections and through conflict resolution, address these issues adequately. The main functions of the GRM will be as follows:

- Provide a mechanism to the PAPs on problems arising as a result of project activities,
- Record the grievance of the PAPs, categorize and prioritize the grievances that need to be resolved, and
- Report to the aggrieved parties about the developments regarding their grievances and the decision of the project authorities.

Under the GRM, the ESI or concerned SDO of the area will maintain the Social Complaint Register (SCR) at the sites to document all complaints received from the local communities. The information recorded in the Register will include date of the complaint, particulars of the complainant, description of the grievance, actions to be taken, the person responsible to take the action, follow up requirements and the target date for the implementation of the mitigation measure. The register will also record the actual measures taken to mitigate these concerns.

As soon as a complaint is received, the ESI will discuss it with the ESMs, and determine the remedial action. If required, consultations will also be undertaken with the contractor's site managers and GSC's Directorate. Once the remedial action is decided, implementation responsibility as well as schedule will be determined.

The proposed remedial action will be documented in the SCR, with complete details (by whom and by when). The proposed remedial action will be shared with the complainant. Similarly, the actual action taken will also be documented in the register and shared with the complainant. The complainant's views on the remedial action taken will also be documented in the register.

7.13 Change Management.

The EIA for the proposed operation recognizes that changes in the operation or the EMMP may be required during the operation and therefore provides a Change Management Plan to manage such changes. Overall responsibility for the preparation of change management statements will lie with Islamabad Electric Supply Company Limited (IESCO).

- Category A changes,
- Category B changes, and ;

- Category C changes.

These categories are defined below further one by one.

7.13.1 Category 'A' Change

The 'Category A' change is one that leads to a significant departure from the project described in the EIA and consequently requires a reassessment of the environmental and socioeconomic impacts associated with the change. In such an instance, IESCO will be required to conduct a fresh EIA of the changed portion of the project, and send the report of this assessment to the relevant agencies for approval (Pak-EPA). Examples of such changes are provided below.

- Change in the transmission line route by more than 2 km of the original alignment. Or change in the route by less than 2 km, but the changed route has environmental and/or social sensitivity more than the original route.
- Increase in the transmission line length exceeding 20 % of the original design. Or increase in length by less than 20% but involving areas which are more sensitive - environmentally and/or socially - than the original route.
- Change in the grid station site by more than 2 km of the location studied during the EIA. Or change in the site by less than 2 km but the new location has a higher environmental and/or social sensitivity.
- Inclusion of new grid station or transmission line sub-project not enlisted in this EIA report.

7.13.2 Category 'B' Change

The category 'B' change is one that may entail project activities not significantly different from those described in the EIA, which may result in project effects whose overall magnitude would be similar to the assessment made in this report. In case of such changes, the ESI (with assistance from the E&SS) will be required to reassess the environmental and socioeconomic impacts of the activity, specify additional mitigation measures, if necessary, and report the changes to the relevant agencies (Contractors, E&SS, Federal EPA). Examples of such changes are provided below.

- Changes in the transmission line route by more than 500 m of the original alignment, but not exceeding 2 km, provided that the changed route does not have environmental or social sensitivity more than the original area.
- Increase in the transmission line length exceeding 10 % of the original design, but not exceeding 20%, provided that the extended route does not have environmental or social sensitivity more than the original area.
- Change in the grid station site by more than 500 m of the location studied during the EIA, but not exceeding 2 km, provided that the new location does not have environmental or social sensitivity more than the original area.
- Such changes will necessitate site surveys for the transmission line route or grid station sites, by the environmental and socioeconomic experts. A site-

specific assessment for any additional environmental as well as socioeconomic issues will need to be carried out. Complete record of the surveys and assessment will be maintained.

7.13.3 Category 'C' Change

A Category-C change is one that is of little consequence to the EIA findings. This type of change does not result in effects beyond those already assessed in the EIA; rather it may be made onsite to minimize the impact of an activity, such as re-aligning a particular section of the transmission line to avoid cutting a tree. The only action required for such changes will be to document the change.

7.14 Public Disclosure

IESCO will disclose this EIA and EMMP to all the stakeholders, at the commencement of the proposed project. The EIA report will be made available to the stakeholders at the sites designated by the EPA, in accordance with the PEPA 1997, section 12 (3), (i).

Table 20: Environmental Management & Monitoring (EMMP)

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
A. Design and Pre- construction Phase					
Change of Land Use					
Land Use Change	Land use and cutting of Natural Vegetation	i Careful selection of land for grid station and T/lines, ii Soil characteristics must be considered, iii High fertile land to be avoided. iv Avoid obvious scars and blemishes on the landscape;	Pre-construction Phase	GSC Division	PD GSC IESCO
v **Loss of Natural Vegetation**					
Loss of Natural Vegetation	Cutting of trees	vi Re-plantation plan should be considered in design phase vii The landscaping of burrow areas and disposal sites consistent with acceptable aesthetic values for the surrounding landscape.	Pre-construction Phase	Design Engineer & GSC Division	PD GSC and E&S Section IESCO
viii **Shifting of Utilities**					
Basic Utilities Shifting	Existing Utilities	ix The existing utilities should be rehabilitated before construction to avoid any inconvenience to the residents of the project area or provide them with alternative arrangement during the construction period.	Pre-construction Phase	GSC Division	PD GSC IESCO
Impact on Archaeological Property					
Significant Property	Cultural, aesthetic, archaeological sites	x No Cultural, aesthetic, archaeological sites fall in RoW of transmission lines, xi In the event of such finding, the Contractor has the duty to secure the site against any intrusion until the archaeological expert will decide on further action.	Pre-construction Phase	Design Engineer & GSC Division	PD GSC IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
Waste Management Plan					
Waste Management Plan	Waste Disposal	i Implement waste management plan that identifies and characterizes every waste arising associated with proposed activities and which identifies the procedures for collection, handling & disposal of each waste.	Prior to site clearance	Design Engineer & GSC Division	PD GSC and E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
Non-Routine Events					
Non-routine events and accidental releases	Mock drills and records of the same	ii Plan to be drawn up, considering likely emergencies and steps required to prevent/limit consequences. iii Follow the Emergency Plan.	Prior to site clearance	Design Engineer & GSC Division	PD GSC IESCO
Land Acquisition Issues					
Grid Station Construction	Land Acquisition	i The land for grid station has been purchased and allotted by the DHA	Pre-construction Phase	GSC Division	PD GSC IESCO
Transmission Lines Construction	Land Acquisition	ii The route of transmission line has been allocated by IESCO, Islamabad.	Pre-construction Phase	GSC Division	PD GSC IESCO
B. Construction Phase					
Contractor Mobilization and Demobilization	Soil Erosion and Contamination	iii Vehicular traffic on unpaved roads will be avoided as for as possible. iv Operation of vehicles and machinery close to the water bodies will be minimized. v Vehicles and equipment will not be repaired on the site. If unavoidable, impervious sheathing will be used to avoid soil and water contamination.	During Construction Phase	GSC Division/Contractor	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
Work safety and hygienic conditions	Health risks if work conditions provide unsafe and/or unfavorable work conditions	i Obligatory insurance against accidents to work labors ii Providing basic First Aid training to specified work staff, and basic medical service and supplies to workers iii Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for labors, iv Protection devices (earmuffs) will be provided to the workers operating in the vicinity of high noise generating machines,	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
		i Proper maintenance of facilities for workers will be monitored by ESU, ii All safety precautions will be taken to transport, handle and store hazardous substances, such as fuel.		GSC Division	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
	Public Health	i The construction crew will be provided awareness for the transmissible diseases (such as HIV/AIDS, hepatitis B and C).	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Movement of vehicles in the construction site and along the haulage routes	Soil compaction and alteration of percolation and vegetation pattern; Damage to properties and utilities	ii Construction vehicles, machinery and equipment will move, or be stationed in the designated RoW, to avoid unnecessary compaction of soil. iii Damages will be instantly repaired and/or compensated at Contractor's obligation iv Water and soil quality will be monitored as envisaged in the Environmental Monitoring Plan	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Movement, maintenance and fueling of construction vehicles	Contamination of soil and groundwater from fuel and lubricants	v Slopes of embankment leading to water bodies will be modified and screened so that contaminants do not enter the water bodies,	Throughout construction Throughout construction period	GSC Division/Contra	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
		vi Construction vehicles and equipment will be properly maintained and refueled in such a way that oil/diesel spillage does not contaminate the soil. vii Fuel storage and refueling sites will be kept away from drainage channels. viii Oil and grease traps will be provided at fueling locations, to prevent contamination of water. ix Unusable debris shall be dumped in nearest landfill sites if available, on other hand then on an approved designated site by IESCO, or local administration. x Operation of vehicles close to the water channels; water reservoirs will be minimized. xi Waste oil and oil-soaked cotton/cloth shall be sold off to authorized vendors xii Water quality will be monitored as envisaged in the Environmental Monitoring Plan as discussed in chapter 8.			
Waste material disposal sites	Contamination of soil/water and impact on landscape value	xiii Dismantling of existing formation is not considered, instead, bituminous layers will be used as sub-base for topping up xiv If spoil material develops, pits will be used after examination on possible soil and water contamination risks. xv Spoils will then be covered with sandy conglomerates.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Soil related Issues					

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
Contractor Mobilization and Demobilization	Soil Erosion and Contamination	i Vehicular traffic on unpaved roads will be avoided as for as possible. ii Operation of vehicles and machinery close to the water channels, water reservoir will be minimized. iii Vehicles and equipment will not be repaired on the site. If unavoidable, impervious sheathing will be used to avoid soil and water contamination.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Construction work for grid station and tower installation.	Soil erosion	i Cut and fill at the proposed grid station sites will be carefully designed, and ideally should balance each other. The surplus soil, if any, will be disposed at places approved by IESCO. ii Safe sites will be selected after surveying the area and ensuring that soil deposition will not have any significant impacts, such as loss of productive land, blocked access, natural vegetation and disturbance to drainage	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
		i If necessary, fill material for grid station site will be obtained from appropriate locations approved by DHA. Such locations will be selected after surveying the area and ensuring that soil extraction will not have any significant impacts, such as soil erosion, loss of natural vegetation and disturbance to drainage. ii Where the use of cultivated land is unavoidable for obtaining the fill material, the top 30 cm soil layer will be	Throughout construction period	GSC Division/Contractor	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
		removed and stockpiled for redressing the land after removal of the burrow material. The excavation in such areas will be limited to 50 cm depth. iii The fill material will not be obtained from any cultivation fields or orchards, unless the consent of the owner is obtained. iv Areas from where the fill material is obtained or surplus soil deposited, will be landscaped to minimize erosion and hazard for people and livestock. v Embankments and excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken per the design (e.g. stone pitching). vi Vehicular traffic on unpaved roads will be avoided as far as possible. Operation of vehicles and machinery close to the water bodies will be minimized.			
		vii Appropriate measures will be taken to avoid soil erosion during the excavation of transmission line poles foundations, particularly within the park area. These include temporary embankments to protect excavated soil, stone pitching and placing gabions. The surplus soil will be disposed as stated above. viii After the completion of tower foundations particularly on the above-mentioned slopes, additional stone	Throughout construction period	GSC Division/Contractor	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
		pitching around the foundation will be carried out, where required, to avoid any subsequent soil erosion/land sliding. Post-construction monitoring of such sites will be carried out to detect early signs of any soil erosion/land sliding. ix The construction works for transmission line route will not be undertaken during the rainy season. x After the completion of the construction work, the transmission line route and other construction sites will be completely restored. No debris, surplus construction material or any garbage will be left behind. xi Photographic record will be maintained for pre-project, during-construction and post-construction condition of the sites (grid station, transmission line route and access roads).			
Construction work for grid station and tower installation.	Soil contamination due to leakage, spoilage etc.	xii Vehicles and equipment will not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination. xiii Waste oils will be collected in drums and sold to the recycling contractors. xiv The waste disposal plan submitted by the contractor(s) will also address the solid waste.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Soil and Burrow Material, Cut and Fill					

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
Construction work for grid station and tower installation	Borrow pit land lease agreement	i The Contractor must obtain any necessary permission for burrow pits from the competent authorities.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Water related Issues					
Construction work for grid station, civil works and T/L	Surface water contamination	ii For the domestic sewage, appropriate treatment and disposal system will be constructed having adequate capacity. Waste oils will be collected in drums and sold to the recycling contractors. iii The inert recyclable waste from the site (such as cardboard, drums, broken/used parts, etc.) will be sold to recycling contractors. iv The hazardous waste will be kept separate and handled according to the nature of the waste.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Construction work for grid station, civil works and T/L	Water Consumption	v Water will be obtained from the source approved by the DHA vi Astute planning will be employed to conserve water at the construction site will be procured in manner that least affects the local communities. Wastewater recycling will be carried out for sprinkling and gardening purposes.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Waste Disposal Issues					

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
Spillage of liquid wastes	Risk of polluting surface and groundwater from liquid waste spillage, drainage and runoff from construction sites	i Application of good engineering and construction practices. ii The contractor should ensure that construction debris do not find their way into streams which may get clogged. iii Work on riverbanks will be kept to a minimum, and retaining walls be constructed. iv To maintain surface water flow/drainage, proper mitigation measures will be taken along the road, like drainage structure along urban settlements. v If spillage occurs, it will be disposed off in an identified dumping site approved by DHA vi Contractor will prepare a waste disposal plan and submit to ESI for his approval.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Disposal of Solid waste		vii Proper and safe waste disposal designated site by ESI or ESM, viii Contractor will prepare a waste disposal plan and submit to ESI for his approval.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Air Quality related Issues					
Vehicular movement and running of machineries	Emission from construction vehicles and machinery, causing public health risks, nuisance and	i The diversion road will be regularly water-sprayed to minimize the dust generation: Schedules will be adjusted to actual needs, determined by the DHA ii Vehicle trips to be minimize to the extent possible	Throughout construction period	GSC Division/Contractor	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
	other impacts on the bio-physical environment	iii All vehicles, equipment and machinery used for construction will be regularly maintained to ensure that the pollution emission levels conform to the NEQS. iv All equipment is operated within specified design parameters. v Air quality parameters will be monitored at determined sites and schedule determined by the DHA vi Ambient air quality within the premises of grid station should be monitored.			
Transportation of materials, and other construction activities that create dust emissions	Dust emissions from machines causing health risk to operators; Impacts on biophysical environment	vii Vehicles delivering loose and fine materials, like sand and fine aggregates, should be covered by sheets to reduce spills on existing road. viii Ambient air quality monitoring is carried out in accordance with the EMMP. ix If monitored parameters are above prescribed NEQS limits, suitable control measures must be taken. x Any dry, dusty materials stored in sealed containers or prevented from blowing. xi Compaction of soil during various construction activities.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Noise, Vibration Dust Related Issues					

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
Construction work for grid station, civil works and T/L	Noise due to construction activities, vehicular movement etc.	i Vehicles will have exhaust mufflers (silencers) to minimize noise generation. ii Nighttime traffic will be avoided near the communities. Local population will be taken in confidence if such work is unavoidable. iii Vehicular traffic through the communities will be avoided as far as possible. Vehicle speeds will be kept low, and horns will not be used while passing through or near the community.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Running of construction machinery	Noise from vehicles, other machinery and equipment	iv List of all noise generating machinery onsite along with age to be prepared. Equipment to be maintained in good working order v The plant and equipment used for construction will strictly conform to noise standards specified in the NEQS. vi Vehicles and equipment used will be fitted as applicable, with silencers and properly maintained. vii Work at night be minimized viii In urban settlements construction activities will be restricted to be carried out between 6 am and 7 p.m. in summers while 5 am to 5 pm in winters. ix Implement good working practices (equipment selection and siting) to	Throughout construction period	GSC Division/Contractor	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
		minimize noise and also reduce its impacts on human health (earmuffs, safe distances, and enclosures). x No machinery running when not required xi Acoustic mufflers/enclosures to be provided in large engines xii In accordance with the Environmental Monitoring Plan noise measurements will be carried out at locations and schedule specified to ensure the effectiveness of mitigation measures. xiii Vehicle trips to be minimized to the extent possible xiv All equipment operated within specified design parameters. xv The noise level will not exceed the permissible limit both during day and night times			
Vehicular movement	Safety Hazards	i Road signage will be fixed at appropriate locations to reduce safety hazard associated with project-related vehicular traffic. ii Project drivers will be trained on defensive driving. iii Vehicle speeds near/ within the communities will be kept low, to avoid safety hazard and dust emissions.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Construction work for grid	Vibration due to construction	iv Selection of up to date and well-maintained plant or equipment with	Throughout construction period	GSC Division/Contract	E&S Section

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
station, civil works and T/L	activities, vehicular movement etc.	reduce noise levels ensured by suitable in-built damping techniques or appropriate muffing devices. v Confining excessively noisy work to normal working hours in the day, as far as possible. vi Providing the construction workers with suitable hearing protection like earmuffs and training them in their use. vii Preferably, restricting construction vehicles movement during nighttime. viii Heavy machinery like percussion hammers and drills should not be used during nighttime without prior approval of the client. ix Contractors should comply with submitted work schedule. Keeping noisy operations away from sensitive points; x Implement regular maintenance and repairs; and employ strict implementation of operation procedures. xi Noise barriers in sensitive areas (in front of schools, hospitals, university, mosques).		or	IESCO
Construction work for grid station, civil works and T/L	Dust due to construction activities, vehicular	i Roads and path should be regularly sprayed with water during dry weather. ii All excavation work should be	Throughout construction period	GSC Division/Contract or	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
	movement etc.	sprinkled with water. iii Construction workers should be provided with masks for protection against the inhalation of dust. iv Vehicle speed in the project area should be prescribed and controlled accordingly.			
Fauna and Flora Resources Issues					
Construction work for grid station, civil works and T/L	Loss of Vegetation	i Clearing of natural vegetation will be minimized as far as possible during the transmission line works. ii For the transmission line route, a tree cutting plan will be prepared and submitted to IESCO for approval. A complete record will be maintained for any tree cutting or trimming. The record will include: the number, species, type, size, age, condition and photograph of the trees to be cut/trimmed. iii Indigenous tree species will be selected for plantation; in particular, Eucalyptus trees will not be used in any case. iv Cleaning natural vegetation will be avoided as far as possible. v Complete record will be maintained for any tree cutting. vi The construction crew will be provided. With LPG as cooking (and heating, if required) fuel. vii Use of fuel wood will not be allowed.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
		viii No herbicide will be used to clear vegetation			
Construction work and illegal hunting by worker	Damage the habitat and, danger to wildlife, disturbance of ecosystem	ix Measures to protect and rehabilitate floral resources of the area discussed in section above will also protect the wildlife resources of the area. x Blasting will not be carried out while working in the park. No nighttime activities will be carried out in this area. The works in this area will be carried out in coordination with the Forest and Wildlife departments. xi Vehicle movement will be limited to the existing tracks in the above area. xii The measures to prevent soil and water contamination will forestall any adverse impact on the faunal resources of the area. xiii Garbage will not be left in the open places. xiv The project staff will not be allowed to indulge in any hunting or trapping activities.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Health and Safety of Workers					
Hygiene related issues during construction phase		i Obligatory insurance of workers against accidents. ii Providing basic medical training to specified work staff and basic medical service and supplies to workers.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
		iii Work safety measures and good workmanship practices are to be followed by the contractor to ensure on health risks for laborers. iv Protection devices should be provided to the workers operating in the vicinity of high noise generating machines. v Provision of adequate sanitation, washing, cooking, and dormitory facilities to workers. vi Provision of protective clothing for labors handling hazardous material e.g. hard hats, adequate footwear for bituminous pavement works etc.			
		vii Adequate signage, lightning devices, barriers and person with the flags during construction to manage traffic at construction sites. viii Timely public notification on planned construction works.			
Social and Gender Issues					
Construction work for grid station, civil works and T/L	Social and Gender Issues	i Construction crew will avoid entering the villages and settlements. ii Local social norms and practices will be respected. iii No child labor will be employed. iv Road signage will be fixed at appropriate locations to reduce safety hazards associated with project-related vehicular traffic. v Project drivers will be trained on	Throughout construction period	GSC Division/Contractor	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
		defensive driving. vi Vehicle speeds near/within the community will be kept low, to avoid safety hazard and dust emissions. vii The communities near the transmission line route will be informed about the construction activities. Protective fencing will be installed where required. viii Before commencing the testing commissioning of the system, the nearby community will be informed. ix Protective fencing will be used where appropriate/possible.			
Construction work for grid station, civil works and T/L	Blocked Access	x In case of the blockage of the existing routes, alternate routes will be identified in consultation with affected communities. xi	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Socio-Economic Issues					
Construction work for grid station, civil works and T/L	Loss of Agriculture	i Temporary RoW has been allocated by DHA to IESCO.	Throughout construction period	GSC Division/Contractor	E&S Section IESCO
Operational Phase					
Water related Issues					
Drainage of water from grid station runoff into water bodies	Water pollution from rainwater containing hazardous substances, congestion of drainage	i Water quality monitoring will be carried out during operation phase at schedule approved by Pak EPA/DHA ii If monitored parameters are above the prescribed limit, suitable control measures will be taken.	Throughout Operational period	GSC Division/Contractor	E&S Section IESCO

Activities and Actions	Issue/ Component	Proposed Mitigation Measures	Timeframe	Institutional Responsibility	
				Implementation	Supervision
	structures near settlements.	iii Ensure proper cleaning scheme for keeping drainage structures clear of debris and blockage.			
Grid station colony	Water Consumption	iv Water will be obtained from the source approved by the DHA v Astute planning will be employed to conserve water at the construction sites and. Water will be procured in manner that least affects the local communities. Wastewater recycling will be carried out for sprinkling and gardening purposes.	Throughout Operational period	GSC Division/Contractor	E&S Section IESCO
Ambient Air Quality					
Air Contamination	Indoor air contamination	i Contaminants such as CO, CO_2, and VOCs to be reduced by providing adequate ventilation.	Throughout Operational	GSC Division/Contractor	E&S Section IESCO

7.15 Post Project Monitoring

The IESCO's Project Manager for Construction of EMAAR Grid Station and it's Transmission Line, or his representative shall prepare a brief post-project report describing the conduct of the actual operation, any changes from the operation for which approval was obtained, the degree to which the recommendations of the EIA were adhered to, any damages to the environment and the mitigation or compensation provided, and monitoring information of scientific or environmental interest that is not propriety in nature. This report should be submitted to the Federal Environmental Protection Agency (Pak-EPA), Pakistan.

8 Conclusion and Recommendations

8.1 Introduction

This Chapter presents the assessment of the possible environmental impacts of 132 KV Grid Station EMAAR, and its Feeding Transmission Line Project. The EIA also includes the justification and detailed description of the project, with an evaluation of the potential impacts and effects on the environment including economic and social consequences. This Chapter describes the conclusion and recommendation of the EIA study of the project. Moreover, this study presents the purpose of the EIA as to the description of the site, the impact of the project during and after implementation, the mitigation measures and residual impacts. IESCO's role in the processing and implementation of the activities as preparation of PC-1s and PFRs (Periodic Financing Request), monitoring implementation activities; that includes submission of Environmental monitoring for all activities under this project.

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8.2 Conclusions.

This study was carried out at the planning stage of the project. Secondary data was used to assess the environmental impacts. The potential environmental impacts were assessed in a comprehensive manner. The report has provided a picture of all potential environmental impacts associated with the Project, and recommended suitable mitigation measures. This study recommends that some further follow up studies are undertaken during project processing in order to meet the Pakistan Environmental Protection Act, IEE/EIA Regulations, 2000

The major conclusions of the EIA are:

- The total estimated cost of the project is Rs. 700 million and would be completed in 400 to 500 days. The EMAAR Pakistan has provided funds to IESCO to construct a new 132 KV grid station and 1.65 Km feeding transmission line to EMAAR Canyon View, DHA Phase V. Before commencing any civil work IESCO has directed EMAAR to provide NOC/Environmental Approval from Pak EPA.
- The main objective of the project is to increase the efficiency, reliability and quality of the electricity supply in EMAAR Housing society in the future.
- The total land allocated for construction of grid station is 18.5 kanal which has been allotted by DHA. The project consists of construction of a grid station, erection of 9 towers on 1.65 Km feeding transmission line from EMAAR Grid station to New-Rawat-Sawan circuit.
- The potential impacts during construction phase includes soil erosion, degradation, contamination soil mixing and compaction; air quality deterioration; noise pollution and vibration; water contamination and

consumption; loss of/damage to the natural vegetation of the area; loss of /damage to the wildlife of the area and public health and safety.

- The significant environmental management issues during operational phase include soil and water contamination; safety hazards; public health and loss of agriculture.
- The project construction and operational activities can potentially affect the natural resources of the area. These adverse impacts can be largely reduced by implementing the appropriate mitigation measures, which has been discussed in this report.

8.3 Recommendations.

On the basis of the overall impact assessment, more specifically, nature and magnitude of the residual environmental impacts identified during present EIA, it is concluded that 132 KV grid station and 132 KV feeding transmission line at EMAAR, DHA Phase V Project is likely to cause environmental impacts mainly during its construction phase. However, these impacts can be mitigated provided the proposed activities are carried out as mentioned in the report, and the mitigation measures included in this report are completely and effectively implemented. The EIA process of the project started with the identification of potential environmental and social impacts resulting from the proposed project's activities their rating as slight, moderate and negligible with the aid of an impact assessment matrix. Project activities that were likely to result in high impacts were investigated further to validate the anticipated impact and an alternative project activity was determined that has a medium or low-level impact. For project activities with moderate and minor level impacts, suitable mitigation measures are proposed to reduce the impact to a low category impact or as low as reasonably possible. Finally, for insignificant impacts, no alternatives or mitigation measures were explored, as it is expected that the environmental management systems in place will be sufficient to avoid or reduce those impacts.

Impact of the proposed project has been assessed for construction and operations which will be controlled through mitigation measures. Mitigation measures are proposed mitigation through technology change, environmental management and clean practices. The exposure of noise generated during operations will be controlled through providing PPEs to the workers.

All vehicles, generators and other equipment used during the construction will be properly tuned and maintained in good working condition in order to minimize emission of pollutants.

Vehicular movement will be restricted to a specific time for dumping of supplies and construction material. Effect on Flora and Fauna will be reduced through predefining the route in such a manner that minimal clearing of the vegetation is required as to reduce the damage on large scale. Construction activities generate considerable waste and provision for suitable separation, storage of waste in

designated and labelled areas on the grid station area. Proper mitigation measures have been provided to reduce all the anticipated impacts of the project.

A. There are a number of other key actions required in the detailed design phase. Prior to construction the IESCO must receive clearance certification from the Pak EPA and IESCO must complete an EMP that will be accepted by the Pak EPA and agreed by the contractor prior to signing the contract. The information provided in this report can form the basis of any further submission to Pak EPA as required in future.

B. No land acquisition, compensation and resettlement are involved. However, provisions may be made in design and operational phase, based on the proposed alignments can be conducted as the detailed designs are worked out and to dovetail with the existing system and minimize adverse impacts and maximize benefits.

C. Baseline monitoring activities should be carried out during project detailed design stage to establish the baseline of parameters for checking during the construction stage. The EMMP recommends monitoring on two occasions at the site location. The results should be integrated with the contract documentation to establish performance action thresholds, pollution limits and contingency plans for the contractor ‘s performance.

D. During the commissioning phase noise monitoring should ensure that statutory requirements have been achieved. Monitoring activities during project operation will focus on periodic recording environmental performance and proposing remedial actions to address any unexpected impacts.

E. The EIA including the EMMP, should be used as a basis for an environmental compliance program and be included as Appendices to the contract. The EMP shall be reviewed at the detailed design stage. In addition, any subsequent conditions issued by Pak EPA as part of the environmental clearance should also be included in the environmental compliance program.

F. Continued monitoring of the implementation of mitigation measures, the implementation of the environmental conditions for work and environmental clearance, and monitoring of the environmental impact related to the operation of should be properly carried out and reported at least twice per year as part of the project performance report.

Annexure-1: Land Documents

DHAI - 401 (R)

DEFENCE HOUSING AUTHORITY ISLAMABAD

101472

Defence Mall
Defence Avenue, Phase I
Defence Housing Authority
Islamabad
UAN: 111-555-400

DHAI/210/1/Record/Almt
17 Apr 2019

Name: Islamabad Electric Supply Company Limited
S/O: -
Address: IESCO Headquarters Street No 40, Sector G-7/4 Islamabad
Tel: 051-9252937

ALLOTMENT LETTER

Dear Sir/Madam,

The Management of Defence Housing Authority Islamabad is pleased to welcome you and allot/transfer plot in your name as per details below:

MS No:	R/008	**TRANSFER TYPE:**	Allotted
PLOT TYPE:	Residential	**PLOT NO:**	-
STREET/LANE:	N/A	**SECTOR:**	-
PHASE:	Phase-V	**SIZE:**	18.5 Kanal

The allotment is provisional and subject to the acceptance of the terms and conditions printed over-leaf.

The Management of Defence Housing Authority Islamabad reserves the right to cancel/alter the location and dimensions until physical possession of the plot is handed over.

Yours Faithfully,

Col (R)
Director Transfer & Record
(Amir Akbar Khan)
17/04/19

Member Copy

TERMS AND CONDITIONS OF ALLOTMENT

1. The plot / component under this allotment is a part of the piece of land initially allotted to M/s Emaar DHA Islamabad Limited (EDIL) a company incorporated under the laws of Pakistan having its registered office at Emaar Sales Centre, DHA Phase-II Extension, Islamabad Highway Islamabad in accordance with an Agreement executed between DHA Islamabad, EDIL and EIL (Emaar Islamabad Limited, the parent company of EDIL). EDIL after surrender of the allotment letter of the land has recommended for issuance of allotment letter of the plot / component, described and identified in this allotment letter, to the allottee in furtherance to an Agreement to sell executed between EDIL and the allottee. The allottee is conversant of the fact that EDIL is exclusively responsible for completion of infrastructure development, provisioning of utilities including electricity, water supply, sui gas etc of the plot / component at the time of handing over possession of the plot / component to the allottee as agreed by and between the allottee and EDIL and for ensuring the specifications of the facilities and standards of the quality of the development and infrastructure as advertised and promised with the allottee.
2. The allottee has paid the cost of land and development charges to EDIL as per terms and conditions agreed in the Agreement to sell executed between EDIL and the allottee. This allotment is and the subsequent transfers of the same will be registered with DHA Islamabad in lieu of Agreement executed between EDIL and DHA Islamabad.
3. This allotment letter is issued to the allottee subject to payment of dues and charges including processing fee, transfer charges, membership fee etc payable by an allottee / member as per byelaws, rules, regulations and policies of DHA Islamabad (as amended & modified from time to time).
4. The allottee understands that EDIL is exclusively responsible for provisioning of maintenance and security of the plot / component under allotment and the Project ("Canyons View Project").
5. The allotment is subject to the condition that DHA Islamabad shall not be responsible for the procurement of the infrastructure or utility services for the Project. DHA Islamabad has however agreed to facilitate EDIL by issuing requisite NOCs and permissions, where applicable.
6. The demarcation and measurement of the plot / component will be carried out by EDIL in the presence of the allottee or his representative and a representative of the TP & BC Directorate of DHA Islamabad at the time of handing over the physical possession of the plot / component.
7. The allottee shall be liable to pay from the date he takes over possession of the plot / component, all taxes, rates, assessments, duties, charges (including betterment and maintenance charges) which may now or hereinafter be charged or imposed upon or be payable in respect of the said plot / component or anything relating thereto by any Competent Authority under any law, rules, regulations, bye-laws or by the State for the time being in force.
8. The allottee shall comply with and abide by all the rules, regulations, bye-laws and such other orders as applicable in Specified Area of DHA Islamabad, as amended and modified from time to time.
9. In order to secure loan from a registered loan giving agency for construction on the plot (in case of allotment of a plot), the allottee may mortgage the plot to such an agency after obtaining a No Objection Certificate from DHA Islamabad on the terms and conditions decided by DHA Islamabad.
10. The allottee shall within a period of two years from the date of approval of drawing of the plot (in case of allotment of a plot) construct a building in conformity with the construction bye-laws of DHA Islamabad and obtain a completion certificate in accordance with the prescribed procedure. After the prescribed period allottee shall be liable to pay non utilization charges fixed by the DHA Islamabad.
11. DHA Islamabad shall have the right to inspect / monitor the construction through its representative at all reasonable timings to ensure compliance of applicable construction byelaws.
12. The allottee shall not disturb/interfere with the lay out of Housing Scheme of DHA Islamabad in any manner whatsoever, and shall not encroach upon or usurp or put into his use, the pavements, pathways, roads, beams, green belt or any of the area/piece of land, in the ownership of the DHA Islamabad, other than the one allotted to him in accordance with the terms and conditions of this allotment letter.
13. In case of any encroachment as mentioned above, DHA Islamabad, in addition to any other action permitted under its bye-laws, rules, regulations, policies (as amended / modified from time to time), may pull down, remove, or demolish the encroachment, without any notice, at the risk and cost of the allottee and the allottee shall be liable to pay to DHA Islamabad the cost so incurred immediately or on removal of the encroachment.
14. The plot shall be used for the sole purpose of erecting a residential/commercial building (whichever is applicable).
15. The allottee shall be liable to pay proportionate cost of any facility provided by the DHA Islamabad.
16. The expenses of the Stamp Duty /Capital Value Tax (whichever is applicable) and any other tax/duty imposed by the Government will be paid by allottee.
17. This allotment is non-transferable except for legal and natural heirs or to a person whose application for transfer is accepted by the Managing Committee of DHA Islamabad according to law. Such transfer shall be subject to payment of fee to DHA Islamabad apart from the other fees.

(The Allottee) 17/04/19
Cell(R) Muhammad Asghar Khan

(On behalf of EDIL)

(On behalf of DHA Islamabad) 17/04/19
Amna Aslam
DHA Islamabad

Annexure-2: References

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Annexure-3: Ambient Air Quality Report

ESPAK

ENVIRONMENTAL SERVICES PAKISTAN

CHEMICAL ANALYSIS TEST REPORT (AMBIENT AIR)

Reference Number: ESPAK/0120I/23/AA/3438/00320 **Date:** 26/06/2023
Name of Industry/Client: Emaar Grid Station.
Address: Canyon Views, Islamabad.
Telephone No.:

Nature of Sample: Ambient Air
Monitoring Location: Grid Area (GPS: 33.526626°N 73.186658°E)
Date of Sample Collection: 22/06/2023
Grab / Composite: Continuous - 24Hours
Sample Collected/Sent By: Farhan Ali, Analyst (Field), ESPAK
Date of Completion of Analysis: 23/06/2023

S. No	Parameters	Limit Values (NEQS-24Hours)	Concentration	Method / Equipment Used	Remarks
1	Carbon Monoxide (CO)	5 mg/m³ (8 Hours)	2.8 mg/m³	Non Dispersive Infrared Absorption (NDIR)	Within Prescribed Limits
2	Sulfur Dioxide (SO_2)	120 µg/m³	14.3 µg/m³	UV Fluorescence (UVF)	Within Prescribed Limits
3	Ozone (O_3)	130 µg/m³ (1 Hour)	39.5 µg/m³	Non Dispersive UV Absorption	Within Prescribed Limits
4	Oxides of Nitrogen as NO	40 µg/m³	15.2 µg/m³	Chemiluminescence Detection	Within Prescribed Limits
5	Oxides of Nitrogen as NO_2	80 µg/m³	25.2 µg/m³	Chemiluminescence Detection	Within Prescribed Limits
6	Particulate Matter $PM_{2.5}$	35 µg/m³	30.3 µg/m³	Particulate Sensor	Within Prescribed Limits
7	Particulate Matter PM_{10}	150 µg/m³	144 µg/m³	Particulate Sensor	Within Prescribed Limits
8	Suspended Particulate Matter (SPM)	500 µg/m³	452 µg/m³	Particulate Sensor	Within Prescribed Limits

NEQS: National Environmental Quality Standards for Ambient Air, 2010

- Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

Note:

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- **The values represent sample conditions when monitoring/testing was carried out.**
- **The report data is not intended to be used legally by the client.**

1. **Sample Analyzed By:** Farhan Ali, Analyst (Field)
2. **Name of Chief Analyst with Seal:** Muhammad Arfan
3. **Signature of Incharge of the Environmental Laboratory:**
   Name: Imran Malik
   General Manager
   Date: 26/06/2023

---------- End of Report ----------

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Annexure-4: Noise Monitoring Report

ESPAK

ENVIRONMENTAL SERVICES PAKISTAN

PAK EPA & PUNJAB EPD CERTIFIED

NOISE MONITORING REPORT

Reference Number: ESPAK/0120I/23/N/3439/00379 **Date:** 26/06/2023

Name of Industry/Client: Emaar Grid Station.

Address: Canyon Views, Islamabad.

Telephone No.:

Nature of Sample: Noise

Date of Sample Collection: 22/06/2023 **Grab / Composite:** Continuous - 24 Hours

Sample Collected/Sent By: Farhan Ali, Analyst (Field), ESPAK

Date of Completion of Analysis: 23/06/2023

Method/Equipment Used: Sound Level Meter

S. No	Measurement Point	Limit Values (NEQS)	Noise Level in dB(A) Leq	Remarks
1	Grid Area (GPS: 33.526626°N 73.186658°E)-Day Time	65 dB(A)	64 dB(A)	Within Prescribed Limits
2	Grid Area (GPS: 33.526626°N 73.186658°E)-Night Time	55 dB(A)	50 dB(A)	Within Prescribed Limits

NEQS: National Environmental Quality Standards for Noise in Commercial Area, 2010 Day Time Hours (6:00 am to 10:00 pm) Night Time Hours (10:00 pm to 6:00 am)

- Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

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- **The report data is not intended to be used legally by the client.**

1. **Sample Analyzed By:** Farhan Ali, Analyst (Field)
2. **Name of Chief Analyst with Seal:** Muhammad Arfan
3. **Signature of Incharge of the Environmental Laboratory:**

Name: Imran Malik
General Manager
Date: 26/06/2023

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Page 1 of 1

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Annexure-5: Ground Water Quality Report

ESPAK

ENVIRONMENTAL SERVICES PAKISTAN

PAK EPA & PUNJAB EPD CERTIFIED

CHEMICAL ANALYSIS TEST REPORT (GROUND WATER)

Reference Number: ESPAK/0120I/23/DW/3440/00830 **Date:** 27/06/2023
Name of Industry / Client: Emaar Grid Station.
Address: Canyon Views, Islamabad.
Telephone No.:
Nature of Sample: Ground Water from Turbine
Date Sample Received: 23/06/2023 **Grab / Composite:** Grab
Date of Sample Collection: 22/06/2023
Sample Collected / Sent By: Farhan Ali, Analyst (Field), ESPAK
Date of Completion of Analysis: 27/06/2023

S. No	Parameters	Limit Values (NSDWQ)	Concentration	Method / Equipment Used	Remarks
1	Total Coliforms	----	ND	SMWW 9221 B	---
2	Fecal Coliform Bacteria	Must not be detectable in any 100mL sample	ND	SMWW 9221 F	Within Limits
3	E. Coli	Must not be detectable in any 100mL Sample	ND	SMWW 9221 F	Within Limits
4	Color	≤15 TCU	ND	SMWW 2120 C	Within Limits
5	Taste	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
6	Odor	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
7	Turbidity	<5 NTU	0.2	SMWW 2130B	Within Limits
8	Total Hardness as $CaCO_3$*	<500 mg/L	276 mg/L	SMWW 2340C	Within Limits
9	Total Dissolved Solids (TDS)*	<1000 mg/L	550 mg/L	SMWW 2540C	Within Limits
10	pH*	6.5-8.5	7.6	SMWW 4500H+B	Within Limits
11	Aluminum (Al)	≤0.2 mg/L	ND	U.S. EPA-200.7	Within Limits
12	Antimony (Sb)	≤0.005 mg/L	ND	U.S. EPA-200.7	Within Limits
13	Arsenic (As)	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits
14	Barium (Ba)	0.7 mg/L	0.1 mg/L	U.S. EPA-200.7	Within Limits
15	Boron (B)	0.3 mg/L	ND	U.S. EPA-200.7	Within Limits
16	Cadmium (Cd)	0.01 mg/L	ND	U.S. EPA-200.7	Within Limits
17	Chloride (as Cl^-)*	<250 mg/L	55 mg/L	SMWW 4500Cl^-B	Within Limits
18	Chromium (Cr)	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits
19	Copper (Cu)	2.0 mg/L	ND	U.S. EPA-200.7	Within Limits
20	Cyanide (CN^-)	≤0.05 mg/L	ND	SMWW 4500 CN^- F	Within Limits
21	Fluoride (F^-)*	≤1.5 mg/L	0.2 mg/L	U.S. EPA 9214	Within Limits
22	Lead (Pb)	≤0.05 mg/L	ND	U.S. EPA-200.7	Within Limits

Page 1 of 2

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CHEMICAL ANALYSIS TEST REPORT (GROUND WATER)

Reference Number: ESPAK/0120I/23/DW/3440/00830 **Date:** 27/06/2023

Name of Industry / Client: Emaar Grid Station.

S. No	Parameters	Limit Values (NSDWQ)	Concentration	Method / Equipment Used	Remarks
23	Manganese (Mn)	≤0.5 mg/L	ND	U.S. EPA-200.7	Within Limits
24	Mercury (Hg)	≤0.001 mg/L	ND	U.S. EPA-200.7	Within Limits
25	Nickel (Ni)	≤0.02 mg/L	ND	U.S. EPA-200.7	Within Limits
26	Nitrate (NO_3^-)	≤50 mg/L	9.0 mg/L	SMWW 4500NO_3^-B	Within Limits
27	Nitrite (NO_2^-)	≤3 mg/L	0.9 mg/L	SMWW 4500NO_2^-B	Within Limits
28	Selenium (Se)	0.01 mg/L	ND	U.S. EPA-200.7	Within Limits
29	Residual Chlorine	0.2-0.5 mg/L	ND	SMWW 4500-Cl B	----
30	Zinc (Zn)	5.0 mg/L	ND	U.S. EPA-200.7	Within Limits
31	Phenolic Compounds (as Phenols)	NGVS	ND	SMWW 5530 C	----

NSDWQ: Pakistan National Standards for Drinking Water Quality, 2010
SMWW: Standard Methods for the Examination of Water and WasteWater 23rd Edition, American Public Health Association, American Water Works Association, Water Environment Federation USA (2017)
USEPA: United States Environmental Protection Agency
NGVS: No Guideline Value Set
ND: Not Detected

- Laboratory tests and measurements were carried out at 25 ± 5 °C and 50 ± 20 % Relative Humidity conditions unless required otherwise.
- Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

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- **The report data is not intended to be used legally by the client.**
- **Only parameters marked with asterisk (*) are ISO 17025:2017 accredited.**

1. **Sample Analyzed By:** Waqas Ahmad (Analyst (ICP-AES)); Ghulam Mustafa (Analyst (Chemical)); Abdul Aziz (Analyst (Chemical)); Khizra Bano (Analyst(Microbiology)); M.Shahid (Analyst (Chemical))
2. **Name of Chief Analyst with Seal:** Muhammad Arfan
3. **Signature of Incharge of the Environmental Laboratory:**

Name: Imran Malik
General Manager
Date: 27/06/2023

---------- End of Report ----------

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Annexure-6: Questionnaire

Questionnaire for the Resident of EMAAR Housing Society

Name		
Age		
Gender		
Occupation		
	Yes	No
Are you the Resident of EMAAR Housing Society?		
Are you in the favour of EMAAR Grid station		
Do you face electricity issue in your area		
Do you think this site is best suitable for the Grid station?		
Do you think this Grid will benefit the EMAAR Housing Society?		

Annexure-7: List of Stakeholders met during EIA

No.		Name of Person	Designation
1	IESCO, Islamabad	Mr. M. Bilal	Sub-Engineer, IESCO, Islamabad
2		Mr. Sher Afzal	Assistant Manager Environment IESCO, Islamabad
3	**Stakeholders**	Mr. Habib Ullah	EMAAR, DHA
4		Mr. Moqeet Ayub	EMAAR, DHA
5		Mr. AR Taimoor	EMAAR, DHA
6		Mr. Uzair	EMAAR, DHA
7		Mr. Salman Nasir	EMAAR, DHA

Annexure-8: Route and Location of Transmission Lines.

Annexure-9: List of Community Members Consulted.

No.	Participants Name	Participants Profession	Address	Date
1.	Master Muhammad Sidique	Local Resident	Mohri Khumbal	25-04-2023
2.	Muhammad Hussain	Local Resident	Mohri Khumbal	25-04-2023
3.	Zahid Ibal	Local Resident	Mohri Khumbal	25-04-2023
4.	Iftikhar	Local Resident	Mohri Khumbal	25-04-2023
5.	Lal Khan	Local Resident	Mohri Khumbal	25-04-2023
6.	Raziq	Local Resident	Mohri Khumbal	25-04-2023
7.	Ghulam Yasin	Local Resident	Mohri Khumbal	25-04-2023
8.	Abdul Baqi	Local Resident	Mohri Khumbal	25-04-2023
9.	Jan-e-Alam	Local Resident	Canyon Views	25-04-2023
10.	Gazanfar	Local Resident	Canyon Views	25-04-2023
11.	Saif Ali	Local Resident	Canyon Views	25-04-2023
12.	Atique – ur – Rahman	Local Resident	Canyon Views	26-04-2023
13.	Muhammad kamal	Local Resident	Canyon Views	26-04-2023
14.	Ghulam sawar	Local Resident	Canyon Views	26-04-2023
15.	Rahim	Local Resident	Canyon Views	26-04-2023
16.	Samina Bibi	Local Resident	Canyon Views	26-04-2023
17.	Ch. Shahid	Local Resident	Canyon Views	26-04-2023
18.	Wapda Property	Local Resident	Gumreh Kas	26-04-2023
19.	Sherbaz	Local Resident	Gumreh Kas	26-04-2023
20.	Shahid Ali	Local Resident	Gumreh Kas	26-04-2023
21.	Amjad Hussain	Local Resident	Gumreh Kas	26-04-2023
22.	Aurangzeb	Local Resident	Gumreh Kas	26-04-2023

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