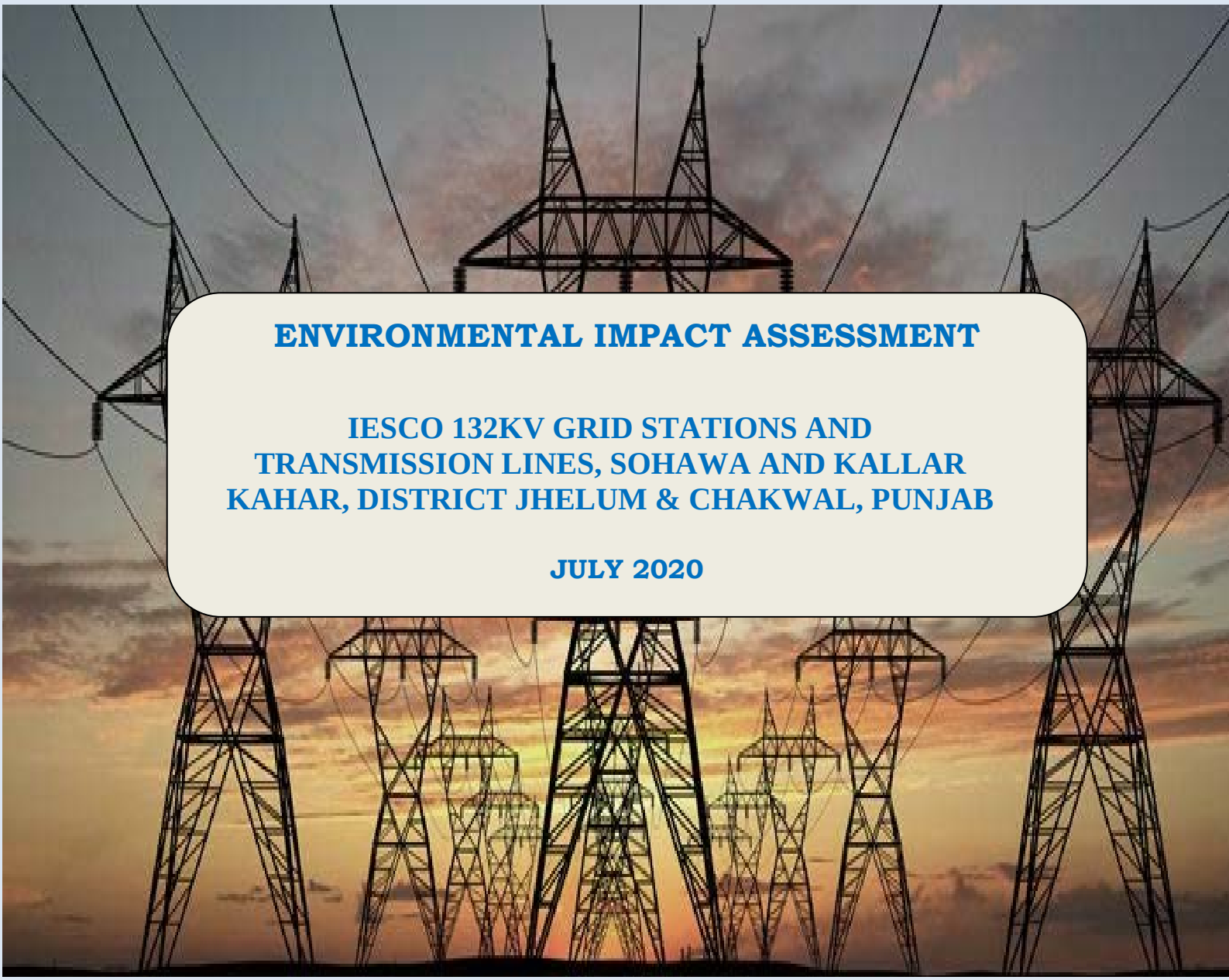

ENVIRONMENTAL IMPACT ASSESSMENT

IESCO 132KV GRID STATIONS AND TRANSMISSION LINES, SOHAWA AND KALLAR KAHAR, DISTRICT JHELUM & CHAKWAL, PUNJAB

JULY 2020

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ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR IESCO 132KV GRID STATIONS AND TRANSMISSION LINES, SOHAWA AND KALLAR KAHAR, DISTRICT JHELUM AND CHAKWAL, PUNJAB

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ACRONYMS

AEB	Area Electricity Boards
AEEA	Annual Environmental Excellence Award
AEIA	Air Quality Impact Assessment
AES	Area Electricity Supply
AJK	Azad Jammu and Kashmir
DISCO	Distribution Company
E&SS	Environmental and Social Safeguard
EIA	Environmental Impact Assessment
ELF	Extremely Low Frequency
EMF	Electro Magnetic Field
EMMP	Environmental Management and Monitoring Plan
EMS	Environmental Management System
ESI	Environmental and Social Inspector
GEF	Global Environmental Facility
GIS	Gas Insulated Stations
GRM	Grievance Redressal Mechanism
GSC	Grid Station Construction (Department)
GSO	Grid Station Operation (Department)
GT Road	Grand Trunk Road
HSE	Health, Safety and Environment
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ICT	Islamabad Capital Territory
IEE	Initial Environmental Examination
IESCO	Islamabad Electric Supply Company
IFC	International Finance Corporation
NCPC	National Cleaner Production Center - Foundation
NCS	National Conservation Strategy
NEQS	National Environment Quality Standards
NFEH	National Forum for Environment & Health
NOC	No Objection Certificate
NPO	Non-Profit Organization
O&M	Operation and Maintenance
PAPs	Project Affected Persons
PCB	Poly-chlorinated biphenyls
PCRWR	Pakistan Council for Research on Water Resources
PEPA	Punjab Environmental Protection Act
PEPC	Pakistan Environmental Protection Council
PEPO	Pakistan Environmental Protection Ordinance

PEQS	Punjab Environment Quality Standards
PMU	Project Management Unit
POP	Persistent Organic Pollutants
SCR	Social Complaint Register
SDPI	Sustainable Development Policy Institute
SMRS	Self-Monitoring and Reporting System
T/L	Transmission Line
UNCED	United Nations Conference on Environment and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
WAPDA	Water and Power Development Authority
WHO	World Health Organization

EXECUTIVE SUMMARY

Due to rapid increase in urbanization, population and demand, Islamabad Electric Supply Company (IESCO) intends to upgrade / expand its 132 kV transmission and grid system. The rationale behind the project is to improve the voltage, reduce line losses and meet the demand of electricity in Tehsil Sohawa and Tehsil Kallar Kahar of District Jhelum and Chakwal respectively. The proposed project is divided into following components:

I. 132 kV Grid Station at Tehsil Sohawa, District Jhelum and its feeding transmission line including only one (01) tubular pole.
II. 132 kV Grid Station at Tehsil Kallar Kahar, District Chakwal and its feeding transmission line including three (03) towers.

This Environmental Impact Assessment (EIA) report for IESCO's proposed 132 kV grid stations and transmission lines in District Jhelum and Chakwal analyzes the impacts associated with the construction and operational phase of the proposed project and its surroundings, suggest mitigation measures, and identifies residual impact which needs monitoring.

This EIA report is consolidation of the findings and assessment carried out during the EIA process. The report is prepared in compliance with specific requirements and objectives of Punjab Environmental Protection Agency and also satisfying IESCO's stipulated scope of work. IESCO has entrusted National Cleaner Production Center (NCPC) to carry out the Environmental Impact Assessment (EIA) of the proposed project. National Cleaner Production Center (NCPC) has experience in Cleaner Production techniques, Environmental Management System, Quality Control, Environmental and Natural Resource Conservation.

This report has been structured in the following manner:

- **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 – Legislation & 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 - Baseline Conditions of Project Area** provides a description of the microenvironment and macro-environment of the proposed project site. This chapter

describes the physical, ecological and socioeconomic resources of project area and its surroundings;

- **Chapter 6 - Public Consultation / Stakeholders Concerns** provides the details of stakeholder consultation methodology and relevant concerns regarding the project;
- **Chapter 7 - Environment, Social Assessment & Mitigation Measures** describes the potential environmental and social impacts of proposed project on the different features of the micro and macro-environment;
- **Chapter 8 - Environment Management & Monitoring Plan (EMMP)** explains the mitigation measures proposed for the project in order to minimize the impacts to acceptable limits. It also describes implementation of mitigation measures on ground and monitoring of environmental parameters against likely environmental impacts;
- **Chapter 9 - Grievance Redressal Mechanism (GRM)** provides an outline of the methodology that will be adopted to address the grievances of affected people.
- **Chapter 10 (Conclusions and Recommendations)** presents conclusion of EIA study and followed by series of Annexes for provision of supporting information.

As per legislative requirements under Section 12 (1) of Punjab Environmental Protection Act, 1997 (Amended 2012); it is mandatory for proponent of any project within the geographical limits of the province of Punjab to conduct an Environmental Impact Assessment (EIA) and acquire an approval / no-objection certificate (NOC) from Punjab Environmental Protection Agency before the commencement of project activities. The proposed project falls under the project category of Schedule II, Category A, sub-section '3' of Pak-EPA Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000.

To establish the background environmental conditions of the project area, a detailed survey of the site was conducted. This included but not limited to topography, geology, hydrology, climate, ambient air quality, seismology, flora and fauna, socio-economic conditions, archaeology, present infrastructure and future proposed development plans for the project area. Information describing the existing environment was gathered from various sources including the client, statutory bodies, local interest groups and secondary published data.

The proposed location for Sohawa grid station is about 500 m away from Grand Trunk Road on Chakwal – Jhelum Road. The coordinates of the grid station site are as follows 33^{o}08'18''N and 73^{o}23'29''E. The land of this project has been purchased by IESCO from a local person / land owner, the copy of land record is attached as **Annex VII**.

The proposed site for Kallar Kahar grid station lies in Township society Kallar Kahar at a distance of 7.1 km from Kallar Kahar Toll Plaza. The coordinates of the grid station site are as follows 32^{o}44'44''N and 72^{o}41'32''E. The land of this project has been provided by the

Township Housing Society, Kallar Kahar, District Chakwal; the copy of MoU is attached as **Annex-VII**.

View of proposed locations at Sohawa and Kallar Kahar

Project Components	Tentative Schedule	Project Cost (PKR)
I. Sohawa Grid Station	September 2020 to October 2021	254.409 Million
II. Kallar Kahar Grid Station	October 2020 to October 2021	149.964 Million

The proposed projects will help to improve the voltage and reduce line losses by coping up the increasing demand of electricity due to rapid increase in population / urbanization in its operational territory. 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, technical losses will also remain high, and the system reliability will progressively decrease, with increasing pressure on the system. The most significant outcomes of "No Action" approach would be a negative impact on current electricity supplies, and the possibility of complete blackouts at times of high demand.

The IESCO Siting and Lay out Board / Technical team has chosen the site for Sohawa grid station by considering several parameters including nearby settlements, ecological environment, ease of access, loss to agricultural land etc. The chosen site is adjacent to Chakwal More in Sohawa on Sohawa – Chakwal Road, declared feasible due to load centre, easy to access and with minimum damage to environment.

The site for Kallar Kahar grid station has been selected after extensive survey of the area by IESCO Technical team. The land, which is being offered by the Township Housing Society, Kallar Kahar requires zero relocation of locals. The site is declared feasible for being a load centre, easily accessible and posing least ecological disturbance.

Generally, two types of grid station designs are available namely gas insulated and air insulated. In view of the fact that the cost of Gas Insulated Station is higher, the conventional air insulated grid station design is the preferred option for the proposed project.

The environmental aspects of the traditional oil-filled circuit breakers essentially pertain to the soil and water contamination caused by the possible oil leakage. However, SF-6 circuit breakers are available for 132-KV and above which are a preferred option for the current project due to their effectiveness. 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.

The report evaluates the screening process and highlights whether significant environmental impacts exist or not and mention the likely environmental impacts arising from the project activities like construction, installation and operation activities of the project. It was evident from the assessment of impacts that no significant damage to wildlife, vegetation or habitats is anticipated from the proposed project. Similarly no residential property recorded, cultural/historical or archaeological sites would be affected by the project. Furthermore, no adverse socio-economic impact of the project is envisaged.

During the EIA process, consultations were held with the community living within the project areas. Different aspects and impacts of the proposed projects were highlighted regarding their impacts on the physical, biological, and socio-economic environment of the project areas. Stakeholders concerns regarding various aspect, existing environment, and impacts of the project were noted in the EIA report. The community within the project areas is in favor of the projects that it will enhance electricity supply in their respective areas of Jhelum and Chakwal Districts. However, they also urge that proper mitigation plans should be adopted to safeguard environment during construction phase of the project.

The location of grid station of proposed project is on a vacant land with no infrastructure or agricultural activity. The soil-related issues include soil erosion and soil contamination. Construction activities and vehicle operation in such areas can potentially cause soil erosion and landslides/ slope stability. Appropriate mitigation measures will be followed to avoid soil contamination as a result of fuel/oils/chemicals spillage and leakage from construction equipment’s and vehicles, and inappropriate waste (solid as well as liquid) disposal.

Construction machinery and vehicles may release exhaust emissions while construction activities may also cause fugitive dust emissions. Due to various construction activities, there will be short-term noise impacts in the immediate vicinity of the project site. Construction machinery and vehicles should be kept in good working condition and properly tuned, in order to minimize

the exhaust emissions. Fugitive dust emissions will be minimized by regular sprinkling water on soil, where required and appropriate.

Clearing of natural vegetation will be minimized as far as possible during the construction works. Approximately three trees and wild shrubs will need to be cut for construction of Sohawa grid station. Tree plantation is a significant part of project to improve the environmental conditions of the site. In order to compensate the removal of the trees during the construction activities, IESCO has devised a plan to plant trees of indigenous species. Hunting and poaching will be strictly prohibited to avoid any damage to wildlife. The operation of the proposed project will accelerate the business activity in the area and will provide employment opportunities to locals.

The mitigations for the impacts identified and monitoring requirements are summarized in the EMMP (Environmental Management and Monitoring Plan) which has been designed to provide a delivery mechanism for the implementation of proposed measures during all phases of the project. The EMMP reflects the commitment of IESCO to safeguard the environment as well as the surrounding population.

Grievance Redressal Mechanism (GRM) provides an outline of the methodology that will be adopted to address the grievances of affected people (if any). A responsive mechanism will be established to resolve the issues, complaints and grievances regarding environmental performance of the project. The Grievance Redress Mechanism will be designed to cater for the issues of the people that can be affected by the Project.

After the detailed impact assessment activity, it can be concluded that Project will bring positive changes in physical, biological and socioeconomic environments. Some activities under this project have been identified to cause low to moderate environmental negative impacts and their mitigation measures have been prescribed. Proper and timely execution of these measures will reverse most of the negative impacts in the long term. These impacts can be controlled by regular monitoring as IESCO would comply with national and international environmental, safety and health standards. Protection and monitoring measures will be incorporated at each phase of the proposed project activity.

CONTENTS

1.0 INTRODUCTION 1-1

1.1 Background 1-1
1.2 Project Categorization 1-1
1.3 Location of Project 1-2
1.4 Project Profile 1-2
1.4.1 Objective 1-3
1.4.2 Scope of Project 1-4
1.5 Objectives of EIA 1-4
1.5.1 Methodology Adopted for EIA 1-4
1.6 IESCO - The Proponent 1-7
1.7 NCPC-The Consultant 1-9
1.7.1 EIA team 1-10
1.8 Report Structure 1-10
1.9 Contact Persons 1-11

2.0 EXISTING LEGAL FRAMEWORK 2-1

2.1 Introduction 2-1
2.2 National Environmental Laws & Legislations 2-1
2.2.1 Pakistan Penal Code, 1860 2-2
2.2.2 Pakistan Environmental Protection Ordinance, (PEPO) 1983 2-2
2.2.3 Antiquities Act, 1975 2-4
2.2.4 The Forest Act, 1927 2-4
2.2.5 Cutting of Trees (Prohibition) Act, 1975 2-4
2.2.6 Land Acquisition Act, 1894 2-4
2.2.7 The Electricity Act, 1910 & the Electricity (Amendment) Ordinance 2-5
2.2.8 The Telegraph Act, 1885 2-5
2.2.9 Employment of Child Act, 1991 2-6
2.3 The Punjab Environmental Protection Act, 1997 (Amended 2012) 2-6
2.4 Review of IEE and EIA Regulations, 2000 2-7
2.5 Pak-EPA, Guidelines for Preparation and Review of Environmental Reports 2-7
2.6 Guidelines for Public Consultation during IEE / EIA 2-8
2.7 Punjab Environmental Quality Standards (PEQS) 2-8
2.8 Punjab Wildlife Act, 1974 2-8
2.9 Punjab Forest Act 2010 2-9
2.10 Pakistan Environmental Assessment Procedures 2-9
2.11 Pakistan NCS and its Implementation Status 2-9
2.12 International Treaties and Conventions 2-10
2.13 Labor Laws 2-11
2.14 IFC Performance Standards on Environmental and Social Sustainability 2-11
2.15 IFC Environment, Health and Safety (EHS) Guidelines 2-11

3.0 PROJECT DESCRIPTION 3-1

3.1 Introduction 3-1
3.2 Scope and Overview of the Project 3-1
3.2.1 Objectives of the Project 3-2
3.3 Location of Project 3-2
3.4 Project Categorization 3-7
3.5 Land use 3-7
3.6 Project Schedule 3-7
3.7 Project Cost 3-7
3.8 Project Components 3-8
3.8.1 Grid Station 3-10
3.8.2 Transmission Line 3-11
3.9 Project Activities Process Flow 3-11
3.9.1 Construction Phase 3-12
3.9.2 Restoration and Rehabilitation after completion of Project 3-13
3.9.2.1 Maintenance Procedure of Transformer 3-13
3.10 Utilities and other requirements during Construction activity 3-14

4.0 ANALYSIS OF ALTERNATIVES 4-1

4.1 Background 4-1
4.2 No-Project Option 4-1
4.3 Alternate Site Option 4-2
4.4 Technical Alternatives 4-3
4.4.1 Transmission Line Alternatives 4-3
4.4.2 Types of Grid Station 4-4
4.2.3 Type of Circuit Breakers 4-5
4.2.4 Type of transformer oil 4-5
4.2.5 Type of Towers 4-6

5.0 BACKGROUND OF THE PROJECT AREA 5-1

5.1 Project Location 5-1
5.2 Physical Environment 5-2
5.2.1 Geology and Topography 5-3
5.2.2 Water Resources 5-4
5.2.3 Climate Conditions 5-5
5.3 Biological Environment 5-7
5.3.1 Flora of the Project Area 5-8
5.3.2 Fauna Species of the Project Area 5-9
5.4 Socio-Economic Environment 5-14

5.4.1 Area and Population 5-14
5.4.2 Education 5-15
5.4.3 Health facilities 5-16
5.4.4 Agriculture and Live Stock 5-17
5.4.5 Business and Industry 5-18
6.4.7 Archaeological Sites 5-19

6.0 STAKEHOLDER CONSULTATION 7-1

6.1 Objectives 7-1
6.2 Stakeholder Consultation and EIA 7-1
6.3 Project Stakeholders 7-2

7.0 ENVIRONMENTAL, SOCIAL ASSESSMENT AND MITIGATION MEASURES 7-1

7.1 Introduction 7-1
7.2 Screening Methodology 7-1
7.3 Designing Phase: Impacts and their Mitigation measures 7-1
7.3.1 Intrusion of Sensitive Receptors 7-1
7.3.2 Impact on migratory bird flyways 7-2
7.2.3 Establishing responsibility on CC regarding disposal of spoil/ excavated earth 7-2
7.2.4 Establishing responsibility on construction contractor to abide PEQS 7-2
7.2.5 Health and Safety of Workers and Public 7-2
7.4 Construction Phase: Impacts and Mitigation Measures 7-3
7.4.1 Erosion of Soil 7-3
7.4.2 Waste Generation and Disposal 7-3
7.4.3 Impacts on Surface and Ground Water Resources 7-4
7.4.4 Fuel and Oil handling, storage and disposal 7-4
7.4.5 Dust Emissions 7-4
7.4.6 Exhaust Emissions 7-5
7.4.7 Noise and Vibration 7-5
7.4.8 Road cutting and rehabilitation 7-6
7.4.9 Occupational Health and Safety 7-6
7.5 Operational and Maintenance Phase: Impacts and Mitigation Measures 7-7
7.5.1 Health Impacts 7-8

8.0 ENVIRONMENTAL MANAGEMENT & MONITORING PLAN 8-1

8.1 Introduction 8-1
8.2 Objectives of the EMMP 8-1
8.3 Scope of EMP 8-2
8.4 Components of the EMMP 8-2
8.4.1 Legislation and Guidelines 8-3

8.4.2 Institutional Capacity 8-3
8.4.3 Summary of Impacts and Mitigation Plan 8-6
8.4.4 Emergency Procedures and Contingency Plan 8-14
8.4.5 Communication and Documentation 8-14
8.4.6 Change Management Plan 8-16
8.4.6.1 Changes to the operation 8-16
8.4.6.2 Changes to the EMMP 8-17
8.4.7 Training Programs 8-18
8.4.7 Costed EMMP 8-18

9.0 GRIEVANCE REDRESSAL MECHANISM 9-1

9-1
9.1 Framework for Grievance Redressal Mechanism 9-1
9.2 Outline of Mechanism for Grievance Redressal

10.0 CONCLUSION **10-1**

10.1 Conclusion 10-1
10.2 Recommendations 10-2

ANNEXURES

Annex I References
Annex II Punjab Environmental Quality Standards
Annex III Terms of Reference
Annex IV Drinking Water Analysis Report
Annex V Ambient Air Analysis Report
Annex VI Noise Analysis Report
Annex VII Land Documents
Annex VIII Meteorological Data of Project Area
Annex IX EIA Team Profile

EXHIBITS

Exhibit 1.1	A view of project sites of Sohawa and Kallar Kahar grid stations	1-2
Exhibit 1.2	Map showing operation areas of IESCO	1-8
Exhibit 1.3	EIA Team	1-10
Exhibit 3.1	Project site view of Sohawa grid station	3-2
Exhibit 3.2	View of Kallar Kahar grid station site	3-2
Exhibit 3.3	Site visit of Kallar Kahar & Sohawa grid station	3-2
Exhibit 3.4	Satellite view of proposed location for Sohawa Grid Station and its adjoining area	3-3
Exhibit 3.5	Satellite view of proposed location for Kallar Kahar Grid Station and its adjoining areas	3-4
Exhibit 3.6	Layout Plan of Sohawa Grid Station	3-5
Exhibit 3.7	Layout Plan of Sohawa Grid Station	3-6
Exhibit 3.8	List of equipment for Kallar Kahar and Sohawa grid stations	3-11
Exhibit 3.9	Project Activities Flowchart	3-11
Exhibit 5.1	District Chakwal's Average Climate Profile	5-6
Exhibit 5.2	District Jhelum's Average Climate Profile	5-7
Exhibit 5.3	Floral Species of the Project Area	5-8
Exhibit 5.4	Life forms of Floral Species with % in District Chakwal	5-9
Exhibit 5.5	Flora of the Project Area	5-11
Exhibit 5.6	Avi-fauna of the Project Area	5-13
Exhibit 5.7	Mammals observed in the Project Area	5-13
Exhibit 5.8	Reptiles observed in the Project Area	5-14
Exhibit 5.9	Population Distribution Chart of District Jhelum	5-14
Exhibit 5.10	Population Distribution Chart of District Chakwal	5-15
Exhibit 5.11	Charts showing Union Councils and Population Distribution of District Chakwal	5-15
Exhibit 5.12	Land Statistics of District Jhelum	5-18
Exhibit 5.13	Industrial Units of District Chakwal	5-18
Exhibit 5.14	Industrial Units of District Jhelum	5-18
Exhibit 6.1	Pictorial View of Public and Stakeholder Consultation	6-3
Exhibit 6.2	Summary of Stakeholders Concerns	6-5
Exhibit 7.1	Results of EMF Assessment	7-9
Exhibit 7.2	Impact Assessment Matrix	7-11
Exhibit 8.1	Environmental Management and Monitoring Plan	8-7
Exhibit 8.2	Contingency Plan	8-14
Exhibit 8.3	Reporting and Assessment	8-14
Exhibit 8.4	Environmental Training Program	8-17
Exhibit 8.5	Costed Environmental Management Plan	8-17

1.0 INTRODUCTION

1.1 Background

This document presents the findings of an Environmental Impact Assessment (EIA) carried out for the construction / installation of two 132 kV grid stations and their feeding transmission lines by IESCO. The rationale behind the project is to improve the voltage, reduce line losses and meet the demand of electricity in Tehsil Sohawa and Tehsil Kallar Kahar of District Jhelum and Chakwal respectively. The project is divided into following components:

i. 132 kV Grid Station Sohawa, Jhelum and its feeding Transmission Line; and
ii. 132 kV Grid Station Kallar Kahar, Chakwal and its feeding Transmission Line

Presently, this site is in possession of IESCO and required NOCs & Approvals have been obtained by the project proponent from the concerned authorities. In fulfillment of requirements of the Punjab Environmental Protection Act, 1997 (Amended 2012), this EIA report is submitted to the Punjab Environmental Protection Agency for environmental approval.

This Environmental Impact assessment (EIA) report identifies and evaluates the potential environmental and social impacts which may result from Project-related activities and, where necessary, introduces measures to mitigate adverse impacts. It ensures that possible adverse environmental impacts are identified and avoided or minimized. It finds ways and means to reduce adverse impacts and shape projects to suit the local environment and present the predictions and options to decision-makers.

The EIA process and report meets the regulatory standards enforced by the Punjab Environmental Protection Agency (PEPA). The report has been prepared in conformance with the requirements of Punjab Environmental Protection Act 1997 (Amended 2012), Pak-EPA Review of IEE and EIA Regulations (2000) and Punjab Environmental Quality Standards (2016).

1.2 Project Categorization

Section 12 (1) of Punjab Environmental Protection Act, 1997 (Amended 2012) requires proponent of project to file an IEE or EIA, as the case may be, and obtain approval from the Provincial Agency before commencing construction or operation of the project.

Section 12 (1) of the PEPA 1997 (Amended 2012) is reproduced herein under for ready reference: " 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."

Pak-EPA Review of IEE/EIA Regulations, 2000 made in exercise of powers conferred under section 33 of Punjab Environmental Protection Act (PEPA) 1997 (Amended 2012) categorizes projects in three categories provided in Schedule I, II and III of the 2000 Regulations. The proposed project falls in category A (3) *"Transmission lines (11 KV and above) and grid stations"* of Schedule II (List of Projects requiring EIA) of the 2000 Regulations.

1.3 Location of Project

The proposed location for Sohawa grid station is 500 m away from Grand Trunk Road on Chakwal – Jhelum Road. The coordinates of the grid station site are 33^{o}08'18''N and 73^{o}23'29''E. The Sohawa grid station will be constructed on 32 kanal of land acquired by IESCO near Chakwal Morr District Jhelum.

The proposed site for Kallar Kahar grid station lies in Township society Kallar Kahar at a distance of 7.1 km from Kallar Kahar Toll Plaza, on 32^{o}44'44''N and 72^{o}41'32''E. Township Housing Society Kallar Kahar has provided 32 kanal of land for construction of 132 kV grid station at Kallar Kahar.

Exhibit 1.1: View of project sites of Sohawa and Kallar Kahar grid stations

I. Sohawa Grid Station

- East: Open field
- North: Open field

- North West: Chakwal – Sohawa Road - 200 m away
- South West: Community project (under construction) - 100 m away

II. Kallar Kahar Grid Station

- East: Graveyard - 200 m away
- North: Residential Plots - 80 m away
- North East: Mosque - 300 m away
- West: Khushab Road - 450 m away
- South: Open field

1.4 Project Profile

1.4.1 Objective

The prime objectives of the proposed projects are to:

- Avoid forced load shedding;
- Maintain and upgrade the existing system;
- Plan, design & implement system expansion to increase the capacity to cope with the higher load demand;
- Reduce the technical losses;
- Improve the quality of electricity supply;
- Improve sustainability, stability, reliability and efficiency of the system, and;
- Improve safety conditions for both workers and general public

1.4.2 Scope of Project

The proposed project is divided into following components:

i. 132 kV Grid Station at Tehsil Sohawa, District Jhelum and its feeding transmission line including only one (01) tubular pole. The grid station will be constructed on 32 kanal of land near Chakwal More, Sohawa Town in District Jhelum.

ii. 132 kV Grid Station at Tehsil Kallar Kahar, District Chakwal and its feeding transmission line including three (03) towers. The Township Housing Society, Kallar Kahar has provided 32 kanal of land for the proposed project.

1.5 Objectives of EIA

The objective of EIA is to foresee the potential environmental and social problems that would arise out of the proposed development activity and address them in the planning and design stage of the project. Following are some of the main objectives of this EIA study:

- Determine & document the state of the environment of the project area to establish a baseline in order to assess the impact of implementation of the proposed project;
- Collect and assess existing environmental & social profile of entire project area and incorporate it in report for future use by client;
- Identify all environmental sensitivities including flora, wildlife and avifauna of the project area, if there is any;
- Identify national heritage sites, archaeological sites & ecologically important areas in the project zone of influence;
- Identify & assess all the major and minor environmental & socio-economic aspects and impacts due to construction & operation in the project microenvironment and generally on its surrounding in accordance with PEPA Act 1997 (Amended 2012) and the rules & regulations framed thereunder;
- Provide assistance to the proponent for planning, designing and implementing the project in a way that would eliminate or minimize the negative impact on the biophysical & socio- economic environment and maximizing the benefits to all future occupants in the most cost-effective manner;
- Provide opportunity to the public for understanding the project and its impact on the community and their environment in the context of sustainable development;
- Develop a detailed Environmental Management Plan for the sustainable implementation mechanism of mitigation measures identified during the study along with monitoring plan.

1.5.1 Methodology Adopted for EIA

This environmental impact assessment was conducted in the following manner:

1. Scoping

A scoping exercise was undertaken to identify the potential issues that are to be considered in the environmental impact assessment. The scoping exercise included the following tasks:

- **Data Compilation:** A generic description of the proposed activities relevant to this environmental assessment was compiled with the help of the Project Proponent.
- **Review of Published literature:** All available published and unpublished information pertaining to the micro and macro environment of the study area was obtained and reviewed. It included the earlier studies conducted in the study area, environmental & social baseline and impact assessment studies conducted by different consultants in past.
- Secondary data was very helpful in understanding the issues that were identified by other consultants.
- **Review of applicable Legislation:** Information on relevant legislation, regulations, guidelines, and standards was reviewed and compiled.
- **Identification of potential impacts:** The information collected in the above procedures was reviewed and potential environmental issues identified.
- **Initial site visit:** An initial site visit was conducted to get an overview of site conditions and the surrounding areas.
- **Stakeholder consultation:** A stakeholder consultation was undertaken to document the concerns of the local community & other stakeholders, and to identify issues that may require additional assessment in order to address these concerns.

2. Review of Legislation and Guidelines

National & Provincial legislations, environmental guidelines, and best industry practices were reviewed to set environmental standards that will be required to follow during different stages of the project. Punjab Environmental Protection Act, 1997 (Amended 2012), Pak-EPA EIA/IEE Regulations 2000 and Sectoral Guidelines were the basic guiding documents used during the study.

3. Baseline Data Collection

Detailed environmental baseline surveys were conducted to collect primary data on the Project Area to help identify sensitive receptors. The primary data were examined and compared with secondary data available from earlier environmental studies in the region. The scope of survey included collection of information on following key aspects:

- Climate and Rainfall
- Air Quality
- Noise Quality
- Topography

- Soil
- Geology
- Hydrology
- Vegetation
- Fauna
- Socioeconomic resources

4. Identification of Aspects

Identification of environmental aspects and their significance is fundamentally important for determination of severity of incidence of impacts at different stages of the project. This step is aimed at obtaining an inventory of the aspects. The aspects identified during this step cover all activities during construction and operation, in order to determine those which have or can have significant impact on the environment.

5. Impact Assessment & EMMP

Environmental experts at NCPC analyzed and assessed the anticipated impacts that are likely to arise due to the identified aspects. Each of the potential impacts identified during the scoping session was evaluated using the environmental, socioeconomic, & project information collected. In general, the impact assessment discussion covers the following aspects:

- Present baseline conditions
- Potential change in environmental parameters likely to be affected by Project related activities
- Prediction of potential impacts
- Evaluation of the likelihood and significance of potential impacts
- Defining of mitigation measures to reduce impacts to as low as practicable
- Prediction of any residual impacts, including all long and short-term, direct and indirect, and beneficial and adverse impacts
- Monitoring of residual impacts

Environmental Management and Monitoring Plan (EMMP) was compiled and included in the environmental assessment report to make it more comprehensive & self-sustaining with the specific purpose of providing working guidelines for the project Proponent and Management personnel who shall be responsible for the construction and operations of the project, so as to enable them to maintain the environmental and social conditions in conformance with the PEPA regulations.

The management plan outlines the details required to manage environmental, safety and community risks arising from the project activities as well as social issues. It also gives the details of monitoring that would be required during the operation phase of the project in order to comply with the requirements of sustainable development.

1.6 IESCO - The Proponent

Islamabad Electric Supply Company Ltd. (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 parts of Azad Jammu & Kashmir (AJK). IESCO was incorporated in April 1998 under the Companies Ordinance 1984. Before this, it was one of the AEBs of WAPDA now collectively called DISCOs.

IESCO is committed to provide leadership in sustainable development and incorporating sustainability principles and identifying alternative and sustainable courses of action to minimize its environmental impact.

IESCO is committed to creating and promoting an environmentally sustainable and responsible culture and foster continuous improvement in its performance in terms of its environmental footprint.

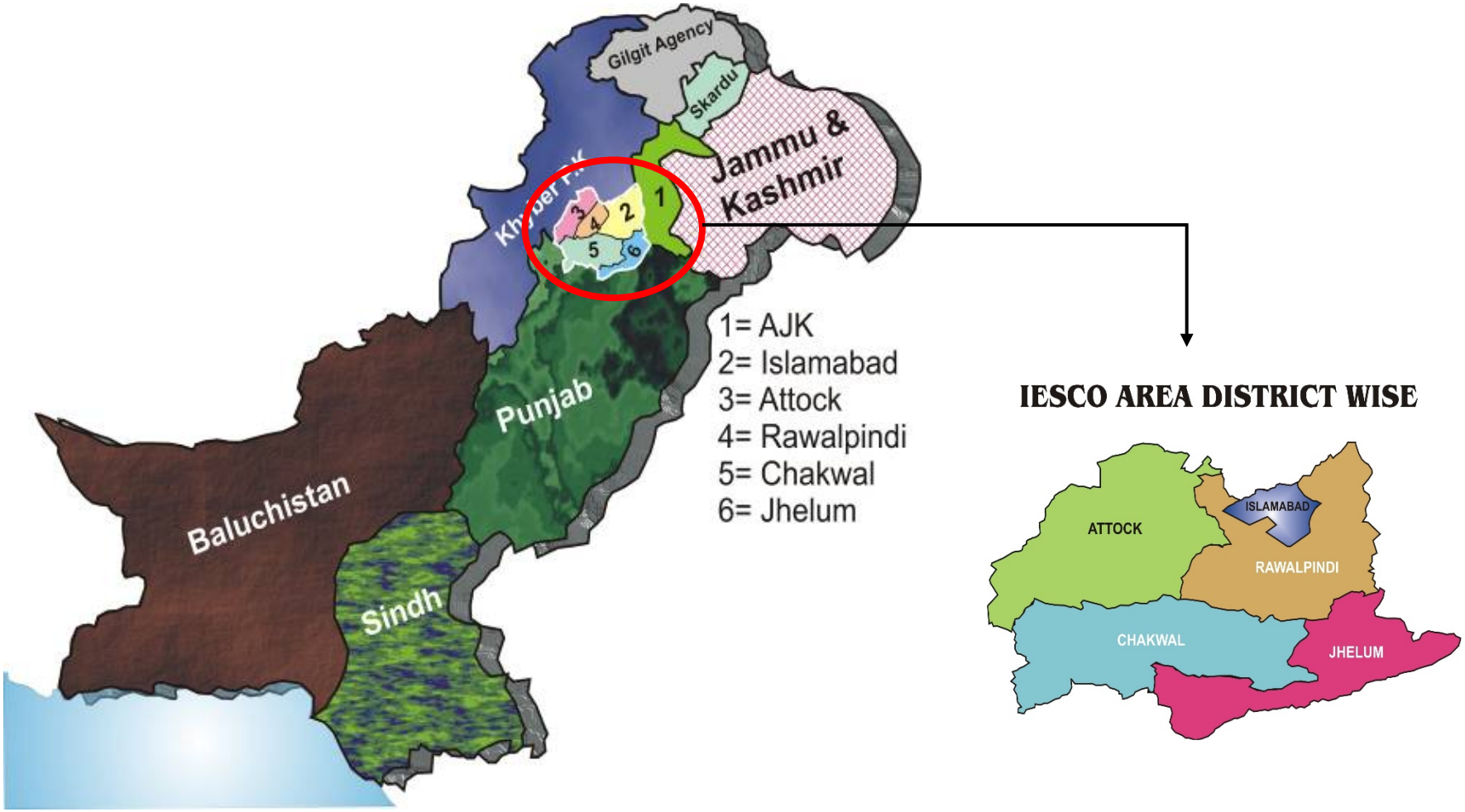


Exhibit 1.2: Map showing operation areas of IESCO

1.7 NCPC-The Consultant

National Cleaner Production Center Foundation (NCPC) is working for the environment and social sector of Pakistan since 1999. The Center was established by UNIDO and is registered under Section 42 of the Companies Ordinance, 1984 by Government of Pakistan in 2002. NCPC is working as a non-profit organization and is certified by Pakistan Centre for Philanthropy (PCP) and by FBR.

NCPC has about ***twenty (20) years*** of experience in providing various services in its areas of expertise. NCPC offers a wide range of services including Initial Environmental Examinations (IEEs), Environmental Impact Assessments (EIAs), Environmental and Social Monitoring, Environmental and Social Audits, Analytical Services, Incineration of Hospital Hazardous Waste, Air Quality Impact Assessments (AQIAs), Bioremediation of Oily Sludge and Oil Spillages, Energy Audits, Cleaner Production Projects and Trainings for capacity building etc. NCPC has also established Federal EPA certified Environment laboratory.

By providing quality services, NCPC has achieved Green Apple Award 2015 &2014, ECO Green Industry Award 2011, 8th Annual Environmental Excellence Award 2011 (AEEA) by National Forum for Environment & Health (NFEH) and Platts Global Energy Award on Corporate Social Responsibility for the year 2007.

NFEH Award (National) | ECO Award (Regional) | Platts Award (Global) | Green Apple Award (International)

NCPC has a wide range of professional staff constituting environmental scientists, environmental engineers, chemical engineer, economist, biologist, social scientists, plant taxonomist, administrative and support staff. The core staff has been selected to cater the diverse services offered by NCPC. NCPC can assemble multi-disciplinary teams from its other NCPCs worldwide and from its extensive list of external consultants. Diverse range of projects has been completed in this way.

1.7.1 EIA Team

For the present study, NCPC selected the team of Environmental Engineers, Environmentalists, Chemical Engineers, Flora and Fauna Expert and Sociologist who can carry out the IEE studies. The NCPC Team consists of the following members:

Sr. No.	Name of Project Team Member	Role	Education
1.	Mr. Muhammad Irshad Ramay	Environmental Engineer	B.Sc. Chemical Engineering M.S Environmental Engineering and Management
2.	Dr. Muhammad Anwar Baig	Hydrologist	PhD in Water, Soil and Environment
3.	Mr. Azhar Qureshi	Flora Fauna Expert	MSc in Zoology
4.	Mr. Tariq Khan	Biologist & Botanist	M.Phil Environment Sciences
5.	Mr. Tahir Hussain	Chemist	MSc Chemistry
6.	Ms. Aroosa Zaheer	Technical Writer/Environmental Engineer	BSc Environmental Engineering
7.	Mr. Nayyar Humair	Air Quality Expert	MSc Chemistry
8.	Mr. Naveed Akhtar	Socio-Economist	M.Phil Sociology
9.	Ms. Sadaf Yasin	Environmentalist	M.Phil Environmental Sciences
10.	Mr. SohailAkram Basra	Environmental Engineer	B.Sc. Environmental Engineering
11.	Mr. Ali Azfar	Chemical Engineer	B.Sc. Chemical Engineering

Exhibit 1.3: EIA Team

1.8 Report Structure

This report has been organized in the following manner:

- ✓ **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 – Legislation & 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 - Baseline Conditions of Project Area** provides a description of the microenvironment and macro-environment of the proposed project site. This chapter describes the physical, ecological and socioeconomic resources of project area and its surroundings;
- ✓ **Chapter 6 - Public Consultation / Stakeholders Concerns** provides the details of stakeholder consultation methodology and relevant concerns regarding the project;
- ✓ **Chapter 7 - Environment, Social Assessment & Mitigation Measures** describes the potential environmental and social impacts of proposed project on the different features of the micro and macro-environment;
- ✓ **Chapter 8 - Environment Management Plan (EMP)** explains the mitigation measures proposed for the project in order to minimize the impacts to acceptable limits. It also describes implementation of mitigation measures on ground and monitoring of environmental parameters against likely environmental impacts;
- ✓ **Chapter 9 - Grievance Redressal Mechanism (GRM)** provides an outline of the methodology that will be adopted to address the grievances of affected people.
- ✓ **Chapter 10 (Conclusions and Recommendations)** presents conclusion of EIA study which is followed by series of Annexes for provision of supporting information.

1.9 Contact Persons

In case of further details or clarifications regarding this EIA, please contact the proponent or the consultant at the following addresses.

IESCO	**NCPC**
Chief Engineer (Development) Project Management Unit (PMU IESCO Head Office, St 40, G-7/4, Islamabad, Pakistan Tel:051-9252519 Fax: 051-9252345	**Mr. Muhammad Irshad Ramay** Coordinator NCPC Refinery P.O. Morgah, Rawalpindi, Pakistan Ph: (+92 51) 5450424 Fax: (+92 51) 5450424/5486876

2.0 EXISTING LEGAL FRAMEWORK

2.1 Introduction

Before initiation of any project, the mandatory legislations enacted by government and other regulatory agencies need to be studied. Governments from time to time have enacted many environmental rules, regulations, laws and guidelines specifying different requirements for diverse kind of projects. Therefore, it would be necessary to study those environmental laws pertaining to the project before its execution so that protection of environment can be ensured.

In this section, same methodology would be followed by studying those rules, regulations and laws that are relevant to the environmental and social aspects of the proposed construction project. The assessment has been carried out to comply with both local and international laws and guidelines. The main among these are:

- National Environmental Laws & Legislations;
- Provincial Environmental Laws & Legislations;
- National & International Environmental and Social Guidelines; and
- Institutional Setup for Environmental Management

This project will comprehensively practice the applicable requirements of policy documents, legislative framework and recommendations described in national and international guidelines of the project and will follow the institutions existing in the country that may influence the environmental management of the proposed project. These laws and guidelines have been incorporated in the mitigation measures and Environment Management and Monitoring Plan (EMMP), which have been formulated for better environmental, ecological and social management.

2.2 National Environmental Laws & Legislations

In Pakistan, the awareness about having environmental protection laws and regulations arose in the late 1970s. First step in this direction was the promulgation of the Pakistan Environmental Protection Ordinance, 1983. The organization entrusted with enforcement of environmental laws was then established viz. Pakistan Environmental Protection Agency in 1984. These efforts were continued and resulted in a plan for protection of environment which is known as the ‘Pakistan National Conservation Strategy’.

Similarly, provincial governments also created Provincial Environmental Protection Agencies to look after the environmental issues in their regions. The powers of Environmental Protection Agencies were considerably enhanced by enacting the Pakistan Environmental Protection Act, 1997. 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). Moreover, there are numerous other national laws that contain the provisions for protection of environment.

Previously, the issue of 'environmental pollution and ecology' was placed in Concurrent list in the Constitution which allowed both Federal and Provincial Governments to enact laws on it. Eighteenth Amendment to the Constitution of Pakistan, 2010, transferred this issue to the Provincial governments. Due to this, the functions related to the national environmental management were transferred to the provinces. The Federal Government has established two Environmental Tribunals in Karachi and Lahore. The Karachi Tribunal has control over the provinces of Sindh and Baluchistan while the Lahore Tribunal covers the provinces of the Punjab and the Khyber Pukhtunkhwa. The High Courts have designated senior civil judges as Environmental Magistrates to take all contraventions punishable in respect of handling of hazardous substances and pollution caused by motor vehicles etc. The international obligations in the context of environment will be managed by the Ministry of Climate Change, Government of Pakistan.

Significant national environmental laws and legislations that have relevance to the project have been discussed below:

2.2.1 Pakistan Penal Code, 1860

Section XIV of PPC deals with the offences affecting the public health, safety, convenience, decency and morals. Person may be guilty of public nuisance if his act or omission causes common injury, danger or annoyance to the public or results in spread of infection of diseases dangerous to life. The section also deals with environmental pollution. However, pollution offences can still be tried under the Pakistan Penal Code, 1860.

2.2.2 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.

More recently 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.

Clause 14 - Handling of Hazardous Waste: requires anyone who generates, collects, consigns, transports, treats, disposes of stores, handles or impacts any hazardous waste to have a permit to do so from FEPA.

Clause 16 - Environmental Protection order: permits FEPA to enforce protection measures and remediation where contamination of the environment has taken place. Where an order is not carried out, FEPA have the authority to carry out the required works and to recover the costs from the person responsible for the source of environmental contamination.

Clause 18 - Offences by Bodies Corporate: identifies individual responsibility and liability to prosecution where contravention of an Ordinance is committed by a body corporate.

Clause 30 - Ordinance to over-ride other laws: this Ordinance takes precedence over other laws in effect at the time.

2.2.3 Antiquities 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 a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area that may contain such articles of archaeological significance.

No archaeological and cultural site as protected under Antiquities Act 1975 is present near the project route alignment.

2.2.4 The Forest Act, 1927

The Forest Act deals with the matters related with protection and conservation of natural vegetation/habitats. The Act contains procedures for constituting and managing various types of forests, such as reserved forests, village forests and protected forests. The Act empowers the provincial forest departments to declare any forest area as reserved or protected. It also defines the duties of forest related public servants, prohibits cutting of trees and prescribes penalties for violation of any provision of the Act.

The Project site does not encompass any reserve/protected forest area.

2.2.5 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.

2.2.6 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 to do all other Acts necessary to ascertain that whether the land is adapted for such purpose.

2.2.7 The Electricity Act, 1910 & the Electricity (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.

2.2.8 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.

2.2.9 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.”

2.3 The Punjab Environmental Protection Act, 1997 (Amended 2012)

PEPA, 1997 is an improvement over PEPO of 1983. The Pakistan Environmental Protection Act, 1997 (PEPA) is the basic Environmental Legislation in the country. PEPA 1997 was enacted on 6 December 1997 with the objective of "protection, conservation, rehabilitation and improvement of environment for the prevention and control of pollution, and promotion of sustainable development".

The Punjab Environmental Protection Act (Amendment) 2012 was appeared to amend the Pakistan Environmental Protection Act 1997.

Islamabad Electric Supply Company, being the proponent 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 Punjab Environmental Protection Act, 1997 (Amended 2012), 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 PEQS, 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 PEQS or the established ambient standard.

2.4 Review of IEE and EIA Regulations, 2000

The Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 promulgated under PEPA 1997 were enforced on June 15, 2000. These Regulations clearly defines the categories of the projects requiring an IEE or EIA, review fees by EPA, filing process of the environmental reports, public participation, decisions by EPA, conditions of approval, compliance reports and monitoring of the environmental parameters etc.

The EIA of the proposed project will be submitted to the Punjab Environmental Protection Agency for approval and only after the issuance of approval, the project activities will be commenced.

Public participation will be ensured as per Section 10 of Review of IEE and EIA Regulation, 2000 which states that,

- In the case of an EIA, the Agency shall, simultaneously with issue of confirmation of completeness under clause (a) of sub-regulation (1) of Regulation 9, cause to be published in any English or Urdu national newspaper and in a local newspaper of general circulation in the area affected by the project, a public notice mentioning the type of project, its exact location, the name and address of the proponent and the places at which the EIA of the project can, subject to the restrictions in sub-section (3) of section 12, be accessed.
- The notice issued under sub-regulation (1) shall fix a date, time and place for public hearing of any comments on the project or its EIA.
- The date fixed under sub-regulation (2) shall not be earlier than 30 days from the date of publication of the notice.

2.5 Pak-EPA, Guidelines for Preparation and Review of Environmental Reports

The scope of Pak-EPA, Guidelines for Preparation and Review of Environmental Reports is confined to general aspects of the environmental reports. For the specific environmental issues, sector specific guidelines are issued time to time by Pak-EPA. This guideline specifically provides, in terms of the general aspects:

- Process of commencing environmental assessment including major steps of environmental assessment and format of the IEE / EIA;
- Process and procedures of impact assessment;
- Mitigation and management for identified impacts;

- Reporting;
- Reviewing of environmental reports and decision making;
- Monitoring and auditing by EPA; and,
- Project Management

2.6 Guidelines for Public Consultation during IEE / EIA

Pak-EPA, Guidelines for Public Consultation during IEE / EIA, provide:

- Stakeholder identification and objectives of stakeholder involvement in IEE / EIA process;
- The methods and techniques of effective public participation during IEE / EIA process;
- Consensus building and dispute resolution among project proponent and affected communities and other stakeholders; and,
- Facilitation for stakeholder involvement

2.7 Punjab Environmental Quality Standards (PEQS)

Environment Protection Department, Punjab was established to combat escalating environmental degradation at national and global level. Environment Protection Department, Punjab created Environment Protection Agency (EPA) which is responsible for the protection, conservation, rehabilitation and improvement of the environment. EPA is building on its successes with the environment through reliable and effective regulations, legislation and high-quality service delivery. EPA sustains qualitative and quantitative standards for the discharge of effluents, wastes, air emissions or noise either for general applicability or for a particular area or from a particular source in the form of Punjab Environmental Quality Standards (PEQS) and other standards established under the laws, rules and regulations.

In exercise of the powers conferred under clause (c) of sub section (1) of section 4 of the Punjab Environmental Protection Act, 1997; the Environmental Protection Council has approved the Punjab Environmental Quality Standards for Industrial Gaseous Emissions. These are an adaptation of National Environmental Quality Standards (NEQS) and were published in August, 2016 for general information. PEQS are attached as **Annexure III.**

2.8 Punjab Wildlife Act, 1974

This Act aims to protect the province's wildlife resources directly and other natural resources indirectly. It classifies wildlife by degree of protection (i.e. animals that may be

hunted on a permit or special license, and species that are protected and cannot be hunted under any circumstances). The Act specifies restrictions on hunting and trade in animals, trophies, or meat. The Act also defines various categories of wildlife protected areas (i.e. national parks, wildlife sanctuaries and game reserves). Provisions in this Act will be applicable throughout the design, construction, operation and maintenance, and decommissioning phases of the proposed Project.

2.9 Punjab Forest Act 2010

The Punjab Government enacted the Punjab 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 Punjab Forest Act, cutting of any trees during the construction of proposed Project will require prior permission from the Punjab Forest Department.

2.10 Pakistan Environmental Assessment Procedures

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.

2.11 Pakistan NCS and its Implementation Status

The National Conservation Strategy (NCS) is the Government's primary policy document on the national environmental issues. The NCS identifies 14 core areas including conservation of biodiversity; pollution prevention and abatement; soil and water conservation; and preservation of cultural heritage, and recommends immediate attention to these core areas in order to preserve the country's environment.

The major objectives of the NCS were improved efficiency in the use and management of resources, conservation of natural resources and sustainable development. The NCS had a

clear set of priorities and 14 core program areas for implementation during the 1990s. In addition, a total of 68 specific programs were identified in these areas, each with a long-term goal and expected outputs and resource investments required within the next decade. Each program also had communication, extension, research and training components. The Pakistan's 8th (1993-98) and 9th (1998-2003) five-year Plans have been developed keeping in view the overall development framework envisaged in the NCS.

2.12 International Treaties and Conventions

Pakistan is also the signatory/member 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 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.

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.

IESCO through the Government of Pakistan is legally bound to commit to achieve the specific environmental goals agreed thereunder and reduce human impacts on the environment.

[1] http://www.unep.org/unep/partners/un/unced/home.htm
[2] http://www.unesco.org/whc/intro-en.htm

2.13 Labor Laws

There are three categories of laws, firstly, the law that regulates the relations between employer and employee; secondly those laws that provide for compulsory levies and thirdly those that provide for minimum standards for employees; the same are as follows:

- Labor Laws regulating the Relation of Employer and Employee
- Labor Laws Assigning Levies;
- Labor Laws Assigning Standards for Wages;
- Labor Laws Setting Standards for Work Place.

2.14 IFC Performance Standards on Environmental and Social Sustainability

IFC's Sustainability Framework is aimed to ensure the IFC commitment to sustainable development and reflects the Corporation's approach to risk management. The Sustainability Framework comprises IFC's Policy and Performance Standards on Environmental and Social Sustainability, and IFC's access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC's commitments, roles, and responsibilities related to environmental and social sustainability. IFC's Performance Standards on Environmental and Social Sustainability define the responsibilities of IFC clients for managing their environmental and social risks. The Performance Standards are:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
- Performance Standard 2: Labor and Working Conditions
- Performance Standard 3: Resource Efficiency and Pollution Prevention
- Performance Standard 4: Community Health, Safety, and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Performance Standard 7: Indigenous Peoples
- Performance Standard 8: Cultural Heritage. Performance Standard 1 applies to all projects that have environmental and social risks and impacts

2.19 IFC Environment, Health and Safety (EHS) Guidelines

The IFC EHS Guideline are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP), as defined in IFC's Performance Standard 3 on Pollution Prevention and Abatement. These Guidelines are used as a technical source of information during project appraisal activities.

3.0 PROJECT DESCRIPTION

3.1 Introduction

This chapter of EIA presents a brief overview of the project including location, scope, need and schedule of the project. This chapter gives a clear picture of the project, its context and operations.

3.2 Scope and Overview of the Project

The proposed project is divided into following components:

i. 132 kV Grid Station at Tehsil Sohawa, District Jhelum and its feeding transmission line (0.1 km) including only one (01) tubular pole. The grid station will be constructed on 32 kanal of land near Chakwal More, Sohawa Town in District Jhelum. The land has been acquired by IESCO. The land is completely barren and slightly broken having 3 small to medium size wood trees.

ii. 132 kV Grid Station at Tehsil Kallar Kahar, District Chakwal and its feeding transmission line (0.5 km) including three (03) towers. The Township Housing Society, Kallar Kahar has provided 32 kanal of land for the proposed project. The land for this project has been provided by the society.

3.2.1 Objectives of the Project

The prime objectives of the proposed projects are to:

- Avoid forced load shedding;
- Maintain and upgrade the existing system;
- Plan, design & implement system expansion to increase the capacity to cope with the higher load demand;
- Reduce the technical losses;
- Improve the quality of electricity supply;
- Improve voltage and ensure uninterrupted electricity;
- Improve sustainability, stability, reliability and efficiency of the system, and;
- Improve safety conditions for both workers and general public

3.3 Location of Project

The proposed location for Sohawa grid station is 500 m away from Grand Trunk Road on Chakwal – Jhelum Road. The coordinates of the grid station site are 33°08’18’’N and 73°23’29’’E. The proposed site for Kallar Kahar grid station lies in Township society Kallar Kahar at a distance of 7.1 km from Kallar Kahar Toll Plaza. The coordinates of the grid station site are 32°44’44’’N and 72°41’32’’E.

Exhibit 3.1: Project site view of Sohawa grid station

Exhibit 3.2: View of Kallar Kahar grid station site

Exhibit 3.3: Site visit of Kallar Kahar & Sohawa grid station

Exhibit 3.4: Satellite view of proposed location for Sohawa Grid Station and its adjoining area

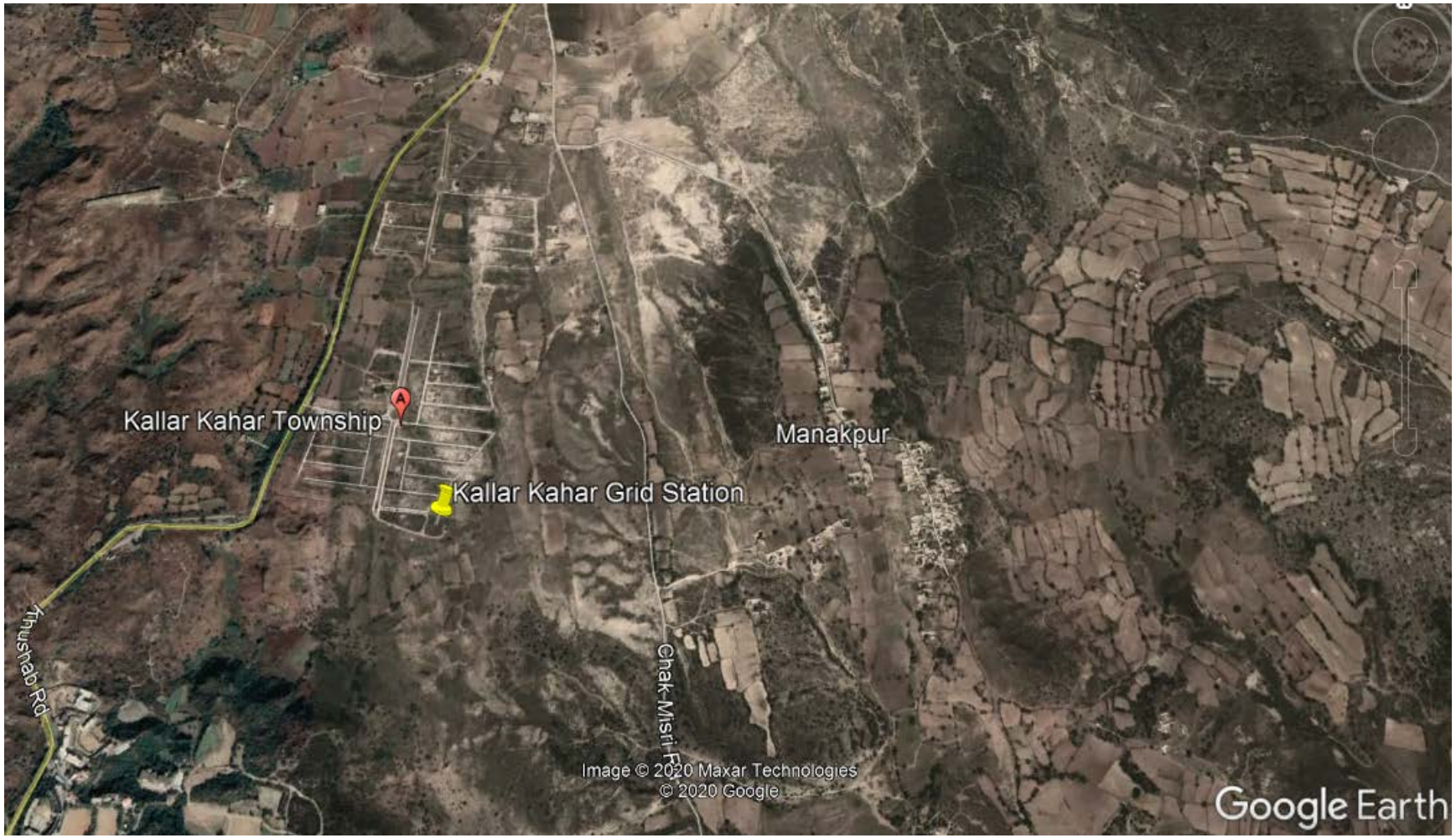


Exhibit 3.5: Satellite view of proposed location for Kallar Kahar Grid Station and its adjoining areas

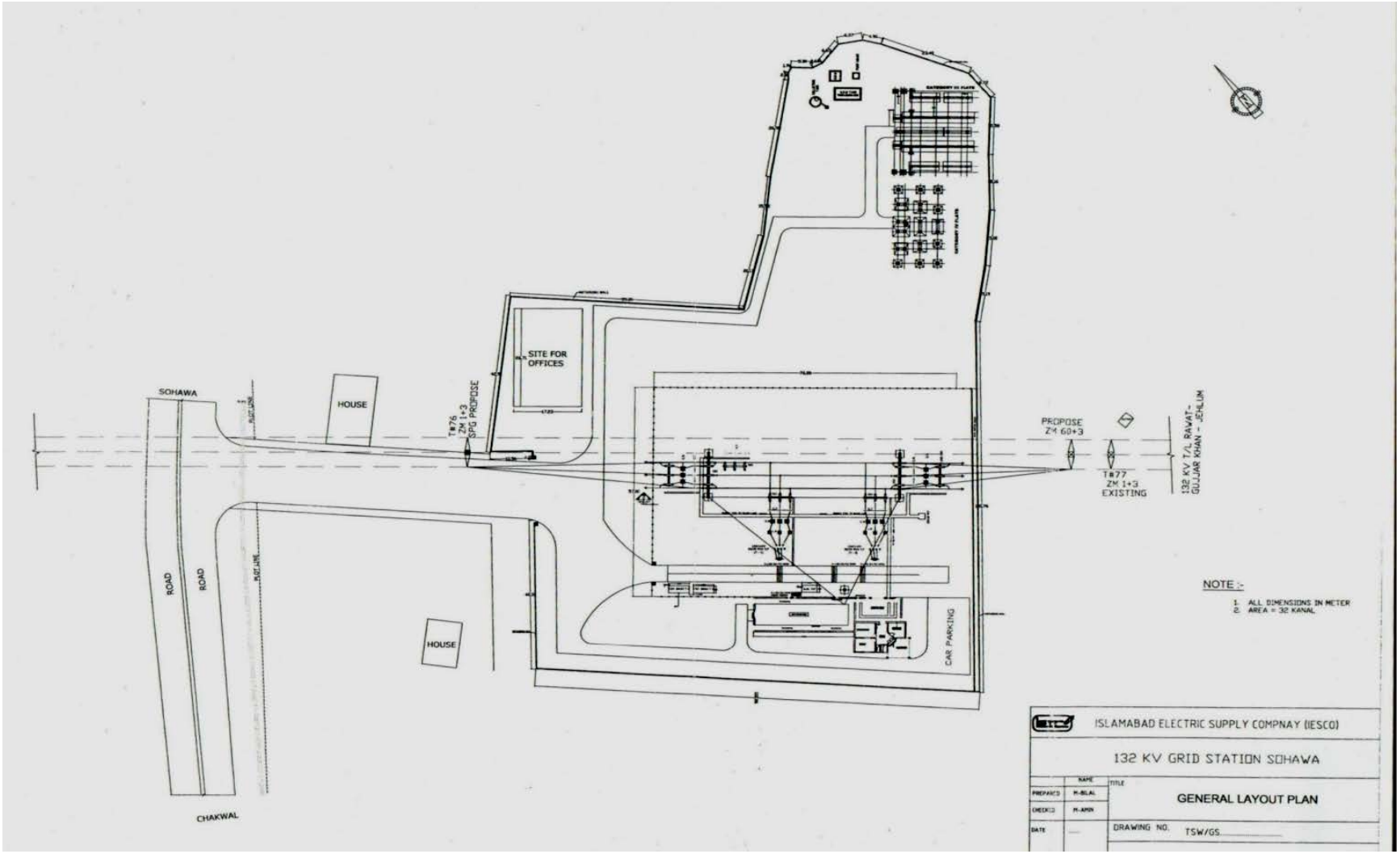


Exhibit 3.6: Layout Plan of Sohawa Grid Station

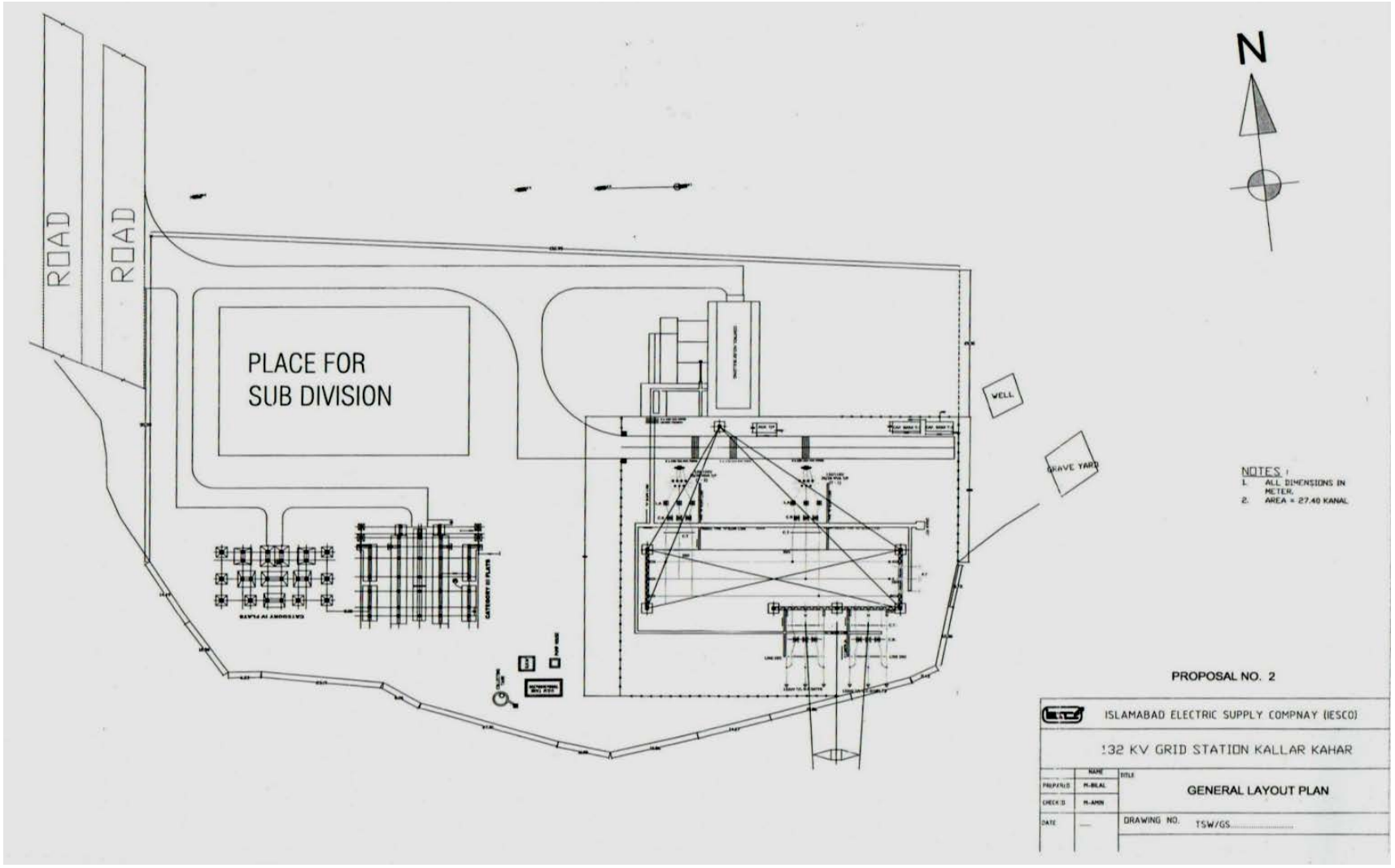


Exhibit 3.7: Layout Plan of Sohawa Grid Station

3.4 Project Categorization

Section 12 (1) of Punjab Environmental Protection Act, 1997 (Amended 2012) requires proponent of project to file an IEE or EIA, as the case may be, and obtain approval from the Punjab EPA before commencing construction or operation of the project.

Section 12 (1) of the PEPA 1997 (Amended 2012) is reproduced herein under for ready reference: " No proponent of a project shall commence construction or operation unless he has filed with the Punjab EPA 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 Agency approval in respect thereof."

Pak-EPA Review of IEE/EIA Regulations, 2000 made in exercise of powers conferred under section 33 of PEPA, 1997 (Amended 2012) categorizes projects in three categories provided in Schedule I, II and III of the 2000 Regulations. The proposed project falls in category A (3) *"Transmission lines (11 KV and above) and grid stations"* of Schedule II (List of Projects requiring EIA) of the 2000 Regulations.

3.5 Land use

Majority of the area around the site is barren with scattered population. No resettlement plan is required for local population as human settlement is located at a safe distance from project sites. There were floral species and minimal vegetation observed on both sites. For the purpose of construction of 132 kV Grid Station at Kallar Kahar, the Township Housing Society Kallar Kahar has provided 32 kanal of land.

The 132 kV Grid Station Sohawa is being constructed in 32 kanal of land acquired by IESCO near Chakwal Morr, Tehsil Sohawa, District Jhelum.

3.6 Project Schedule

- **Sohawa Grid Station**

September 2020 to October 2021

- **Kallar Kahar Grid Station**

October 2020 to October 2021

3.7 Project Cost

- **Sohawa Grid Station**

Estimated Cost = 254.409 Million Rupees

- **Kallar Kahar Grid Station**

Estimated Cost = 149.964 Million Rupees

3.8 Project Components

3.8.1 Grid Station

The list of equipment for Kallar Kahar and Sohawa Grid Stations is listed below:

Sr. No	Description of Material	Quantity	Unit
1	20/26 MVA 132/11.5 KV Power Transformer along with all allied accessories	2	No
2	132 KV Circuit Breaker with SSS along with allied accessories & Termination Connectors	4	Set
3	132 KV Transformer C.T with SSS along with allied accessories & Termination Connectors Ratio 200:100:5/5A	6	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	5	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	6	No
9	11KV Lightening Arrestor with allied accessories	6	No
10	11 KV Post Insulator with clamps	6	No
11	132KV Column	6	No

12	132KV Beam	4	No
13	132KV Earth Mast	1	No
14	11KV Bus Bar Structure	2	No
15	Control Panel CP-30	2	No
16	Control Panel CP-50	2	No
17	Relay Panel RP-3	2	No
18	Relay Panel RP-4	2	No
19	Connector Type TMRH.	6	No
20	Connector Type TM63A.	30	No.
21	Connector Type TMHH.	15	No
22	Connector Type 90B75F	6	No
23	Connector Type 90BH30.	6	No.
24	AC/DC Station Aux Panel	1	No
25	11KV Incoming Panel 25KA	2	No
26	11KV Outgoing Panel 25 KA	16	No
27	11KV Bus Bar Coupler	1	No
28	Pad Mounted Auxiliary Transformer 100 KVA	1	No
29	Earthing Platform	9	No
30	110 Volt Battery Bank a/w allied accessories	1	Set
31	110 Volt Battery Charger	1	No
32	Earth Rod 16mm dia 3Mtr Long	65	No
33	Cartridge Type A	250	No
34	Cartridge Type B	100	No
35	Cartridge Type C	75	No
36	Mould for Type A	2	No
37	Mould for Type B	2	No
38	Mould for Type C	2	No
39	Holding Clamps for Moulds	3	No

40	String Tension Assembly for Conductor 600mm	6	Set
41	Tension Assembly for Earth wire 9 mm	20	No
42	Earth wire 9mm	300	Mtr
43	Aluminium Conductor 600 mm	650	Mtr
44	Grounding Conductor 95 mm	2500	Mtr
45	Disc Insulator 100 KN	54	No
46	All: Pipe 75mm dia 4Mtr long	6	No
47	Power Cable 1000 MCM	2400	Mtr
48	Indoor Termination Kits for 1000 MCM	30	Set
49	Outdoor Termination Kits for 1000 MCM	30	Set
50	Control Cable 4x2.5 mm	2200	Mtr
51	Control Cable 8x2.5 mm	1800	Mtr
52	Control Cable 16x2.5 mm	1800	Mtr
53	Control Cable size 4x6 mm	2500	Mtr
54	Power Cable 4/0 AWG	80	Mtr
55	Outdoor Termination Kits for 4/0 AWG	1	Set
56	Indoor Termination Kits for 4/0 AWG	2	Set
57	L.T Power Cable 2/core.	275	Mtr
58	L.T Power Cable 4/0 core.	150	Mtr
59	11 KV Capacitor Control Panel	2	No
60	11 KV Capacitor 200 KVAR	72	No
61	11 KV Capacitor Rack with Structure along with all allied accessories Complete Set	6	No
62	Neutral CTs	2	No
63	LT service Box	3	No
64	Earthing Unit	10	No
65	Mercury lamp 125 watt	22	No
66	Chok mercury 125 watt.	22	No

67	Shade for mercury lamp	22	No
68	Holder 3 pin type	22	No
69	Tubular pole type A	22	No
70	Tubular pole type B	6	No
71	19/.083 4 Core Cable	120	Mtr.

Exhibit 3.8: List of equipment for Kallar Kahar and Sohawa grid stations

3.8.2 Transmission Line

The proposed feeding transmission line length for Sohawa Grid Station is 0.1 km with installation of only one (01) tubular pole. The proposed feeding transmission line length for Kallar Kahar Grid Station is 0.5 km with the installation of three (03) towers. 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 Grid Station Construction (GC) Department along with Environment and Social Safeguard Section of IESCO has marked the alignment of transmission line after careful consideration of the land use, ecological environment and nearby settlements along the route.

3.9 Project Activities Process Flow

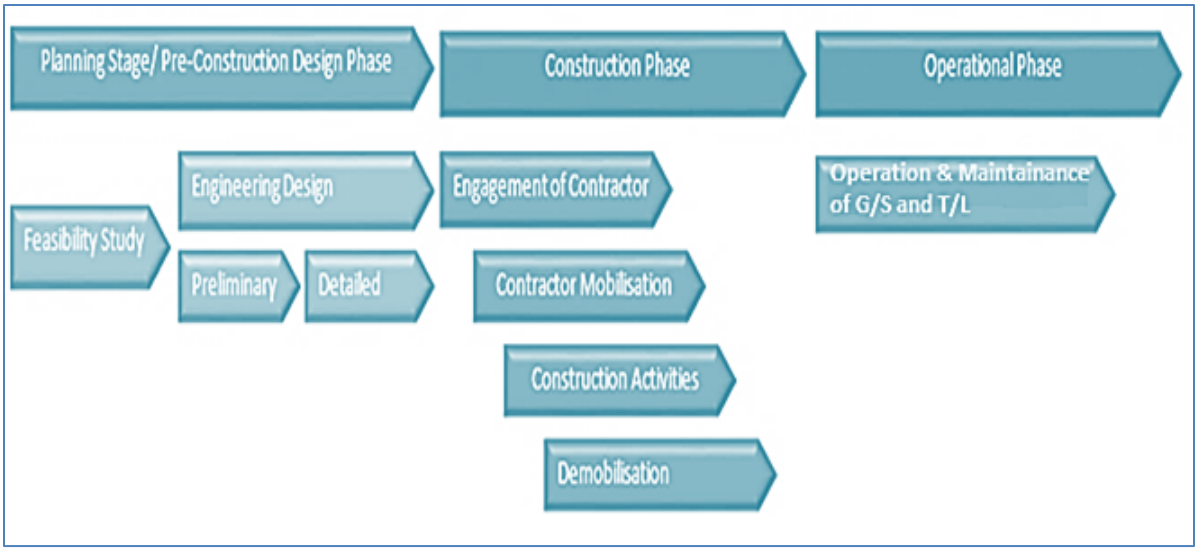


Exhibit 3.9: Project Activities Flowchart

3.9.1 Construction Phase

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, Operation, planning and PMU) is constituted. The committee after thorough inspection finalizes the site for purposed grid station establishment.
- After taking over the land, the site is surveyed, and its contour plan is developed. Soil survey and geo-technical investigation are also carried out at this stage.
- The 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.
- Parallel to the civil works, the grid station equipment's (transformers, breakers, isolators, control panels, feeder and allied equipment's) are obtained from the central stores.
- The equipment is handed over to GSC Department, who installs them once the civil works are completed.
- Once the installation is completed, the system will be tested jointly by the GSO and GSC Divisions.
- After the testing, the grid station is commissioned and put into operation.

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.

3.9.2 Restoration and Rehabilitation after completion of Project

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

A: 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.

B: 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.

3.9.2.1 Maintenance Procedure of Transformers

- **Power Transformer Repairs**

The minor repairs for the power transformers are carried out at the grid stations. However, for the major repairs, the transformers are transported to the WAPDA's Power Transformer Reclamation Workshop at Kot Lakhpat, Lahore. IESCO, much like the other DISCOs, intends to utilize the same facility in the future as well.

- **Distribution Transformer Repair**

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, Hasan Abdaal and Rajjar, Jhelum for repairing.

- **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. Oil sample is taken out of the transformer and test performed. A record is maintained for these yearly tests. No action is taken if the test results are within the prescribed limits. However, if the dielectric strength of the transformer oil is found to be less than the allowable limits, the oil is replaced. After every five years, a more comprehensive testing is carried out for the transformer oil.

- **Transformer Oil Disposal Procedure**

The transformer oil is mostly recycled in the transformer workshops. The unusable waste oil is disposed through contractors. WAPDA 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.

3.10 Utilities and other requirements during Construction activity

- **Water**

Construction contractor will be responsible for providing drinking water. In all probability drinking water shall be obtained from reputable companies producing such water. The estimated demand of water supply will be 3,000 – 4,000 gallons per day during construction period.

- **Solid Waste Management**

The contractor camp will generate a maximum of 0.15 tons of solid waste. IESCO waste management procedures will be followed by Construction Contractor who will be responsible to handle, dispose of the solid waste generated during different phases of construction activities as per standard waste management procedures.

- **Work Force**

Construction labor will be provided by Construction Contractor. Atleast, 50 construction workers will be provided on site for commencement of project activities.

4.0 ANALYSIS OF ALTERNATIVES

4.1 Background

The screening of alternatives is a part of the EIA process to select the best among all possible project options. The alternatives illustrate and contrast the environmental implications and consequences of different options available to achieve the proposed objective. The alternatives of a project are defined as the options that can help to meet the objectives of a project by different means including an alternative project site, technology or material, design or inputs. The key criteria when identifying alternatives is that they should be feasible and reasonable.

Most guidelines use terms such as ‘reasonable’, ‘practicable’, ‘feasible’ or ‘viable’ to define the range of alternatives that should be considered. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options will be adopted for the project.

4.2 No-Project Option

Under the current power crisis in Pakistan, a “no project option” is considered to be the least viable option. With the expansion and increase in population, electricity consumption has grown steadily in recent years. In addition to generation constraints, the high growth of electricity demand in Pakistan is putting the existing distribution infrastructure under stress resulting in unacceptably high levels of outages, voltage fluctuations and the overloading of lines and transformers. The distribution system constraints cause inefficiencies at the consumer end – such as high levels of un-served energy or investment in costly self or captive generation – which extracts significant economic and financial rent.

The immediate priority for investment in the distribution system is to address the capacity shortfalls / constraints that currently result in regular system outrages and supply interruptions to customers. These works need to be done urgently to avoid a rapid deterioration of power transformers which could result in prolonged outages and load shedding.

The 500kV and 220kV transmission lines forming the primary transmission system would carry power from the generating stations to primary load centers. In order to ensure safe dispersal of power further to the secondary transmission ends, a reliable secondary system comprising of 132kV network i.e. Grid Stations and Transmission

Lines has to be established by setting up new facilities, strengthening the existing secondary system through Rehabilitation, Extensions, Augmentations and Up-gradation of present facilities according to the load requirements.

The proposed projects will help to improve the voltage and reduce line losses by coping up the increasing demand of electricity due to rapid increase in population / urbanization in its operational territory. The most significant outcomes of "No Action" approach would be a negative impact on current electricity supplies, and the possibility of complete blackouts at times of high demand.

4.3 Alternate Site Options

The following options have been considered for the proposed projects:

I. Sohawa Grid Station

- Site A – This site is 2 Km away from Chakwal More Sohawa on Sohawa – Chakwal Road. The IESCO Siting and Lay out Board/Technical team rejected the site on following grounds;
    a. The 70% of this site was including agriculture land with wheat crops and remaining 30% land was in nulla.
    b. The transmission line was 2.0 to 3.0 km away from the site and involved settlement in the route of transmission line.
    c. Not feasible for load center.

- Site B - This site is adjacent to Chakwal More in Sohawa on Sohawa – Chakwal Road, the site is declared feasible due to future load demand, load centre, accessibility and minimum damage to environment.

II. Kallar Kahar Grid Station

After extensive survey of the area the site was selected by the IESCO Technical team.

The following criteria for establishment of proposed project have been considered for the selection of the site:

- The land is offered by the Township Housing Society, Kallar Kahar;
- Load center;
- Permission from the relevant departments;
- No threatened vegetation will be disturbed or removed;

- No fragmentation of habitat or disturbance to faunal species;
- Least disturbance of water bodies;
- Least ecological disturbance;
- Ease of Construction work surrounding land;
- Zero relocation of locals and maintenance of a sufficient distance from settlements;
- No villages or residential colony have been observed in the close proximity of the project site, and;
- No wildlife sanctuaries, army installations and protected areas are observed during site visit.

4.4 Technical Alternatives

4.4.1 Transmission Line Alternatives

The decision between overhead versus underground transmission lines was also considered. Certainly, electric power can be transmitted by underground power cables which assist the transmission of power crosswise over thickly populated urban zones, territories where area is occupied or arranging assent is troublesome, waterways and other natural obstacles, land with extraordinary natural or environmental heritage, regions of significant or prestigious infrastructural advancement and area whose worth must be kept up for future urban development and rural improvement.

- **Underground Transmission Line**

– Less subject to harm from extreme climate conditions (mostly lightning, wind and heavy showering);

– Remarkably decreases the intensity of electromagnetic fields (EMF) in the surrounding area. All electric currents produce EMF, yet the protecting shield provided by the earth encompassing underground cables limits their extent and power;

– Underground cables require a narrower encompassing strip to introduce; though an overhead line require a surrounding strip of around 20 – 200 meters wide to be kept for all time clear for safety, support and repair;

– Site restoration for underground construction is a much larger effort than it is for overhead construction because soil is disturbed along the entire route;

– High-voltage underground transmission lines require small substations called transition substations wherever the underground cables connect to overhead transmission;

- Underground high-voltage transmission lines generally need to be replaced after approximately 40 years;
- Underground cables pose no risk to low flying airplane or to natural life, and are essentially more secure as they pose no shock hazard (except the digging and excavation);
- Their maintenance and repair is very arduous and time consuming;
- Underground lines are silent except in the immediate area near the transition substations, which are lighted throughout the night for security purposes;
- They are less likely to cause death or injury due to accidental contact with the lines/cables;
- The transmission through underground is more expensive than overhead electrical cables, and the life cycle expense of an underground power cable is two to four times more than an overhead electrical cable.

- **Overhead Transmission Line**

- Installation of overhead lines may avoid removal of small trees and bushes along the transmission ROW;
- Overhead lines are at great risk against lightning strikes which can cause interruption and serious accident;
- Overhead lines use bare conductors and can be damaged;
- Aesthetically unattractive as they distract the scene of the landscape;
- It doesn't require high cost in construction, repair & maintenance;
- Overhead high voltage lines can emit hiss or hum noises;
- When people come into accidental contact with overhead lines, the implications are extremely severe;
- Overhead lines have a life expectancy of more than 80 years;
- Its cost is lesser than Underground Transmission line.

In the case of proposed project, the ROW selected is an open land and already existing overhead lines traversing along the route. Also there is no human habitant and any obstructions exist in close proximity of ROW. Therefore, any major impact of EMF, intrusion of human interests or human population, community risk, existing infrastructure is not envisaged.

4.4.2 Types of Grid Station

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

- Gas-insulated
- Air Insulated (Conventional)

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.

Air Insulated / Conventional Grid Station: 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, the conventional grid station design is the preferred option for the proposed project.

4.4.3 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.

4.4.4 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. However, the old transformers which already exist in power distribution system may have PCBs contaminated oil. Currently the MoCC in collaboration with UNDP is implementing a project "Comprehensive Reduction and Elimination of Persistent Organic Pollutants (POPs) in Pakistan" through Global Environmental Facility (GEF) funding. The aim of this project is to make inventory of PCBs contaminated transformers and to phase out the PCBs contaminated transformer oil and other equipment from Pakistan or onsite treatment of PCBs contaminated transformer oil due to financial and technical constrains of DISCOs. In view of their extremely harmful effects however, use of this oil is not a preferred option for all applications, including the proposed project.

IESCO's specifications for the procurement of transformers clearly mentioned 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.

4.4.5 Type of Towers

- **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 in rural area, therefore the conventional towers will be preferred at Kallar Kahar project site while tubular pole will be installed at Sohawa grid station.

5.0 BASELINE CONDITIONS OF PROJECT AREA

5.1 Project Location

❖ Chakwal

Chakwal District is present in Potohar Plateau of Punjab, Pakistan. It is the most rural district of Punjab. It is located in the north of the Punjab province. In the south of Chakwal district Khushab is located, its northeast Rawalpindi, to its east Jhelum, to its west Mianwali and to its northwest Attock. The large part of M2 passes through Chakwal District. The largest factory in Asia Best Way cement factory is also located in Chakwal District.

Chakwal District is present at the Potohar plateau and the Salt Range. It is a semi arid district and the topography is largely hilly, the area is covered with scrub forest in the southwest and in north and northeast leveled plains are dry rocky patches. Chakwal district covers an area of about 6,524 square kilometers. The highest peak of the district is Chail peak, which is about 3,701 feet (1,128 m) above sea level which is present in the salt range in the southern portion.

❖ Jhelum

Jhelum District is present in Pothohar Plateau of the Punjab, Pakistan. Jhelum is believed to be one of the oldest districts of Punjab. Jhelum is a popular city of Pakistan a large number of soldiers in the British was from Jhelum and after independence large of number soldiers in Pakistan armed forces are from Jhelum due to which it is also known as city of soldiers or land of warriors and martyrs.

The district of Jhelum stretches from the river Jhelum almost to the Indus. North-Western railway gets parts of supply form two coal-mines in the district. These two coal mines are the only mines in Punjab province which are in working condition. For salt trade Pind Dadan Khan is the chief centre. The main line of the North-Western railway passes through the district, and also traversed along the south by a branch line. Jhelum is present at the North of Punjab province. At the south of Jhelum district, it is bordered by Sargodha and Mandi Bahauddin, to its south west Khushab, Jhelum River to its south and east, at its east Gujrat, Chakwal to its west, at north east Mirpur, and Rawalpindi to its north.

5.2 Physical Environment

5.2.1 Geography and Topography

❖ **Chakwal**

Chakwal District lies at coordinates 33°40′38″N 72°51′21″E. At North, Chakwal district borders with Rawalpindi and Attock, in east it is bordered with Jhelum, in its south it is bordered with Khushab and Mianwali in the west. The total area of Chakwal district covers an area of about 6,524 square kilometers.

The southern portion runs up into the Salt Range, the highest point in the district Chail peak is also in this range which is about 3,701 feet (1,128 m) above the sea. Between this and the Sohan river, which follows more or less the northern boundary, the country consists of what was used to be a fairly level plain, which slopes down from 2,000 feet (610 m) 1,400 feet (430m) at the foot of the hills, neighborhood of the Sohan; today the surface is much cut up by ravines and for that reason it is very difficult to travel over.

Chakwal lies at the Potohar plateau and the Salt Range, it is a semi arid district and the topography is mostly hilly, the area is covered with scrub forest in the southwest and in north and northeast leveled plains are dry rocky patches.

❖ **Jhelum**

Jhelum District lies at coordinates 32°56′N 73°44′E. The district capital, Jhelum City, is situated on the right and left bank of the Jhelum River. The river Jhelum is accessible throughout the district, which forms the south-eastern portion of a rugged Himalayan spur, extending between the Indus and Jhelum to the borders of the Sind Sagar Doab. Its scenery is very pleasing, although not of so wild as the north mountain region of Rawalpindi, and is lighted up in areas by cultivated valley patches. The Salt Range is the backbone of the district, throughout its whole breadth from east to west a treble line of parallel hills running in three long forks. A broad alluvial fan spread out between river Jhelum and surrounding hills and is known as Riverine region, starting from the Mangla Cantonment (just near Mangla Dam) to the Bagga village in Pindadan Khan Sub-division. Its average width is about 11 kilometres but is subject to great variation

River passes at the Eastern and Southern parts of Jhelum District. The soil adjacent to the river is generally plain, fertile and alluvial. Usually the area is cultivable and produces all types of crops. In the North of the District, most of the higher area is rough and broken. Jhelum District land is typically fertile but Salt Range Mountains with scattered plateaus

cover much of it. Pind Dadan Khan which is at the western edge is both very rough and difficult which makes this area relatively unapproachable. In this area newly constructed Motorway is now open.

District Jhelum is at the North-East of Punjab; Grand Trunk Road spreads on both sides of Jhelum s. Rawalpindi District is at the North of Jhelum District, Mandi Baha-ud-Din is in the South, Gujrat and Sargodha is in the East by Azad Jammu and Kashmir of Jhelum District and in the West by Chakwal & Khushab from which Jhelum District is separated from Kohistan-e-Namak which is a mountain range.

The backbone of the district is formed by the Salt Range, a treble line of parallel hills running in three long forks from east to west throughout its whole breadth. The range rises in bold precipices, broken by gorges, clothed with brushwood and traversed by streams which are at first pure, but soon become impregnated with the saline matter over which they pass. Between the lines of hills lies a picturesque table-land, in which the beautiful little lake of Kalarkahar nestles amongst the minor ridges. North of the Salt Range, the country extends upwards in an elevated plateau, diversified by countless ravines and fissures, until it loses itself in tangled masses of Rawalpindi mountains.

5.2.2 Water Resources

❖ **Chakwal**

Chakwal District is semi-arid region with shortage of water. Water supply systems are installed in those areas where water shortage problem persist. Water supply systems are installed in Villages, Tehsils, and in the main City. But current water supply infrastructure needs to be upgraded because of increase in demand of water. There are small dams around the Chakwal which are as follows:

- Khokhar Zer Dam.
- Dhok Tallian Dam.
- Walana Dam.
- Lakhwal Dam.
- Khai Dam.
- Kot Raja Dam.
- Arrar Mughlan Dam.
- Walana Dam.
- Naka Dam Kallar Kahar.
- Baghtal Dam.

- Mial Dam.
- Arrar Mughlan Dam (Under Construction).

❖ **Jhelum**

River Jhelum passes through bold precipices, gorges, brushwood and traversed by streams which are clean, but shortly it gets mixed with the saline matter over which they pass. Among the line of hills there lies a table-land, in which the beautiful Kallar Kahar Lake is present amongst the minor ridges.

The river Jhelum is navigable throughout the district, which forms the south-eastern portion of a rugged Himalayan spur, extending between the Indus and Jhelum to the borders of the Sind Sagar Doab. Its scenery is very picturesque, although not of so wild a character as the mountain region of Rawalpindi to the north and is lighted up in places by smiling patches of cultivated valley. The backbone of the district is formed by the Salt Range, a treble line of parallel hills running in three long forks from east to west throughout its whole breadth.

North of the Salt Range, the country extends upwards in an elevated plateau, diversified by countless ravines and fissures, until it loses itself in tangled masses of Rawalpindi mountains. In this rugged tract cultivation is rare and difficult, the soil being choked with saline matter. At the foot of the Salt Range, however, a small strip of level soil lies along the banks of the Jhelum and is thickly dotted with prosperous villages.

The drainage of the district is determined by a low central watershed running north and south at right angles to the Salt Range. The waters of the western portion find their way into the Sohan and finally into the Indus; those of the opposite slope collect themselves into small torrents and empty themselves into the Jhelum River.

The people here depend on groundwater for irrigation, there is no provision of canals in the area. Private tube wells and boring system have been installed by the landowners. The boring depth here usually is between 50ft to 150ft.
The sewage of the district drains into low central watershed which runs north and south at right angles of the Salt Range. The western portion water falls into the Sohan, and into Indus; those of the opposite slope gets collected into small torrents, and gets emptied into Jhelum River.

There are some small dams around the district which are as follows:

- Salial Dam.
- Fatehpur Dam.

- Shah Habib Dam.
- Domeli Dam.
- Garat Dam.
- Tainpura Dam-I Dam.
- Tainpura Dam-II Dam.
- Lehri (Baral) Dam.
- Jammergal Dam.
- Gurha Utam Singh Dam.

Water Quality Analysis Report has been attached as **Annexure IV**.

No spring was identified in the vicinity of the project area during the site visit. However the possibility of springs in the area cannot be ruled out. No wetland of significant importance was observed in the project area.

5.2.3 Climatic Conditions

❖ **Chakwal**

Chakwal district is in subtropical region and its climate is typical of the area, but it is a cooler region because of its elevation, from central Punjab. It is a semi arid District. June is considered to be the warmest month of the year. The temperature in June can be more than 32°C. January is the coldest month, with temperatures averaging 10.5 °C. Winter temperatures normally range between –4° C and 25° C, and summer temperatures average between 15° C and 40° C. The driest month is November, with 7 mm of rain. Most of the precipitation here falls in August, averaging 133 mm.

Months	Average. Temperature (°C)	Average temperature (°F)	Precipitation/rainfall (mm)
January	10.9	51.6	35
February	13.6	56.5	35
March	18.6	65.5	37
April	24.2	75.6	28
May	29.3	84.7	23
June	33	91.4	36
July	30.9	87.6	126

Months	Average. Temperature (℃)	Average temperature (℉)	Precipitation/rainfall (mm)
August	29.5	85.1	150
September	28.5	83.3	60
October	23.9	75.0	11
November	17.4	63.3	7
December	12.4	54.3	17

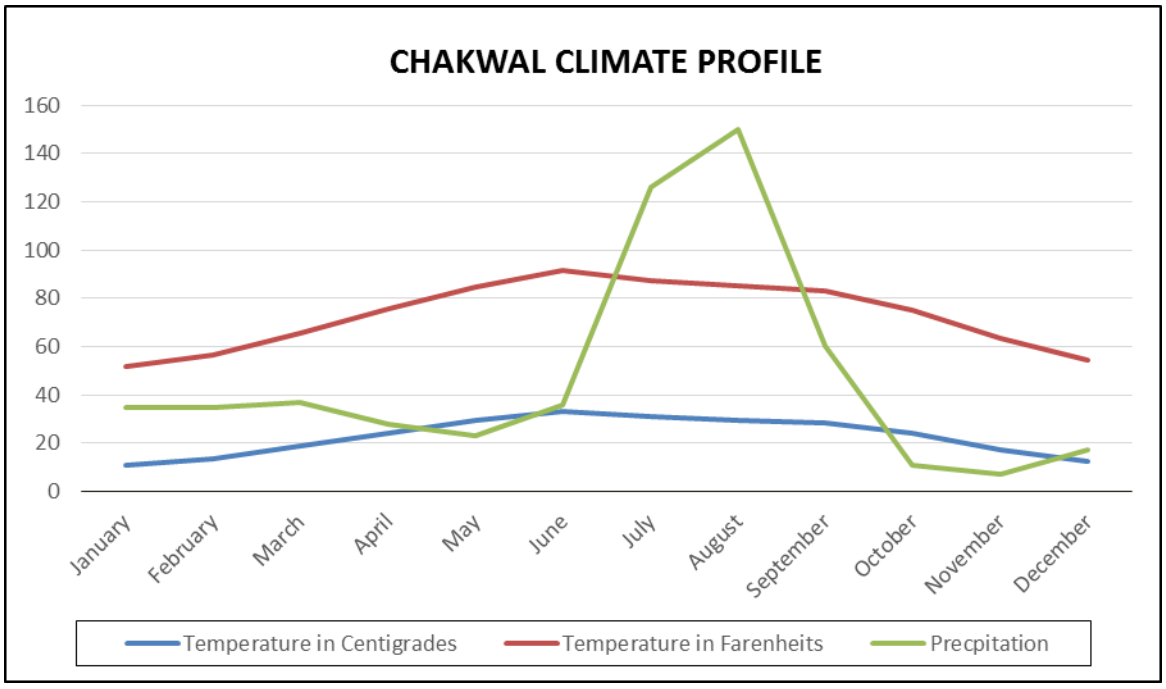


Exhibit 5.1: District Chakwal's Average Climate Profile

❖ **Jhelum**

The climate of the area is extreme. In winter the temperature is very cold and summer temperature is very hot. The average rainfall can occur from 48 to 69 mm per annum which is much lower than the required quantity, however in the rainy season the water flow from North to the river Jhelum with a very fast speed which causes damage to the crops, bridges, roads and are also responsible for the soil erosion in the District. June is the warmest month of the year. The temperature in June can reaches upto 33.4 °C. January is the coldest month, with temperature reaches upto 12.1 °C. The driest month is November, with 11 mm of rain. Most of the precipitation in the district falls in August, which is about 234 mm.

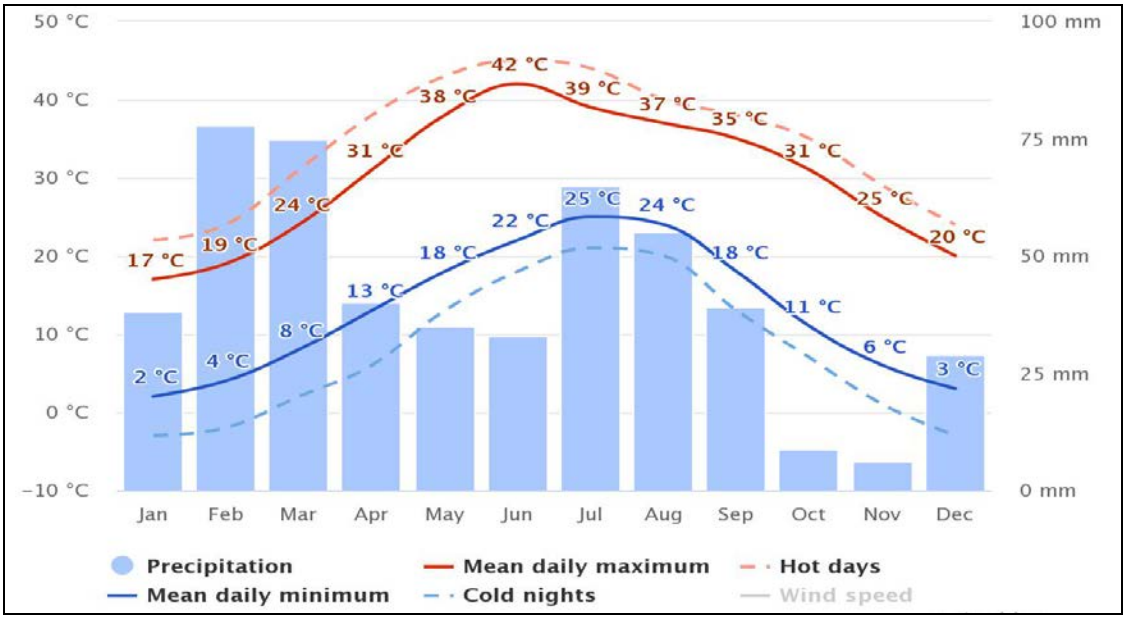


Exhibit 5.2: District Jhelum's Average Climate Profile

Meteorological data of the project area has been taken from Pakistan Meteorological Department for the year 2017 and has been attached as **Annexure VIII**.

5.2.4 Seismicity

Jhelum fault is an important strike-slip fault (wrench fault) trending north-south, which tracks the western periphery of the axial zone of Hazara- Kashmir syntaxial bend. The fault was reported by the original researchers to extend along the Jhelum River and further southwards to the Chaj Doab.

The epicentres of low to moderate magnitude earthquakes, recorded in the Punjab plain are associated with the subsurface fractures in the basement rocks, which are concealed by thick alluvial deposits.

The area has no history of any serious damages due to the earthquake. The area lies in Zone 2B which is a Minor Hazard Region.

5.3 Biological Environment

5.3.1 Flora

❖ **Chakwal**

The floral species which are most abundant in the district are as follows:

- Kau (Olea cuspidata)
- Phulai(Acacia modesta)
- Sanatha (Dodones viscosa)
- Gurgura (Monotheca buxifolia)
- Pataki (Gymnospo Riaroyleana)

The general vegetation of the district consists of dry deciduous scrub. The grass species which are dominant in the district are;

- Sariala (Heteropogan contortus)
- Khawi (Cymbopogan jwarancusa)
- Mesquite (Prosopis juilfloro)
- Karir (Capparis sphylla)

Exhibit 5.3: Floral Species of the Project Area

S. No	Life form	Percentage %
1	Herbs	39.47
2	Grasses	22.36
3	Trees	19.73
4	Shrubs	14.47
5	Sedges	2.63
6	Parasite	1.31

Exhibit 5.4: Life forms of Floral Species with % in District Chakwal

❖ **Jhelum**

Flora of Jhelum District is dry, deciduous shrub type, phulai, kahu (wild olive) and sanatha are the main species in the district. The forests are open. On sandstone and red marl vegetation is poor. The southern slopes are barren while slopes of north-western area carry good forests. There is a huge burden on Jhelum Forests Division with right of grazing, browsing and wood for fire.

5.3.2 Fauna

❖ **Chakwal**

The lake is located at a distance of approximately 5.0 km from the project site. Kallar Kahar Lake is a corridor of migratory birds during winter season. In the past, the lake had been a principal site for the endangered White headed Duck but unfortunately this bird has not been visiting the lake since a few years.

The lake was once considered an ideal route for various species of migratory birds during the winters; they no longer stop at the lake due to the pollution.

The species which exist in various areas of Chakwal district are as follows:

- **Grey partridge** – it can be found all over the district, especially in the areas, which are lightly populated.
- **Black partridge** – it can be found beside the seasonal channels and water holes in the bellas all over the district.
- **Chakore** – it can be found in dry rocky areas of the district mainly in the Choa Saidan Shah area.
- **See-See partridge** – it can be found at a number of places in the district, in the dry rocky area particularly in the Kallar Kahar mountain belt which is leading into subdivision Talaga.

❖ **Jhelum**

The fauna of the Jhelum District is typically indigenous, but similarly diverse and interesting. In Jhelum District the rocky and rough terrain, little rainfall, the barely cover of vegetation and the increase in number of hunters, all these have share in restricting the fauna in the District. Though the hills support good diversity of wildlife, The River also offers a better environment for wildlife. Wildlife of Jhelum District is as follows:

- **Urial** (an animal from deer family) and **Chinckara** are spot aids
- **Wild bores**: They can be found in the Salt Range.
- **Wolves, foxes & Wild cats**: can also be found in the District
- Hare: is fairly common in the District.
- **Chikor grey & Black Partridge**: are also found in the parts of the district.
- **Migratory ducks**: like Teal Pin tail and Mallard and some Geese visit the district during winter.

No forests are present at the proposed site. Therefore no threat expected for vegetation from the activities on site. No rare and threatened species recognized at national or international level found in the whole study area.

Complete details of Flora and Fauna of the project area are given in the following exhibits.

Scientific Name of Plant	**Local Name of Plant**	**Family**	**Remarks**
Acacia modesta	Phulai	Mimosaceae	Tree
Acacia nilotica	Kikar	Mimosaceae	Tree
Olea ferruginea	Kau	oleaceae	Tree
Dalbergia sissoo	Shisham	Papilionaceae	Tree
Eucalyptus globulus	Sufaida	Myrtaceae	Tree
Melia azadirachta	Bkain	Meliaceae	Tree
Morus alba	Toot	Moraceae	Tree
Zizyphus mauritiana	Ber	Rhamnaceae	Tree
Ficus carica	fig	Moraceae	Tree
Dodonia viscosa	Sanatha	Sapindales	Shrub
Lantana camara	Lantana	Verbenaceae	Shrub

Saccharum munja	Kana	Fabaceae	Shrub
Prosopis juliflora	Musquite	Fabaceae	Shrub
Calotropis procera	Desi Ak	Asclepiadaceae	Shrub
Cannabis sativa	Bhang	Canabaceae	Scatter in patches, throughout the project site
Cynodon dactylon	Ghass	Poaceae	Scatter grass in patches, throughout the project site
Cenchrus ciliaris	Ghass	Poaceae	Scatter grass in patches, throughout the project site

Exhibit 5.5: Flora of the Project Area

Sr. No.	Common Name of Birds	Scientific Name	Status		Occurrence				Listing			
			Migratory	Resident	Common	Abundant	Less Common	Rare	WPO/Act	IUCN Red List	CMS Appendix	CITES Appendix
1.	Black Drongo	*Dicrurus macrocercus*		X	X							
2.	Black Kite	*Milvus migrans*		X	X							II
3.	Brown Hill Warbler	*Prinia criniger*		X			X					
4.	Clamorous Reed Warbler	*Acrocephalus stentoreus*		X	X							
5.	Collared Dove	*Streptopelia decaocto*		X		X						
6.	Common Babbler	*Turdoides caudatus*		X		X						
7.	Common/Indian Myna	*Acridotheres tristis*		X		X						
8.	Crested lark	*Galerida cristata*		X		X						
9.	Greater Grey Shrike	*Lanius excubitor*		X		X						
10.	Grey Partridge	*Francolinus pondicerianus*		X		x						
11.	Black Partridge	*Melanoperdix niger*		X		X						
12.	Chukar	*Alectoris chukar*		X		x						

Sr. No.	Common Name of Birds	Scientific Name	Status		Occurrence				Listing			
			Migratory	Resident	Common	Abundant	Less Common	Rare	WPO/Act	IUCN Red List	CMS Appendix	CITES Appendix
13.	Hoopoe	*Upupa epops*		X	X							
14.	House crow	*Corvus splendens*		X		X						
15.	House Sparrow	*Passer domesticus*		X		X						
16.	Indian Pond Heron	*Ardeola grayii*		X		X						
17.	Indian Robin	*Saxicoloides fulicata*		X	X							
18.	Indian Roller	*Coracias benghalensis*		X	X							
19.	Indian Tree-Pie	*Dendrocitta vagabunda*		X	X							
20.	Koel	*Eudynamys scolopac Ea*		X	X							
21.	Little Grebe	*Tachybaptus ruficollis*		X	X							
22.	Little Green Bee-eater	*Merops orientalis*		X		X						
23.	Pied Kingfisher	*Ceryle rudis*		X	X							
24.	Purple Moorhen	*Porphyrio porphyrio*		X	X							
25.	Purple Sunbird	*Nectarinia asiatica*		X	X							
26.	Red wattled Lapwing	*Hoplopterus indicus*		X		X						
27.	Red-vented Bulbul	*Pycnonotus cafer*		X	X							
28.	Rose-ringed Parakeet	*Psittacula krameri*		X			X					
29.	See see Partridge	*Ammoperdix griseogularis*		X			X					
30.	White breasted Kingfisher	*Halcyon smyrnensis*		X	X							
31.	White cheeked Bulbul	*Pycnonotus leucogenys*		X	X							
32.	Lapwing	*Vanellinae*		X			X					
33.	Wagtail	*Motacila alba*		X			X					
34.	Magpie	*Pica pica*		X			X					
35.	Treepie	*Dendrocitta vagabunda*		X			X					

Sr. No.	Common Name of Birds	Scientific Name	Status		Occurrence				Listing			
			Migratory	Resident	Common	Abundant	Less Common	Rare	WPO/Act	IUCN Red List	CMS Appendix	CITES Appendix
36.	Crested Plover	*Charadrius hiaticula*		X			X					
37.	Duck		x									

Exhibit 5.6: Avi-fauna of the Project Area

Sr. No.	Common Name	Scientific Name	Occurrence				Listing		
			Abundant	Common	Less Common	Rare	WPO/Act	IUCN Red list	CITES Appendix
1.	Urial	*Ovis Vignei Punjabiansis*						end	II
2.	Chinkara (Indian gazelle)	*Gazella bennettii*						Dec/ LC	
3.	Asiatic jackal	*Canis aureus*		X					III
4.	Cape hare	*Lepus capensis*		X					
5.	Common Red Fox	*Vulpes vulpes*		X					III
6.	House Mouse	*Mus musculus*		X					
7.	Indian crested Porcupine	*Hystrix indica*		X					
8.	Indian hare	*Lepus nigricollis*		X					
9.	Wild Boar	*Sus scrofa*		X					

Exhibit 5.7: Mammals observed in the Project Area

Sr. No.	Common Name	Scientific Name	Listing		
			WPO/Act	IUCN	CITES Appendix
1.	Black Rock Agama	*Laudakia melanurus*			
2.	Dhaman/Rat snake	*Ptyas mucosus*	X		II
3.	Garden Lizard	*Calotes versicolor*			
4.	Indian Cobra	*Naja naja*			II

5.	Indian Monitor lizard	*Varanus bengalensis*	X		I
6.	Saw scaled Viper	*Echis carinatus pyramidum*			
7.	Spotted Indian house Gecko	*Hemidactylus brookii brookii*			

Exhibit 5.8: Reptiles observed in the Project Area

5.4 Socio-Economic Environment

5.4.1 Area and Population

❖ **Jhelum**

Jhelum District was established on 23 March 1849. According to the 2017 census of Pakistan, total population of the district is 1,222,650, of which 50.6 % is female. The district of Jhelum, covers an area of about 3,587 square kilometers (1,385 sq mi), and is administratively divided into four tehsils which are: Jhelum, Sohawa, Pind Dadan Khan and Dina, which are divided into 44 Union Councils. Jhelum City is the central city of the district.

	Households	Population (2017)			
		Male	Female	Transgender	Total
RURAL	145,783	419,969	448,456	23	868,448
URBAN	59,009	181,995	172,180	27	354,202
Total	**204,792**	**601,964**	**620,636**	**50**	**1,222,650**

Exhibit 5.9: Population Distribution Chart of District Jhelum

Jhelum has a diverse ethnic population. Major casts living in district Jhelum include Rajput, Jatt, Kyanis, awan and Malik.

❖ **Chakwal**

According to 2017 census, total population of the district is 1.3 million, 0.26 million (20%) of which is urban while the remaining 1.04 million (80%) is rural. Annual increment in population is 1.9%.

The district of Chakwal is administratively divided into five Tehsils namely:

1. Chakwal
2. Kallar Kahar

3. Choa Saidan Shah
4. Talagang
5. Lawa

People speak Dhani, Majhi and Potohari dialects of Punjabi Language. English is also spoken by educated people.

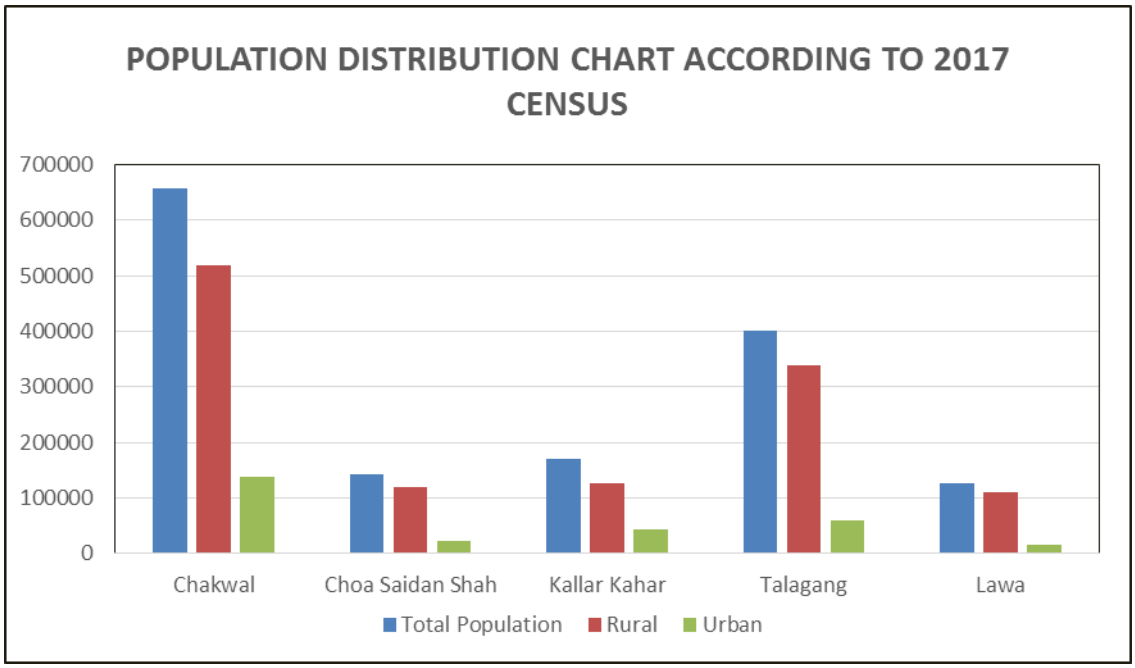
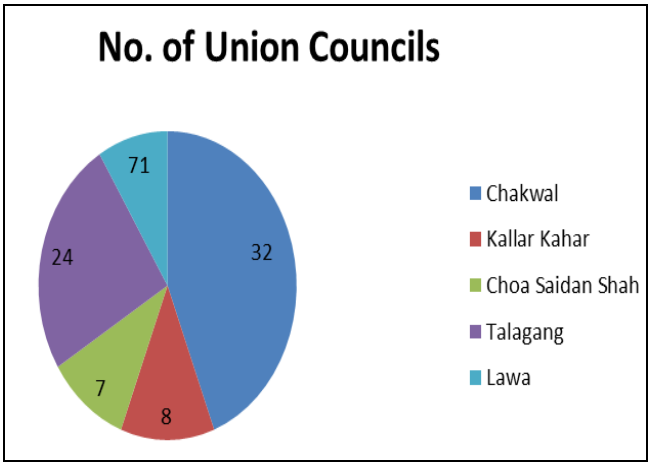


Exhibit 5.10: Population Distribution Chart of District Chakwal



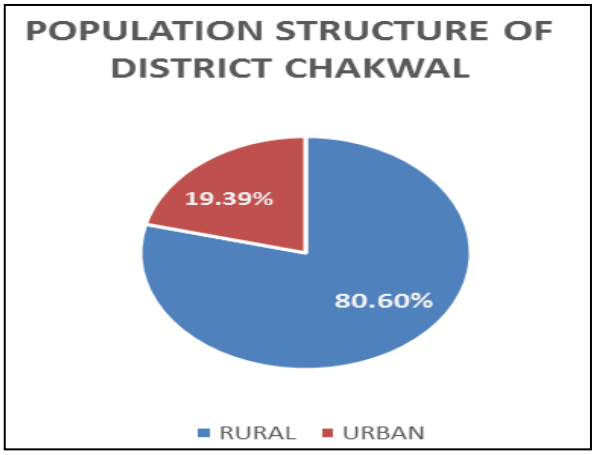


Exhibit 5.11: Charts showing Union Councils and Population Distribution of District Chakwal

5.4.2 Education

❖ **Chakwal**

According to 2017 survey by Alif Ailaan, Chakwal district is ranked 13th in Pakistan that have above 71.88% literacy rate. Most of the improvements have been seen at the primary level. Still a lot of work needs to be done in order to bring a bigger change.

District Chakwal has a total number of 1,208 Institutions. Out of these 64 are located in urban areas and the remaining 1,144 are in Rural Areas. The total enrolment for the district is 187,942. Urban areas have an enrolment of 20,217, whereas the rural area share is 167,725.Majority of the villages in the project area have government schools and colleges. Number of teachers in Chakwal district are 9,178. However, there are few private high schools also working in the area. For higher education, people have to go to the nearby colleges of the Chakwal.

❖ **Jhelum**

The literacy rate of Jhelum District has been recorded to be 73% as of 2017, which has improved from 38.1 % in 1981. There are 791 government schools in Jhelum District from which 308 are male schools and 483 female schools. According to the statistics by Punjab government there are 82,123 enrolled male students and 79,477 enrolled female students in Jhelum District. According to the statistics there are 2532 male teachers in the district and 3154 female teachers in the Jhelum District.

5.4.3 Public Health

❖ **Chakwal**

Health facilities in the district are quite well established. There is 01 District Headquarters (DHQ) Hospital and 03 Tehsil Headquarters (THQ) Hospital in District Chakwal. In Chakwal District, there are 09 Mother and Child Health Centers (MCH), 64 Basic Health Units (BHU), 36 Rural Dispensaries (RD) and 10 Rural Health Centre (RHC). The health establishment is lead by the District Health Officer. Other than the Medical facilities provided by the government a large number of hospitals and dispensaries exist in the private sector in the District.

❖ **Jhelum**

In Jhelum District Executive District Health Officer is the Head of health department. In the district there is 01 District Headquarters Hospital, 02 Thesil Headquarters Hospitals, 06 Rural Health Centers (RHC), 49 Basic Health Units (BHU), 10 Dispensaries, 01 TB Hospital and 29 other health facilities in the District. Other than the Medical facilities provided by the government, a large number of hospitals and dispensaries exist in the private sector in the District.

5.4.4 Agriculture and Live Stock

❖ **Chakwal**

About 80% population of the Chakwal District is involved in agriculture sector. The main crops of District are Wheat, Groundnut, Oilseeds, Grams, Lentils- Masoor, Moong, Mash, Maize, Millets, Jawar. Crop yield is dependent on rain. The total area is 1,619,265 acres out of which 10,894 acres is irrigated area, 143,377 is forest while non-cultivated area is 831,772 acres.

A large number of people in Chakwal District keep livestock. There are also number of poultry and dairy farms. There are some privately own poultry and dairy farms who use modern technology as well. Livestock is kept for the purpose of meat; milk, butter, yogurt or as an asset.

❖ **Jhelum**

Jhelum District has an area of about 3587 square kilometers, out of which about 316,815 acres (1,282.10 km2) are cultivated. The area is located near River Jhelum right on the eastern part of Potohar upland. In District Jhelum agriculture is rainfall dependent. The average rainfall of the District ranges from 20 to 40 inches (1,000 mm). About three fourth of this precipitation is received in monsoon season and the remaining is received during the rest of the year. At present irrigated area is limited but the demand on the construction of small dams is gradually increasing. In Pind Dadan Khan, salt is the main feature which is damaging the rich agricultural land day by day.

Particulars	Area (acres)
Cultivated Area	316,815
• Irrigated Area	33,832
• Rain fed	282,983

Un-Cultivated Area	541,952
• Forest	110,491
• Cultureable Waste	149,971
• Not available for cultivation	281,490
Total Area	**858,767**

Exhibit 5.12: Land Statistics of District Jhelum

5.4.5 Business and Industry

❖ **Chakwal**

Pehlwan Revary is known is well known sweet product in country and abroad. The major industrial units of the district are:

Units	Total Number
Cement Plants	04
Textile Mills	04
Packaging Material Mills	03
Poultry Feed Mills	03
Brick Kilns	120
Flour Mills	06
Poultry Farms	2,267

Exhibit 5.13: Industrial Units of District Chakwal

❖ **Jhelum**

There are 104 industries in Jhelum District out of which the major units are as follows

Industry Names	No. of Industries
ICI Soda Ash	01
Pakistan Tobacco Company	01
Cement	01
Mari Petroleum	01
Brick Kilns	83
Flour Mills	16

Exhibit 5.14: Industrial Units of District Jhelum

5.4.6 Archaeological Sites

- Takht-e-Babri is a tourist destination in Kallar Kahar, Chakwal District in Punjab, Pakistan. It is located about 06 km away from proposed site of Kallar Kahar Grid Station. Takht-e-Babri is a flat stage and throne cut out of stone by the 1st Mughal Emperor King Babur to address his army while coming down from Kabul in the quest of the crown of Delhi.

- No sites of archaeological / cultural importance have been observed near the proposed area of Sohawa.

6.0 STAKEHOLDERS CONSULTATION

Stakeholder consultation is an essential component of EIA. NCPC consulted the persons and organizations potentially affected by the proposed project and associated infrastructure, and informed and engaged any interested individuals, groups, stakeholders and aboriginal communities in this assessment.

This Section summarizes the stakeholder consultation process conducted as vital part of the EIA process of the proposed project. This Section provides an overview of the consulting process, including the project stakeholders who have been involved and the consultation activities that have been carried out to date. It concludes with consultation findings.

6.1 Objectives

The key objectives of this stakeholder consultation are to promote sustainable development by ensuring that the proposed development project do not undermine critical resources and ecological functions as well as wellbeing, lifestyle and the expectations of the local community where the project is to be proposed. Hence, the present stakeholder's consultation process intends to:

- Enable the understanding (by all key stakeholders) of the proposed project by sharing information with stakeholders on proposed project and expected impacts on the physical, biological and socio-economic environment of the Project corridor
- Understand stakeholders concerns regarding various physical, biological and socio-economic aspects of the proposed project
- Review the social impacts of the operations and accurately identify and resolve key issues that may result from the proposed project
- Provide an opportunity to the public to influence Project plan in a positive manner; hence to increase their confidence about the proponent, reviewers and decision makers
- Reduce conflict through the early identification of controversial issues, and work through them to find acceptable solutions
- Create a sense of ownership of the proposal in the mind of the stakeholders
- Optimize local benefits that can be derived from the proposed project
- Develop the proposal which is truly sustainable

6.2 Stakeholder Consultation and EIA

The stakeholder consultation process was conducted to provide stakeholders with an opportunity to raise concerns and comment on the potential impacts and merits of development. Their input was captured in order to focus the assessment on key concerns, and to better understand expectations of the affected population.
Stakeholder consultation is fundamental to the development of the EIA in the following ways:

- Information is shared in a meaningful and timely manner to enable the public to provide considered feedback;
- The EIA team is fully able to understand and characterize the potential environment and socio-economic impacts of the project; and
- It enables the Project to develop effective mitigation measures and management plans that are sensitive to the local context.

6.3 Project Stakeholders

Stakeholders are those people who may be directly or indirectly affected by the project or who may have an influence on, or an interest in, the project. While planning the public consultation process, stakeholders were split into two categories: primary stake holders and secondary stakeholders.

The term ‘primary stakeholder’ has been used for all those people who may be directly affected by the project activities. For this project, primary stakeholders are limited to local community members.

The term ‘secondary stakeholders’ refers to individuals and organizations that will not be directly affected by project implementation, but that individual or organization do have an influence or an interest in the area and might be affected indirectly.

During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. Different stakeholders were identified during the field survey and they had different types of stakes and concerns according to their professions. The list of key stakeholders is outlined below in Box 1.

Box 1: List of key stakeholders

- Project participants
- Public representatives

- Local residents
- Government Officials
- Shop owners

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.

Exhibit 6.1: Pictorial View of Public and Stakeholder Consultation

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.

- Frequent load shedding and low voltage/ voltage fluctuation problems during the whole year, especially in summers and at night times.
- The project implementation will be very beneficial for the community as grid station after 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.
- 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.
- The existing system is overloaded all the year round. People promoted the idea of up gradation of existing electricity system, as they would be able to get reliable supply of electricity and start their own business. This will also create employment opportunities for local people.
- Proper mitigation plans should be adopted for this project and work should be completed within scheduled time
- Boundary wall should be constructed around the grid station area to make it safe from external disturbance. General public should be prohibited to get in close proximity of the grid station site.
- There should be proper safety measures in case of any emergency.

Name & Designation	Location	Opinions/Concerns/Issues/Suggestions
Mr. Sher Afzal, Assistant Manager 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. M. Jahangir	Forest	▪ The forest department had no concern

	Department Punjab	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.
Mian Amir Project Director	Township Society Kallar Kahar	▪ He explained the issues being faced by public i.e. load shedding and voltage drop problems in the area. ▪ Looking forward to early completion of the project as it will also facilitate the newly established housing society.
Dr. Javed Iqbal Physician	Tehsil Headquarter Hospital (THQ) Kallar Kahar	▪ He pointed towards the 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 occupational health and safety standards.
Employee TMA	Kallar Kahar	▪ Showed no concern over the execution of the project. ▪ The selected sites are quite distant from public and have minimal impacts on community.
Sheikh Asad Shop owner	Kallar Kahar	▪ A great initiative of IESCO to solve the issues of the residents of Kallar Kahar. ▪ Frequent load shedding and low voltage/ voltage fluctuation problems will be resolved.
Mr. Fazal Malik Shopkeeper	Sohawa	▪ Showed no concern over the execution of the project.
Mr. Qutub Shah Own Business	Sohawa	▪ Showed no concern over the execution of the project. ▪ It will facilitate for smooth business activities.
Mr. Sar Gul Khan Local Resident	Kallar Kahar	▪ Good initiative by IESCO. No issue with the initiation of project.
Mr. Iftikhar Ahmad Local Resident	Sohawa	▪ Good initiative by IESCO. No issue with the initiation of project.

Exhibit 6.2: Summary of Stakeholders Concerns

7.0 ENVIRONMENT, SOCIAL ASSESSMENT & MITIGATION MEASURES

7.1 Introduction

This chapter documents the findings of assessment of potential environmental and socio-economic impacts and proposes their mitigation measures. It includes identification, analysis, prediction, significance and characteristics of the impacts and mitigation measures to prevent unacceptable adverse effects through the implementation of appropriate project modifications.

This chapter plays a vital role in environmental impact assessment and identifies all significant impacts during the designing, construction and operation phases of the project. Environmental and social aspects identified during the stakeholder consultations and by the screening process are assessed for their severity and mitigation measures have been proposed on the basis of assessment. Additionally, residual impacts are identified using professional judgment that may persist after adoption of mitigation measures. The proponent will adopt these mitigation measures to reduce, minimize and compensate for the negative impacts as far as possible.

7.2 Screening Methodology

Potential Project impacts have been identified in this section related to the project construction and operation phases. Impact predictions are based on the consultants' previous experiences on similar projects; professional judgment; data collected in the field; discussions with local communities, relevant government officials and relevant technical specialists. Predicted impacts relate to all the aspects of the construction activities of 132 kV Transmission line and connecting Grid Stations. Many of the mitigation measures are related to route alignment, others with good construction practices.

7.3 Design Phase: Impacts and their Mitigation Measures

Designing phase impacts are primarily related to i) migratory birds' flyway and bird's protection from conductors; and ii) contractor compliance. Mitigations are mainly related to careful selection of the right of way for underground transmission line so as to avoid or minimize impacts.

7.3.1 Intrusion of Sensitive Receptors

There are no protected cultural and heritage sites located near the proposed TL route. Also there are no ecologically protected areas along the proposed TL alignment.

7.3.2 Impact on migratory bird flyways

The birds during migration fly at elevations between 800 and 2000 m, whereas maximum height of the towers of the transmission lines is less than 40 m. As such, the 132 kV transmission line route will not cause any obstruction for the flight of migratory birds. Also there are existing lines located in the route.

Mitigation Measures

- Detachable bird protection devices and anti-bird devices will be installed.
- Construction workers will not be allowed for hunting in the area.
- There will be no significant impact as the site is located at a distance of 05 km from the lake.

7.3.3 Establishing responsibility on Contractor regarding disposal of excavated earth

Contractor shall be made responsible through contract documents for proper disposal of the scrap/ spoil / excavated earth in case of foundation construction and towers erection and not to dump these scrap / spoils/ earth on agriculture land / open spaces / canals or leave unattended along the construction site. It should be disposed according to best waste management procedure.

7.3.4 Establishing responsibility on construction contractor to abide PEQS

Contractor shall also be made responsible through contract documents to follow Punjab Environmental Quality Standards (PEQS) and applicable standards throughout construction and ensure compliance of the same through periodic environmental monitoring reports.

7.3.5 Health and Safety of Workers and Public

Contractor shall be made responsible through contract documents to follow Standard Practices and Standard Operating Procedures (SOPs) of IESCO to ensure health & safety of workers at the site and public during all construction operations.

7.4 Construction Phase: Impacts and Mitigation Measures

Some of the significant impacts of construction activities are i) soil erosion, ii) obstruction to movement of traffic along intersecting roads for limited time, ii) waste generation and disposal during construction, iii) deterioration of local air quality due to vehicular emissions, and iv) occupational health and safety.

7.4.1 Erosion of soil

Project activities may cause erosion of soil. Such activities may be identified as transportation of materials and equipment, preparation of tower base for overhead TL, laying of transmission cables, removal of natural vegetation etc. Usually, the exposed soil after excavation for foundations is vulnerable to erosions and runoff by heavy rains.

But, the impact of all these activities would be less significant and temporary lasting only for construction of tower base. However, the aspects of soil erosion such as blockage of surface drainage network, impact on quality of natural water and biological system may cause potential environmental impacts that may also affect their users.

Mitigation Measures

- Cut and fill should be balanced to the extent practical at each site in order to minimize the need for fill and for spoil disposal. Cut material should be used to level the site area or be disposed at designated spoil disposal sites;
- The excavated soil must be contained in an enclosure to reduce the chances of runoff during the seasons of precipitation;
- Stock piles of fine material should be wetted or covered with tarpaulin especially during windy weather conditions;
- Site workers should wear dust masks especially during the dry and windy weather conditions;
- After constructional activities are finished, the site which is cleared temporarily and is recommended for vegetation should be re-vegetated promptly;
- No disposal in waterways is allowed.

7.4.2 Waste Generation and Disposal

Typical solid waste generated during construction activities include faulty conductors and insulators, steel scrap, faulty scaffoldings, waste concrete, empty cement bags, excavated soil etc. Random storage of this waste is hazardous to the workers at the site and the ambient environment as well. Poor waste management practices would result in short term negative impacts on the surrounding, agriculture areas and waterways.

Mitigation Measures

- Contractor will ensure proper disposal of the spoil / excavated earth in case of construction of foundation and not to dump these scrap / spoils/ earth on open plots / open spaces / canals or leave unattended along the construction site.
- It should be disposed / recycled according to Contractor's HSE Plan and Procedures;

7.4.3 Impacts on Surface and Ground Water Resources

Generally, the type and significance of the impact is dependent on the characteristics of the water resource, the design of the structures and their method of construction.

Mitigation Measures

- All excavated soil left after backfilling should be completely removed;
- Soil runoff from the site leading to off-site contamination (particularly during rainy season) will be restricted by making silt fences near the foundations.

7.4.4 Fuel and Oil handling, storage and disposal

Inappropriate handling, storage and disposal of fuels and oils at construction sites may lead to contamination of soil.

Mitigation Measures

- Spillage of oil and grease from the vehicles will be avoided.
- Oils will be stored in secure designated areas with temporary impermeable containment;
- Refueling, oil changing and engine maintenance of machinery, equipment and vehicles will be avoided at construction site;
- Oil contaminated materials will be disposed at designated waste disposal facilities.

7.4.5 Dust Emissions

Construction activities that may lead to dust generation include cutting and excavation; transportation and tipping of cut materials; handling and storage of aggregates; concrete batching; site leveling and clearing; and associated activities. The PM10 in the ambient air is already present in excess to prescribed limits of PEQS. Therefore, any activity leading to dust emissions will aggregate the dust problem.

Mitigation Measures

- Dust emissions from soil piles and aggregate storage stockpiles should be reduced by keeping the material wet by sprinkling water at appropriate frequency and erecting windshield walls on three sides of the piles;
- It should be mandated by Contractor to backfill the excavations after erection of towers and rehabilitate the excavated area to its original position. If it is a road, the backfilling will be followed by leveling and carpeting of road with bitumen;
- Vehicular movement should be restricted to a specific time for dumping of supplies and construction materials; and
- Workers should wear dust masks and safety goggles, especially during dry and windy weather conditions to avoid health risk.

7.4.6 Exhaust Emissions

Major sources of exhaust emissions are standby diesel generators, material transport vehicles and emissions from construction machinery/earth moving equipment. Major exhaust emissions of concern are CO, CO2, SOx, NOx and PM10. These emissions are injurious to human health in high concentration.

Mitigation Measures

- All vehicles, generators and other equipment used during the construction activities will be properly tuned and maintained in good working condition in order to minimize emission of pollutants;
- Vehicles fitness will be regularly ensured to reduce the exhaust emissions;
- Emissions from the machinery and vehicles will be monitored on regular basis to ensure compliance of PEQS; and
- Excessive engine idling will be discouraged and machinery causing excessive pollution (i.e. visible clouds of smoke) will be banned from sites.

7.4.7 Noise and Vibration

During the construction phase noise will be generated from the operation of heavy machinery, crane operations and haulage of construction materials to and around construction sites and construction activities including excavation, pilling, backup power generators for supply of electricity; use of pressure horn etc. These construction activities are expected to produce noise levels in the range of 80 – 95 dB and may cause

discomfort to locals and fauna.

Mitigation Measures

- Vehicles and machinery will be equipped with silencers. Contractors will be required to fit noise shields on high noise construction machinery;
- Site labor working in high noise area such as where noise level exceeds 80 dB (A), will wear earplugs; and
- The stationary sources of noise such as concrete mixers, power generators and pumps will be equipped with noise barriers and will be selected and segregated from work areas.

7.4.8 Road cutting and rehabilitation

It is not envisaged that intersecting roads will be excavated or any of the tower of proposed transmission line will be laid along the road. However, if the road needs to be cut / excavated, following measures to be undertaken:

- If any intersecting road need to be cut / excavated, relevant civic agency will be taken onboard.
- Backfilling of excavation on road will be followed by leveling to existing ground level;
- If the relevant civic agency allows the carpeting of road, it will be conducted as per their standards;
- Diversions will be provided for commuters and diversion signs will be erected.

7.4.9 Occupational Health and Safety

The construction works and tower erection pose an inherent risk of injury to workers from accidents and hazardous working environments. There may be either minor or major accidents due to different activities of construction phase.

Mitigation Measures

- Preventive and protective measures including modification, substitution, or elimination of hazardous conditions, with particular attention to live power lines, working at height, high noise levels will be made;
- Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 200 pounds, when working at heights equal or greater than two meters or at any height if the risk includes falling into operating machinery, into water

or other liquid, into hazardous substances, or through an opening in a work surface.

- Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards as well as fall rescue procedures to deal with workers whose fall has been successfully arrested.
- Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking, and labeling covers for openings in floors, roofs, or walking surfaces.
- While working in excavation, shoring technique will be used to protect workers by installing supports to prevent soil movement for excavation that do not exceed 20 feet in depth.
- Spoils will be kept at least two feet back from the edge of a excavation.
- It will be ensured that excavated area is inspected by a competent person prior to entry and after any hazard- increasing event such as a rainstorm, vibrations or excessive surcharge loads.
- Way to exit an excavation--such as a ladder, stairway or ramp--no more than 25 feet of lateral travel for labors will be provided.
- Designated smoking areas will be provided away from construction site and waste areas.
- Fuels and flammable substances will be kept away from construction site and waste areas.
- Appropriate fire extinguishers and fire response provisions will be available at the site;
- Appropriately stocked first-aid equipment at work site, including appropriately trained first aid staff on site and adequate transport facilities for moving injured persons to hospital;
- Training for workers and appropriate incentives to use and comply with health and safety procedures and PPEs will be provided;
- Emergency response plan will be developed by Contractor and will be implemented during entire phase of construction activity;
- Procedures for documenting and reporting occupational accidents, diseases, and incidents;
- There will be strict safety requirements for personnel assigned to construction work; and
- Appropriate safety signage will be posted along the construction site.

7.5 Operation and Maintenance Phase: Impacts and Mitigation Measures

The most focusable area in the impact assessment process of proposed project is operational and maintenance activities of Transmission Line, as impacts generated during these phases may have long term and continuous affects. Potential operational issues include impact on migratory birds, EMF effects, occupational and community

health and safety risks, risks from fires, earthquakes. Mitigation measures have been incorporated into the design to minimize them to acceptable levels.

7.5.1 Health Impacts

a. Human Exposure to Electromagnetic Fields (EMF)

Electric and magnetic fields (EMF) are invisible lines of force emitted by and surrounding any electrical device (e.g. power lines and electrical equipment). Electric fields are produced by voltage and increase in strength as the voltage increases. Its strength is measured in volts per meter (V/m). Electric fields are shielded or weakened by materials, such as trees and building materials. Magnetic fields are measured in units of gauss (G) or tesla (T), where 1T equals 10,000G. Magnetic fields pass through most materials and are difficult to shield. Both electric and magnetic fields decrease rapidly with distance. Since magnetic fields are most likely to penetrate the body, they are the component of EMF that is usually studied in relation to human health. Power frequency EMF typically has a frequency in the range of 50 – 60 Hz and is considered Extremely Low Frequency (ELF).

Overall, ground-level magnetic fields from underground cables fall much more rapidly with distance than those from a corresponding overhead line, but can actually be higher at small distances from the cable. The graph in Figure below shows the illustration for underground cable vs. overhead lines.

Although there is public and scientific concern over the potential health effects associated with exposure to EMF (not only high voltage power lines and substations, but also from everyday household uses of electricity), Cancer, changes in behavior, memory loss and many other diseases has been suggested as resulting from exposure to EMF. But there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern. ICNIRP is a non-governmental organization formally recognized by the World Health Organization (WHO), which has set guidelines exposure limits for public and occupational exposure to EMF.

The following table exhibits the results of EMF assessment carried at two grid stations installed in recent and past years. The comparison of observations with ICNIRP safe exposure limits exhibits that the EMF radiations from grid station are within safer limits.

Sr. No.	Location at Grid Station	EMF of Grid Station installed in 2020 (uT)	EMF of Grid Station installed in 1998 (uT)	Safe Exposure Limits (uT)
1	Control Room	0.02	0.02	100
2	Yard	19.1	22.1	
3	Inside Boundary Wall	0.01	0.01	
4	Outside Boundary Wall	0.00	0.00	

Exhibit 7.1: Results of EMF Assessment

Mitigation Measures

- Operation phase EMF monitoring will be undertaken by IESCO as usual practice and the average and peak exposure levels will be compared with ICNIRP recommendations exposure;

b. Electrocution and Induced Currents

Electrocution can occur as a result of direct contact with high-voltage electricity or from contact with tools, vehicles, ladders, or other devices that are in contact with high-voltage electricity. Power line fields can also induce voltages and currents on conductive objects such as metal roofs or building, fences, and vehicles. When a person or animal comes in contact with a conductive object a perceptible current or small secondary shock may occur.

Mitigation Measures

- Warning signs will be posted at towers along the ROW.
- Conducting objects (e.g. fences or other metallic structures) installed near power lines will be grounded to prevent shock.

MATRIX IMPACT VALUES Negligible Minor Moderate Significant Positive	Physical Impacts									Biological impacts			Socio-economic impacts		
	Geology	Topography	Ground water	Surface Water	Air Quality	Land Quality	Soil Erosion	Noise	Land Use	Flora	Fauna	Agriculture	Local Population	Archaeological	Employment
Site Selection for Grid Stations															
Equipment Selection															
Land Acquisition															
Contractor's Mobilization															
Construction of Camp															
Camps operation															
Solid Waste Management															
Effluent Disposal															

MATRIX IMPACT VALUES Negligible Minor Moderate Significant Positive	Physical Impacts									Biological impacts			Socio-economic impacts		
	Geology	Topography	Ground water	Surface Water	Air Quality	Land Quality	Soil Erosion	Noise	Land Use	Flora	Fauna	Agriculture	Local Population	Archaeological	Employment
Transportation of construction material															
Use of construction material															
Solid Waste Disposal															
Operation of Facility															
Solid Waste Disposal during operation phase															
O&M of Grid Stations															

Exhibit 7.2: Impact Assessment Matrix

8.0 ENVIRONMENT MANAGEMENT AND MONITORING PLAN

8.1 Introduction

This section discusses the implementation and management of mitigation measures that are required for proposed project that includes progressive report and techniques to assure that all necessary environmental protection measures are carried out in the future as planned and to reduce residual impact to acceptable levels and achieve the expected outcomes of the project. The Environmental Management & Monitoring Plan (EMMP) is based on the type, extent and duration of the identified environmental impacts. The EMMP has been prepared following the regulatory requirements and guidelines.

Environmental Impact Assessment (EIA) for construction 132 KV Transmission line along with Grid stations at Sohawa and Kallar Kahar have identified potential impacts that are likely to arise during the project construction and operation phases.

To minimize the effects of adverse impacts the EIA recommends mitigation measures. These mitigation measures include the use of alternative options, management and physical controls, or compensation in monetary terms. The proposed mitigation measures are based on the understanding of the sensitivity and behaviour of environmental receptors in the project area, the legislative controls that apply to the project and a review of good industry practices while operating in sensitive environments.

For the effective implementation and management of the mitigation measures, an Environmental Monitoring and Management Plan (EMMP) have been prepared. The EMMP satisfies the requirement of the Punjab Environmental Protection Act (2012) and EIA/IEE Regulations. The EMMP outlines the aims and objectives, defines the responsibilities of the project sponsors/owners and contractor(s), and lays down the required communication, reporting procedures and mechanism through which the proposed measures will be monitored.

8.2 Objectives of EMMP

An EMMP provides a mechanism to address the adverse environmental impact of a project during its execution, to enhance the project benefits, and to introduce standards of good practice to be adopted for all the project works. The primary objectives of the EMMP are as follows;

- To facilitate the implementation of the mitigation measures

- To define responsibilities of the project proponents, contractors, and environmental monitors, and to provide effective means of communication among all
- To provide monitoring mechanism and identification of its parameters for ensuring the complete implementation of all mitigation measures and their effectiveness
- To provide a mechanism for taking timely action in the face of unanticipated environmental situations
- To identify training requirements at various levels
- To ensure project sponsors/ owners and contractors to meet all environment related obligations
- To facilitate owner/project sponsors to follow corporate policy on environment
- To ensure that after completion of storage facility, restoration and rehabilitation work will be carried out
- To ensure required equipment and human resources for environmental monitoring and meeting accidental spillage are in place and personnel are trained to meet accidents and emergencies

8.3 Scope of EMMP

The Environmental Management & Monitoring Plan is detailed strategy to be implemented for achieving improved environmental performance in the following areas:

- Environmental Management
- Water Usage and Disposal
- Recycling and Waste Management
- Storm Water Management
- Pollution Prevention/Environmental Risk Assessment
- Bio-Diversity
- Energy Management
- Transport
- Community Awareness

8.4 Components of the EMMP

The EMMP consists of the following components:

- Legislation and Guidelines
- Organizational Structure and Responsibilities
- Mitigation Plan
- Environmental Monitoring Plan
- Emergency Procedures and Contingency Plan

- Communication and Documentation
- Change Management
- Environmental Budget
- Costed Environmental Management Plan
- Environmental Training

8.4.1 Legislation and Guidelines

The EIA report has discussed national and international legislation and guidelines that are relevant to the project. IESCO will also ensure that the key project management staffs of IESCO and all its assigned contractors are aware of these legislation and guidelines prior to the start of the project activities.

- **PEPA, 1997:** The Punjab Environmental Protection Act, 1997 (Amended 2012) is the basic Environmental Legislation in the country. The Act also requires that no person shall emit pollutants or noise in amount, concentration or level that is in excess of the Punjab Environmental Quality Standards. (PEQS)

- **EIA/IEE Regulations:** The project will be carried out in conformance with EIA/IEE regulations and relevant international conventions and that guidance is sought from national and international guidelines. An independent monitoring consultant will be appointed for the project.

- **PEQS Requirements:** PEQS will be followed throughout the project activities and operation. The PEQS are available for industrial gaseous emissions, motor vehicle emissions and noise levels, and industrial and municipal effluents.

8.4.2 Institutional Capacity

This section provides an organizational structure for the environmental management during the proposed project implementation and defines the roles and responsibilities of the various stakeholders for the duration of the project.

Management Approach

The management approach is as follows:

A. **Project Proponent:** The overall responsibility for compliance with the environmental management plan rests with the project proponent (Islamabad Electric Supply Company Limited).

B. **Contractors:** The contractors will carry out field activities as part of the proposed project. The contractors will be subject to certain liabilities under the

environmental laws of the country, environmental policy of IESCO and under their contract with the Project Proponents.

A certain degree of redundancy is inevitable across all management levels, but this is in order to ensure that compliance with the environmental management plan is crosschecked. Other essential features of the EMMP are:

1. The Project Proponents will appoint an HSE Coordinator to accompany the contractors throughout the duration of the project.
2. The Project Proponent will ensure that all contracts it executes with sub-contractors comply with positive environmental sensibilities and the environmental policy of the proponent.
3. To ensure commitment, the contractors will be required to appoint a dedicated environment officer.
4. All environmental personnel will be authorized to implement the policies and requirements of the environmental management plan.
5. The Project Proponent will cooperate with regulatory agencies (such as the Punjab EPA) and other stakeholders who may want to send their own teams to monitor the activities of the project.

The organizational roles and responsibilities are summarized below:

1. Monitoring Tiers of Proponent

The overall monitoring of the project will be carried out in three tiers.

- **Contractor Level:** They are liable to appoint an HSE/Environment officer to supervise all the activities been carried out at the project site.
- **GSC Department:** Site Incharge of site Engineer is solely responsible for implementation of EMMP.
- **E&SS:** Environment and Social Safeguard is a section of Project Management Unit (PMU) IESCO which overall monitors all the projects.

2. On the Job Supervision and Monitoring

- Each contractor will appoint a dedicated Environment Officer, who will be responsible for ensuring compliance with the EMMP during the project works (camp establishment, trenching, foundations, backfilling, erection etc.) He will also be responsible for communication with and the training of the construction and erection crews in all aspects of the EMMP.
- The Project Proponent's Environment and Social Safeguard Section will train the Contractor's Environmental Officer / HSE Coordinator who will than train the labors and also be responsible for all environmental issues and for the implementation of the EMMP in the field/site.

- Training in safety and spill response should be routine for personnel involved in the transportation of raw materials and products

3. Communication

The following means will be employed to communicate environmental concerns among members of the staff:

- **Kick-off Meeting**

At the beginning of the project, a meeting will take place at the main contractor's camp to discuss the environmental issues. The following personnel will attend the meeting:

IESCO

- Deputy Manager (E & SS)
- Project Coordinator

Contractor

- Site Manager
- Environmental/HSE Officer
- Senior Supervisor

The purpose of the meeting will be to present the environmental management plan to the field personnel.

- **Regular Meetings**

Meeting among following personnel, will be held at least twice a month:

IESCO

- Assistant Manager (E & SS)

Contractor

- Site Manager
- HSE Officer

Any relevant environmental issues, progress of the monitoring team, and areas of concern will be discussed during these meetings.

8.4.3 Summary of Impacts and Mitigation Plan

The mitigation plan is a key component of the EMMP. It lists all the potential effects of the project and their associated mitigation measures identified in the EIA.

- **List of Mitigation Measures**: A comprehensive listing of mitigation measures (actions)
- **Implementation Personnel:** The person(s) responsible for ensuring the full implementation of the action
- **Implementation Monitoring:** The persons responsible for monitoring the action
- **Monitoring Parameter:** The parameters to be monitored in order to ensure the effective implementation of the action
- **Schedule:** A timescale for the implementation of the action to ensure that the objectives of mitigation are fully met

For each impact, the mitigation measures are suggested as below:

Exhibit 8.1: Environmental Management and Monitoring Plan

Environmental Aspect	Impacts	Mitigation Measures	Responsibility	Parameters	Frequency	Responsibility
Pre-Construction Phase / Design Phase						
Birds	Chance of Collision of Birds with the conductor string	• All suspension poles will have detachable bird protection devices, over each suspension insulator string. • All angle poles having jumper insulator strings will also be furnished with anti-bird devices.	IESCO	Check the bird protection devices are installed	One time after installation	IESCO
Barriers to movement of people/traffic	excavation & backfilling of transmission line may result in obstruction		Contractor	Traffic diversion sites, check access routes of pedestrians and construction sites	Monthly / reported quarterly basis	Contractor/IESCO
Contract clauses	Non-compliance of local environmental standards and EIA recommendations by Contractor	• Construction Contractor shall be made responsible through contract documents for proper disposal of the spoil / excavated earth and not to dump these spoils/ soil on or near open plots / open spaces / open storm water drains/ in front of residents or leave unattended along the construction site. It should be disposed in nearby designated landfill site. • A proper site rehabilitation plan shall be made by the contractor which include the spoil / excavated earth disposal arrangements • Contractors shall also be made responsible through contract documents to follow Punjab Environmental Quality Standards (PEQS) and applicable standards during all the construction operations and ensure compliance of the same through periodic environmental monitoring reports.	Project Implementation Department, Environment and Social Safeguard Section			

Environmental Aspect	Impacts	Mitigation Measures	Responsibility	Parameters	Frequency	Responsibility
		• Contractors shall be made responsible through contract documents to follow Standard Practices and Standard Operating Procedures (SOPs) to ensure health & safety of workers at the site and public during all construction operations.				
Construction Phase						
Sensitive receptors and existing infrastructure	Effect on Sensitive Receptors and Existing Infrastructure	• Prior notices shall be given to the concerned administrators before the start of construction activities near these sensitive locations; • Prior notices shall be given to the shop owners and residents before the start of construction activities near these settings; • All drawings of existing services along the chosen route alignment must be with the CC; • Damage to sewerage lines and water mains will be avoided; • It is responsibility of CC to rehabilitate the damaged lines to its original position in coordination with the relevant agencies; • It will be ensured that relevant staff of utilities agencies is present during construction activities while working near utility lines; and	Contractor	Review the records of local consultations	Before Construction on monthly basis / reported quarterly basis	Contractor/IESCO
Soil erosion	Blockage of surface drainage network, impact on quality of natural water and biological system may cause potential environmental impacts that may also affect their users.	• Construction activities will be scheduled to avoid runoff due to rain; • The excavated soil will be contained in an enclosure to reduce the chances of runoff during the seasons of precipitation; • Stock piles of fine material will be wetted or covered with tarpaulin especially during windy weather conditions; • Cut and fill will be balanced to the extent practical at each site in order to minimize the need for fill and for spoil disposal. Cut material will be used to level the site area; or	Contractor	Check any obstruction in existing drains due to construction, check lifting of waste material, check waste management plan	Monthly / reported quarterly basis	Contractor/IESCO

Environmental Aspect	Impacts	Mitigation Measures	Responsibility	Parameters	Frequency	Responsibility
Local drainage	Impact on Surface and ground water sources	• All excavated soil left after backfilling will be completely removed; • Debris and vegetation clogging culverts and drains will be regularly cleared; • Soil runoff from the site leading to off-site contamination (particularly during rainy season) will not be allowed. • Construction works will ensure that the drains are not disturbed otherwise the entire road will be flooded.	Contractor	Check drainage infrastructure	Monthly / reported quarterly basis	Contractor/IESCO
Fuel and oil handling, storage and disposal	Soil contamination	• Spillage of oil and grease from the vehicles will be avoided. • Oils will be stored in secure designated areas with tEMMPorary impermeable containment; • Refuelling, oil changing and engine maintenance of machinery, equipment and vehicles will be avoided at construction site; • Oil contaminated materials will be disposed at designated waste disposal facilities.	Contractor	Check contamination on the ground, check waste disposal	Monthly / reported quarterly basis	Contractor/IESCO
Construction Waste Disposal	This waste has the potential to cause negative impact on the surroundings if not properly managed and disposed of. Irregular storage of this waste is hazardous to the workers at the site as well	• A Comprehensive Waste Management Plan for Construction phase will be developed; • Construction sites will be equipped with tEMMPorary refuse bins, and construction wastes should be collected on a daily basis and contained in a tEMMPorary designated waste storage area on each site; • Any hazardous waste will be separated and stored in areas clearly designated and labelled, and disposed in environmentally safe manner. • Hazardous waste will be routinely collected from the designated area and disposed at licensed waste disposal facilities approved by PEPA; and	Contractor	Domestic waste, Hazardous waste, electro waste, Paper and Polythene material waste and Wood	Measured on daily basis and reported quarterly	Contractor/IESCO

Environmental Aspect	Impacts	Mitigation Measures	Responsibility	Parameters	Frequency	Responsibility
		• Upon completion of activities at a construction site, all solid wastes will be completely removed and the site will be restored.				
Dust Emissions	Deterioration of local Air Quality	• Dust emissions from soil piles and aggregate storage stockpiles will be reduced by keeping the material wet by sprinkling water at appropriate frequency and erecting windshield walls on three sides of the piles; • It will be mandated by IESCO to Contractor to backfill the trenches after laying of the Transmission Line and rehabilitate the excavated area to its original position. If it is a road, the backfilling will be followed by levelling and carpeting of road with bitumen; • Vehicular movement will be restricted to a specific time for dumping of supplies and construction materials; and • Workers will wear dust masks and safety goggles, especially during dry and windy weather conditions to avoid health risk.	Contractor	SPM, PM_{10}, $PM_{2.5}$, SOx, NO, NO_2 and CO	Measured monthly for 12 working hours / reported quarterly basis	Contractor/IESCO
Exhaust Emissions	Deterioration of local Air Quality	• 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; • Emissions from the machinery and vehicles will be monitored • on regular basis to ensure compliance of PEQS; • Excessive engine idling will be discouraged and machinery causing excessive pollution (i.e. visible clouds of smoke) will be banned from sites; • Standby generators for power supply will be kept away from pathways and will be placed at locations where probabilities of human intervention are limited; and • The stack height of the generators used will be at least 3 m above the ground.	Contractor	Smoke, CO, Noise, NOx, PM, SO_2	Measured monthly/ reported quarterly basis	Contractor/IESCO

Environmental Aspect	Impacts	Mitigation Measures	Responsibility	Parameters	Frequency	Responsibility
Noise and Vibration	Construction activities are expected to produce noise levels in the range of 80 – 95 dB and may cause discomfort to local residents	• Machinery operation and high noise activities should be carefully planned and scheduled; • High noise activities will be planned at night to avoid disturbance for office workers, school children/staff etc. at any construction site. • Vehicles and machinery will be equipped with silencers. Contractors will be required to fit noise shields on high noise construction machinery; • Site labor working in high noise area such as where noise level exceeds 80 dB (A), will wear earplugs; • The stationary sources of noise such as concrete mixers, batching plant, power generators and pumps will be selected and segregated from work areas and residents; and • Occupational health, safety and environmental procedures and Environmental management plan for proposed project would be followed.	Contractor	Noise Intensity (dB)	Monthly / reported quarterly basis	Contractor/IESCO
Safety Precautions for the Workers	The construction of civil works poses an inherent risk of injury to workers from accidents and hazardous working environments. There may be either minor or major accidents due to different activities of construction phase	• Preventive and protective measures including modification, substitution, or elimination of hazardous conditions, with particular attention to live power lines, working at height, working above water, EMFs, high noise levels will be made; • Measures for the management and appropriate disposal of hazardous wastes will be undertaken to ensure protection of the workforce and the prevention and control of releases and accidents; • Appropriate fire extinguishers and fire response plans will be available at the site;	Contractor	Accidents, PPEs, Annoyance, Fire Hazards, Safety Protocols, Spill on Land and Spill on Water	Continuous / reported quarterly basis	Contractor/IESCO

Environmental Aspect	Impacts	Mitigation Measures	Responsibility	Parameters	Frequency	Responsibility
		• Appropriately stocked first-aid equipment at work sites, including appropriately trained first aid staff on site and adequate transport facilities for moving injured persons to the nearest hospital will be available; • Training for workers and appropriate incentives to use and comply with health and safety procedures and PPEs will be provided; • Procedures for documenting and reporting occupational accidents, diseases, and incidents; • There will be strict safety requirements for personnel assigned to construction work; and • Appropriate safety signage will be posted along the construction site.				
Traffic Movement near construction site	Traffic flow in the locality of project will slightly increase during construction activities of the project, which directly impact the traffic flow along the right of way of underground transmission lines and in the vicinity of grid stations. schools and residents).	• Traffic management plan will be developed and implemented during the construction phase; • Excavation near schools and businesses will be done during non-peak hours and will be done in segments throughout the route alignment; • Adequate and appropriate road signs will be erected to warn road users along the ROW of transmission lines; • The movement of equipment (trucks) during construction will be limited to non-peak hours; • Raw materials for construction work will be adequately covered within the trucks to prevent any escaping into the air and along the roadway; • Vehicles will be maintained regularly to reduce the exhaust emissions; and • Any complain launched b y community member will be responded and appropriate action will be taken to avoid it in future.	Contractor	Traffic flow, timing of activities, near misses and injuries records and reporting	Continuous / reported quarterly basis	Contractor/IESCO

Environmental Aspect	Impacts	Mitigation Measures	Responsibility	Parameters	Frequency	Responsibility
Social Impacts	Community health & safety issues	• The excavated trench will be protected from a hard barricade or scaffolding to avoid falling of pedestrian / vehicle; • The side of the road along the preferred route will be chosen by Contractor in such a way that it will not restrict the movement of traffic or provision of diversion is provided as per traffic management plan; • It should be mandated by IESCO to Contractor to backfill the trenches after laying of the Transmission line and rehabilitate the excavated roads to its original position. The backfilling will be followed by levelling and carpeting of road with bitumen; • Contractor should inform the community beforehand regarding the timings of the construction works and should respond to their complaints swiftly. • Proper lighting at night near trenches will be ensured; and Diversions, danger points and works at culverts, bridges and construction sites will have appropriate warning signs; this is particularly important at night to avoid accidents.	Contractor	Review of complaint register	Monthly / reported quarterly basis	Contractor/IESCO
				Surface topography, Proper backfilling and carpeting	Continuous / reported quarterly basis	Contractor/IESCO
Post Construction / Operational Phase						
Human Exposure to Electromagnetic Fields (EMF)	Adverse health effects	• Undertake EMF monitoring as per IESCO predefined procedures.	IESCO	Electromagnetic Field (EMF)	Conducted and reported annually	IESCO

8.4.4 Emergency Procedures and Contingency Plan

Despite the best intentions preventive efforts and designs, emergencies may arise and accidents can happen. The emergency procedures are designed to mobilize personnel in a planned manner to respond immediately to emergency situation arising out of the pipeline or Terminal stations by incidents such as accidents, fire due to major leakage, natural disaster, mob attach or air attach etc.

Explosion and Fire Hazards

Activity	Strategy	Responsibility	Timing
Fire Hazards	Proper fire fighting equipment will be available at appropriate places	IESCO	Construction and Operation
Risk Management	Proper equipment and trained staff	IESCO	Construction and Operation

Exhibit 8.2: Contingency Plan

8.4.5 Communication and Documentation

An effective mechanism for storing and communicating environmental information during the project is an essential requirement of an EMMP. This activity will be done by an Independent Monitoring Consultant. The key features of such a mechanism are:

- Precise 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

Item	Description
Data Recording and Maintenance	All forms will be numbered and a tracking system will be developed for each. Whenever a form is released for use in the field, its number will be recorded. The monitors will be required to account for each form after completion. In this manner, it will be ensured that all forms are returned to the office, be they filled, unused, or discarded
Storage of Information	A database for information collected during the project will be prepared. The database may include information on: • Training programs • Staff deployment • Non-compliance • Corrective actions • Water Resources

	• Quality & Quantity • Results of effects monitoring • Water usage • Fuel usage
Meeting	For effective monitoring, management and documentation of the environmental performance during the operation, environmental matters will be discussed during daily meetings held on-site. Environmental concerns raised during the meetings will be mitigated after discussions between the IESCO site representatives
Report	The IESCO site representative and the contractors will also prepare a weekly environmental report. Copies of the report will be provided to the IESCO and the contractor's higher management

Exhibit 8.3: Reporting and Assessment

8.4.6 Change Management

An environmental assessment of the proposed project has been made on the basis of the project description available at the time the EIA was conducted. However, it is possible that changes in the project design will be required when the project is implemented. This section describes the mechanism that will be put into place to manage changes that might affect the project's environmental impact.

8.4.6.1 Changes to the Operation

The changes in the project design have been categorized as first-order, second order, and third-order. These are defined below:

i. **First-Order Change**

A first-order change is one that leads to a significant departure from the project described in the EIA and consequently requires a reassessment of the environmental impact associated with the change. In such an instance, the monitoring will be required to reassess the environmental impact of the proposed change, the results of which will then be sent to the Punjab EPA for approval.

ii. **Second-Order Change**

A second-order change is one that may entail the 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 monitoring will be required to reassess the impact of the activity on the environment, specify additional mitigation measures, if necessary, and report the changes to the Punjab EPA. The EPA will

review the change management statement and communicate if any concerns. If EPA agrees, it does not have to send a formal approval. Seven days after submission of the change management statement, the change will be implemented unless a communication to the contrary has been received from EPA.

iii. **Third-Order Change**

A third-order 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 is to avoid cutting a tree, relocating construction campsites to minimize clearing vegetation, etc. The only action required for such changes would be to record the change in the Change Record Register.

8.4.6.2 Changes to the EMMP

The possible categories of changes have been discussed above. The changes in the project design or the results of the environmental monitoring may necessitate changes in the EMMP. In this case, the following actions will be taken:

- A meeting will be held between the project proponents and the concerned contractor, During the meeting the proposed addition to the EMMP will be discussed and agreed upon by all parties
- Based on the discussions during the meeting, a change report will be produced collectively, which will include the additional EMMP clause and the reasons for the addition
- A copy of the report will be sent to the head offices of the project proponents and the contractor
- All the relevant project personnel will be informed of the addition.

The changes in the EMMP may include either additional or reduced monitoring or reporting requirements

8.4.7 Training Programs

An environmental training will help to ensure that the requirements of the EIA and EMMP are clearly understood and followed by all the project personnel throughout the project period.

The primary responsibility for providing training to all the project personnel will be to formulate indicative environmental training program, which will be finalized before the commencement of the project. The appointed HSE officer will train the project proponent's staff, the contractors, and other staff engaged for the project. Training

will cover all staff levels, ranging from the management and supervisory to the skilled and unskilled categories. The scope of the training will cover the requirements of the EIA and the EMMP, with special emphasis on sensitizing the project staff to environmental, ethnic, and social context of the area.

Staff	Trainer	Contents	Schedule
All Site Personnel	Contractor	- Environmental sensitivity of the project area - Mitigation measures - Contingency plan - Community issues - Social and cultural values	Prior to the start of the project activities
Construction Crew	Contractor	- EMMP - Waste disposal	Prior to the start of the construction activities
Drivers	Contractor	- Road safety - Defensive driving - Waste disposal - Cultural values and social sensitivity	Before and during the field operations
Mechanics	Contractor	- Waste disposal	Before and during the field operations
Camp Staff	Contractor	- Camp operation - Waste disposal - Natural resource conservation - Housekeeping	Before and during the field operations
Restoration Teams	Contractor	- Restoration requirements - Waste disposal	Before start of restoration activities

Exhibit 8.4: Environmental Training Program

8.4.8 Costed Environmental Management Plan

Sr. #	Description	Quantity	Unit	Rate	Amount
1	Water quality monitoring/management/ testing/analysis (Before Mobilization, during works execution & after completion) Parameters, PH, Electric Conductivity, Color, taste, odor, turbidity, TDS, TSS, Total hardness, chloride, Arsenic, Cadmium, Sulphate, Copper, Sodium, Calcium, Magnesium, Potassium, Nickle,	18	Test (No.)	20,000	360,000

	Lead, Carbonate, Bicarbonate, Iron, Nitrate, Zinc, Aluminium, Flouride, Chromium, Manganese, Total Coliform, E Coliform, Fecal Coliform				
2	Air quality monitoring/testing (Before Mobilization during works execution & After completion) Parameters: Ambient Air, Work site, PM2.5, PM10, Lead, SOx, NOx, CO	18	Test (No.)	14,000	252,000
3	Noise monitoring/analysis/measurement/management (One job/month) Parameters Offices/control room, working site area	18	Test (No.)	2,000	36,000
4	Other environmental & social mitigation measures (Demarcation of work area, SSEMMP, First Aid Box, Fire fighting Equipments, Proper storage of oil and lubricant, awareness panaflexes (size 4x6 feet) minimum 15 No.	1	Job	140,000	140,000
5	Solid waste & wastewater management, safe storage/placement of raw materials	12	Job	30,000	360,000
6	Tree plantation (5'-7' Height)	150	No.	500	75,000
7	Filling watering & ramming earth (suitable for plantation) with new earth will lead upto 30m and lift upto 1.5m.	450	Cum	150	67,500
8	Turfing lawns with grass including plugging, laying setting and watering	743	Cum	300	222,900
				Total	**Rs.151,3400**

Exhibit 8.5: Costed Environmental Management Plan

9.0 GRIEVANCE REDRESSAL MECHANISM

A responsive mechanism will be established to resolve the issues, complaints and grievances regarding environmental performance of the project. Complaints may receive at individual and group levels. They may be addressed at different levels depending upon the nature of the complaint. These are local level representatives, parliaments and legal institutions. The Grievance Redress Mechanism will be designed to cater for the issues of the people that can be affected by the Project.

9.1 Framework for Grievance Redressal Mechanism (GRM)

Pak-EPA has issued a set of guidelines of general applicability and sectoral guidelines indicating specific assessment requirements. Under the regulations and guidelines, no specific requirements are laid out for developing a grievance redress mechanism for projects. However, under its Guidelines for Public Consultation, 1997, the proponents are required to consult stakeholders during the implementation phase of the project. In this regards, it is stated that the representatives of local community participate in the monitoring process to promote a stable relationship between the project management and the community.

9.2 Outline of Mechanism for Grievance Redressal

IESCO and Contractor will adopt the GRM Procedure outlined below, which requires interaction, consultation, and timely resolution of legitimate grievances. This approach is aimed at building a reputation of aware, concern and responsible organization among the community, with a view to build and sustain acceptance and support for the construction of the project.

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 HSE officer (Contractor) 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 HSE officer will discuss it with the concerned site Engineer of GSC's Directorate and determine the remedial action. If required, consultations will also be undertaken with the E&S section PMU. 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.

The SCR will be reviewed during the fortnightly meetings at the site. The progress on the remedial actions will also be reviewed during the meetings.

The Register will also be shared with the Project Director (GSC) and Chief Engineer (Development) on regular basis, for information and further action, if any.

10.0 CONCLUSION AND RECOMMENDATIONS

10.1 Conclusion

This Environmental impact assessment study was carried out to identify the environmental and socioeconomic impacts of the proposed 132 kV Sohawa and Kallar Kahar Grid Stations and their feeding T/Ls.

This study has been carried out at the planning stage of the projects. Primary and secondary data were used to assess the environmental and social 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 projects, and recommended suitable mitigation measures.

The EIA process ensures that the impacts of the project activities during construction and operation stages have been adequately addressed and mitigation measures duly proposed wherever needed. Adoption of mitigation measures will ensure reduction of impact on the micro and macro environment as well as socio-economic conditions to acceptable levels. The development of this project will be compatible with the requirements of the Punjab Environmental Protection Act 2012, Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations 2000, and Punjab Environmental Quality Standards (PEQS); as well as other regulatory requirements of Government of Punjab and Government of Pakistan. The issue of environment, health & safety has been duly incorporated in the design, construction & operations phases of the project.

On the basis of the findings of the EIA Study, it is possible to conclude that:

- Construction and operation of proposed project will, on adoption of the mitigation measures, have no significant impact on the physical as well as socio-economic composition of the microenvironment and macro-environment of the project area;
- The likely impacts of construction activity and operation of the grid station and TL will be appropriately mitigated through controls as adopted by IESCO, careful planning and management;
- The project is not likely to cause displacement of population, loss of business and annoyance to the living environment as the project area is owned by IESCO, already existing transmission lines are located in the area;

Mitigation measures as suggested in Environmental Management and Monitoring Plan will be implemented by the IESCO and Contractor followed by environmental monitoring conducted to ensure that all measures are implemented as intended. The

Environmental Management and Monitoring Plan has been prepared in accordance with national laws and guidelines. In addition, any subsequent conditions issued by Punjab EPA as part of the environmental clearance should also be included in the environmental compliance program.

10.2 Recommendations

Following essentials recommendations, which are also the part of EMMP as mitigation measures, will be followed by IESCO / Contractor in letter and spirit:

- Monitoring activities during project activities shall be carried out for periodic recording of environmental performance and proposing remedial actions to address any unexpected impacts.

- IESCO shall be responsible for proper disposal of the scrap/ spoil / excavated earth in case of foundation construction and towers erection and not to dump these scrap / spoils/ earth on agriculture land / open spaces / canals or leave unattended along the construction site.

- Contractor shall also be made responsible through contract documents to follow Punjab Environmental Quality Standards (PEQS) and applicable standards throughout construction and ensure compliance of the same through periodic environmental monitoring reports.

- Emergency response plan will be developed by Contractor and implemented during entire phase of construction activity;

The EIA study, therefore, recommends that No Objection Certificate (NOC) of the project to be issued by Punjab EPA with the surety that the suggested mitigation measures will be adopted, and the Environmental Management and Monitoring Plan will be followed in letter and spirit.

ANNEX I: REFERENCES

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ANNEX II: PUNJAB ENVIRONMENTAL QUALITY STANDARDS

EXTRA ORDINARY ISSUE

REGISTERED No. L-7532

The Punjab Gazette

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LAHORE MONDAY AUGUST 15, 2016

GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT

NOTIFICATION
(124 of 2016)

12th August 2016.

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Drinking Water is published for general information:

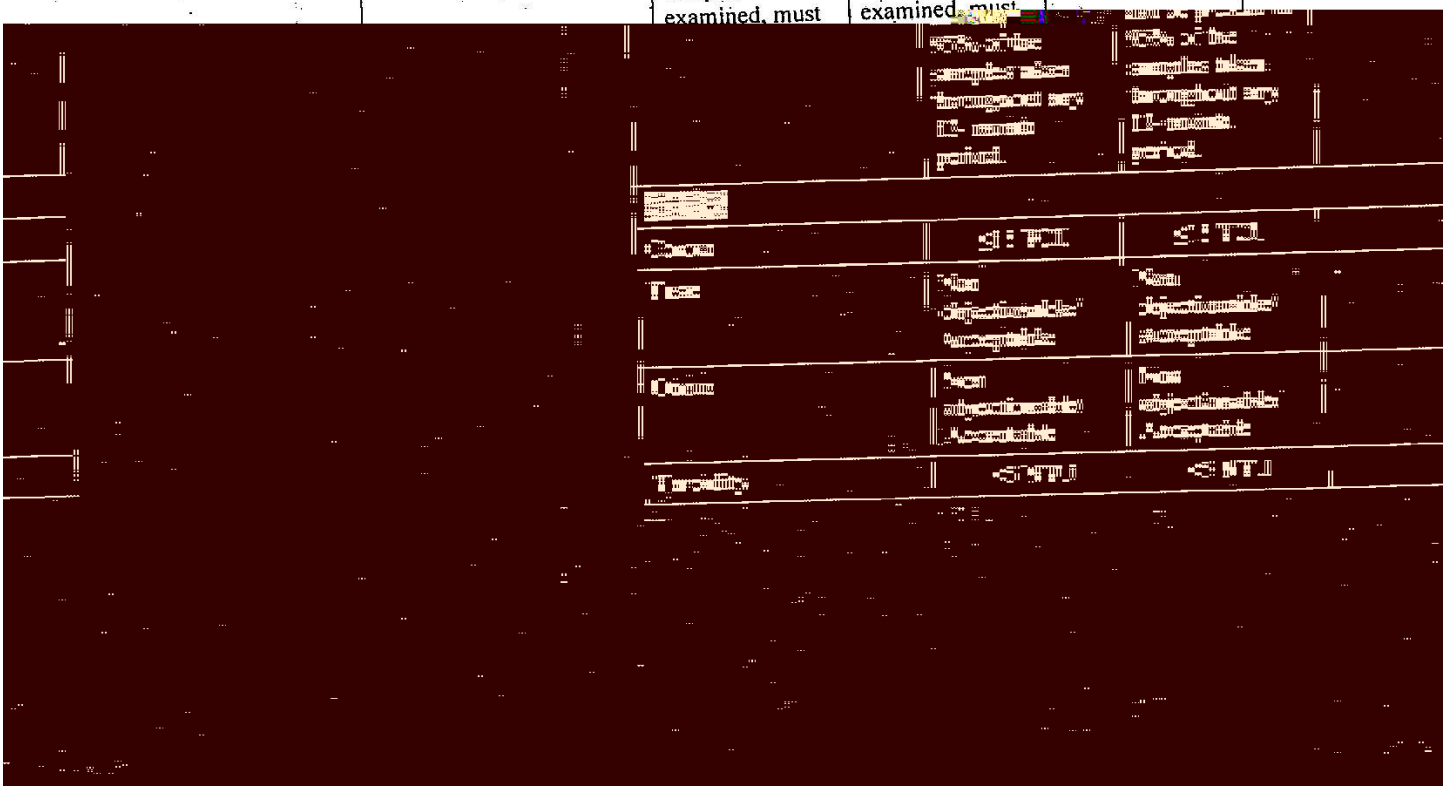
DR SYED ABUL HASSAN NAJMEE
Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

Government of the Punjab
Environment Protection Department

NOTIFICATION: No. SO(G)/EPD/7-26/2013. – In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Drinking Water:

Punjab Environmental Quality Standards for Drinking Water

Properties/Parameters	Standard Values	WHO Standards	Remarks
Bacterial			
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	Most Asian countries also follow WHO standards
Treated water 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	Most Asian countries also follow WHO standards
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	Must not be detectable in any 100 ml sample In case of large supplies, where sufficient samples are examined, must	Most Asian countries also follow WHO standards



Properties/Parameters	Standard Values	WHO Standards	Remarks
Total hardness as $CaCO_3$	< 500 mg/l	---	
TDS	<1000	< 1000	
pH	6.5 – 8.5	6.5 – 8.5	
Chemical			
Essential Inorganic	mg/Litre	mg/Litre	
Aluminum (Al) mg/l	≤0.2	0.2	
Antimony (Sb)	≤0.005 (P)	0.02	
Arsenic (As)	≤0.05 (P)	0.01	Standard for Pakistan similar to most Asian developing countries
Barium (Ba)	0.7	0.7	
Boron (B)	0.3	0.3	
Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing countries
Chloride (Cl^-)	<250	250	
Chromium (Cr)	≤0.05	0.05	
Copper (Cu)	2	2	
Toxic Inorganic	mg/l	mg/l	
Cyanide (CN)	≤0.05	0.07	Standard for Pakistan similar to Asian developing countries
Fluoride (F)*	≤1.5	1.5	
Lead (Pb)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing countries
Manganese (Mn)	≤ 0.5	0.5	
Mercury (Hg)	≤0.001	0.001	
Nickel (Ni)	≤0.02	0.02	
Nitrate (NO_3)*	≤50	50	
Nitrite (NO_2)*	≤3 (P)	3	
Selenium (Se)	0.01(P)	0.01	

Properties/Parameters	Standard Values	WHO Standards	Remarks
Residual chlorine	0.2-0.5 at consumer end 0.5-1.5 at source		
Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing countries
Organic			
Pesticides mg/l			PSQCA No. 4639- 2004, Page No. 4 Table No. 3 Serial No. 20-58 may be consulted.**
Phenolic compounds (as Phenols) mg/l		0.002	
Poly-nuclear aromatic hydrocarbons (as PAHs) g/l		0.01 (By GC/MS method)	
[redacted]			
Alpha Emitters bq/L or pCi	0.1	0.1	
Beta emitters	1	1	

* Indicates priority health related inorganic constituents, which need regular monitoring.

** PSQCA: Pakistan Standards Quality Control Authority.

(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department

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GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT

NOTIFICATION

[redacted]

Government of the Punjab
Environment Protection Department

NOTIFICATION: No. SO(G)/EPD/7-26/2013. – In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Ambient Air:

Punjab Environmental Quality Standards for Ambient Air

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
Sulfur Dioxide (SO_2)	Annual Average*	80 µg/m^3	Ultraviolet Fluorescence method
	24 hours**	120 µg/m^3	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m^3	Gas Phase Chemiluminescence
	24 hours**	40 µg/m^3	
Oxides of Nitrogen as (NO_2)	Annual Average*	40 µg/m^3	Gas Phase Chemiluminescence
	24 hours**	80 µg/m^3	
Ozone (O_3)	1 hour	130µg/m^3	Non dispersive UV absorption method
Respirable Particulate Matter $PM_{2.5}$	Annual Average*	15µg/m^3	Preferably β-Ray absorption method
	24 hours**	35µg/m^3	

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of measurement
	1 hour	15µg/m^3	
Lead (Pb)	Annual Average*	1 µg/m^3	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5µg/m^3	
Carbon Monoxide (CO)	8 hours**	5 mg/m^3	Non Dispersive Infra Red (NDIR) method
	1 hour	10 mg/m^3	

* Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

** 24 hourly /8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.

(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department

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GOVERNMENT OF THE PUNJAB
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NOTIFICATION
(118 of 2016)

12th August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Industrial Gaseous Emissions is published for general information:

DR SYED ABUL HASSAN NAJMEE
Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

Government of the Punjab
Environment Protection Department

NOTIFICATION: No. SO(G)/EPD/ 7-26 /2013. – In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Industrial Gaseous Emissions:

PUNJAB ENVIRONMENTAL QUALITY STANDARDS FOR INDUSTRIAL GASEOUS EMISSIONS (mg/Nm^3, UNLESS OTHERWISE DEFINED)

No.	Parameter	Source of Emission	Standard
1	2	3	4
1	Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann Scale or equivalent smoke number
2	Particulate matter [1]	(a) Boilers and furnaces:	
		(i) Oil fired	300
		(ii) Coal fired	500
		(iii) Cement Kilns	300
		(b) Grinding, crushing, clinker coolers and related processes, metallurgical processes, converters, blast furnaces and cupolas.	500
3	Hydrogen Chloride (HCl)	Any	400
4	Chlorine (Cl_2)	Any	150
5	Hydrogen Fluoride (HF)	Any	150
6	Hydrogen Sulphide (H_2S)	Any	10
7	Sulphur Oxides [2][3]	Sulfuric acid / Sulfonic acid plants	5000
		Other plants except power plants operating on oil and coal	1700
8	Carbon Monoxide (CO)	Any	800

No.	Parameter	Source of Emission	Standard
9	Lead (Pb)	Any	50
10	Mercury (Hg)	Any	10
11	Cadmium (Cd)	Any	20
12	Arsenic (Ar)	Any	20
13	Copper (Cu)	Any	50
14	Antimony (Sb)	Any	20
15	Zinc (Zn)	Any	200
16	Oxides of Nitrogen	Nitric acid manufacturing unit	3000
		Other plants except power plants operating on oil or coal:	
		Gas fired	400
		Oil fired	600
		Coal fired	1200

Explanations:

1. Based on the assumption that the size of the particulate is 10 micron or more.
2. Based on 1 percent sulfur content in fuel oil. Higher content of sulfur will cause standards to be pro-rated.
3. In respect of emissions of sulfur dioxide and nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to the Punjab Environmental Quality Standards (PEQS) specified above, comply with the following standards:

A. Sulfur Dioxide

Sulfur Dioxide Background levels Microgram per cubic meter (ug/m^3) Standards				
Background Air Quality (SO_2 Basis)	Annual Average	Max. 24 hours Interval	Criterion I Max. SO_2 Emission (Tons per Day per plant)	Criterion II Max. Allowable ground level increment to ambient (ug/m^3) (One Year Average)
Unpolluted Moderately Polluted*	< 50	< 200	500	50

Sulfur Dioxide Background levels Microgram per cubic meter (ug/m^3) Standards				
Background Air Quality (SO_2 Basis)	Annual Average	Max. 24 hours Interval	Criterion I Max. SO_2 Emission (Tons per Day per plant)	Criterion II Max. Allowable ground level increment to ambient (ug/m^3) (One Year Average)
Low	50	200	500	50
High	100	400	100	10
Very Polluted**	> 100	> 400	100	10

* For intermediate values between 50 and 100 ug/m^3 linear interpolations should be used.

** No projects with Sulfur dioxide emissions will be recommended.

B. Nitrogen Oxide

Ambient air concentrations of Nitrogen Oxides, expressed as NOx should not exceed the following:

Annual Arithmetic Mean 100ug/m^3 (0.05 ppm)

Emission levels for stationary source discharges before mixing with the atmosphere, should be maintained as follows:

For fuel fired steam generators, as Nano-gram per joule (10^{-9} g/J) of heat input:

Liquid fossil fuel	130
Solid fossil fuel	300
Lignite fossil fuel	260

Note: Dilution of gaseous emissions to bring them to the NEQS limiting value is not permissible through excess air mixing blowing before emitting into the environment.

(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department

EXTRA ORDINARY ISSUE

REGISTERED No. L-7532

The Punjab Gazette

PUBLISHED BY AUTHORITY

LAHORE MONDAY AUGUST 15, 2016

GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT

NOTIFICATION
(123 of 2016)

12th August 2016

The following Notification No. SO(G)/EPD/Z-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for motor vehicle exhaust and noise is published for general information:

DR SYED ABUL HASSAN NAJMEE
Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

Category/Class	Tiers	CO	HC+ NOx	PM	Measuring method	Applicability
2	3	4	5	6	7	8

Type of Vehicle
1

[redacted]

Passenger Cars	M1: with reference mass (RW) upto 2500 kg	Pak-II IDI	1.0	0.7	0.08		All imported and locally manufactured diesel vehicles with effect from 01-07-2012
	Cars with RW over 2500 kg to meet NI category standards	Pak-II, DI	1.0	0.9	0.10	NEDC (ECE 15+EUDCL)	
Light Commercial Vehicles	NI-I(RW<1250kg)	Pak-II, IDI	1.0	0.70	0.08		
		Pak-II, DI	1.0	0.90	0.10		
	NI-II(1250kg< RW<1700kg)	Pak-II, IDI	1.25	1.0	0.12		
		Pak-II, DI	1.25	1.3	0.14		
	NI-III(RW>1700kg)	Pak-II, IDI	1.50	1.2	0.17		
		Pak-II, DI	1.50	1.6	0.20		

Parameters Standards (maximum permissible limit)	Measuring method
85 dB(A)	Sound-meter at 7.5 meters from the source

(b) For Heavy Duty Diesel Engine and Large Goods Vehicles (g/KWh)

Type of Vehicle	Category/ Class	Tiers	CO	HC	NOx	PM	Measuring method	Applicability
1	2	3	4	5	6	7	8	9
Heavy Duty Diesel Engine	Trucks & Buses	Pak-II	4.0	1.1	7.0	0.15	ECE-R-49	All imported and locally manufactured diesel vehicles with effect from 01-07-2012
Large Goods Vehicl	N2(2000 and up)	Pak-II	4.0	7.0	1.1	0.15	EDC	

es								
Parameters	Standards (maximum permissible limit)							Measuring

[redacted]

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LAHORE MONDAY AUGUST 15, 2016

GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT

NOTIFICATION
(121 of 2016)

12th August 2016

The following Notification No. SO(G)/EPD/7-26/2013, dated 05.08.2016 regarding the Punjab Environmental Quality Standards for Noise is published for general information:

DR SYED ABUL HASSAN NAJMEE
Secretary
Government of the Punjab
Law and Parliamentary Affairs
Department

Government of the Punjab
Environment Protection Department

NOTIFICATION: No. SO(G)/EPD/7-26/2013. In exercise of the powers conferred under clause (c) of sub-section (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the following as the Punjab Environmental Quality Standards for Noise:

Punjab Environment Quality Standards for Noise

No.	Category of Area/Zone	Effective from 1st July, 2010		Effective from 1st July, 2013	
		Limits in dB(A) Leq*			
		Day Time	Night Time	Day Time	Night Time
1	Residential Area (A)	65	50	55	45
2	Commercial Area (B)	70	60	65	55
3	Industrial Area (C)	80	75	75	65
4	Silence Zone (D)	55	45	50	45

Note:

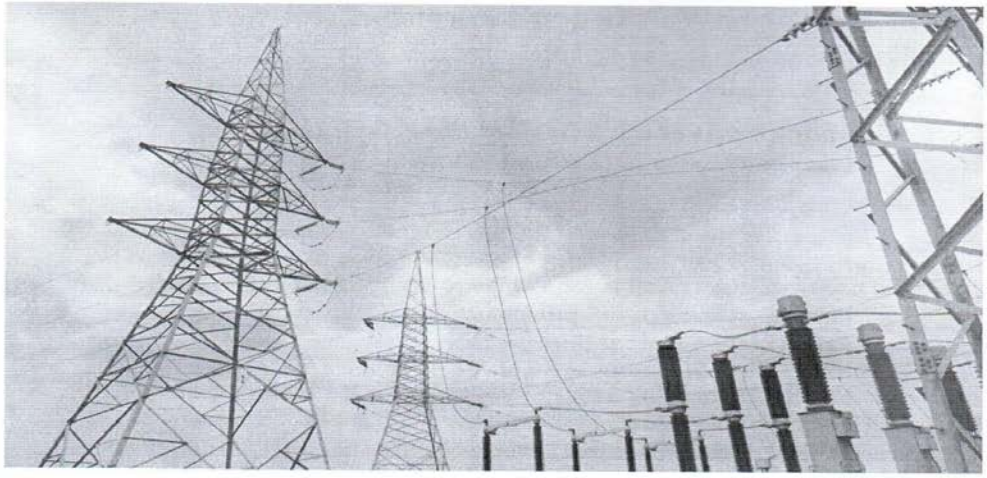
1. Day time hours; 6:00am to 10:00pm.
2. Night Time hours; 10:00 pm to 6:00 am.
3. Silence Zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospital, educational institutions and courts
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority

* dB(A) Leq: Time weighted average of the level of sound in decibel on scale A which is relatable to human hearing.

(IQBAL MOHAMMED CHAUHAN)
Secretary, Government of the Punjab
Environment Protection Department

ANNEX III: TERMS OF REFERENCE

ISLAMABAD ELECTRIC SUPPLY COMPANY



TERMS OF REFERENCE

For Preparation of
ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT
Of

i) 132 KV Grid Sation Sohawa, Jhelum & its Feeding T/Line
ii) 132 KV Grid Sation Kallar Kahar, Chakwal & its Feeding T/Line

(February, 2020)

Prepared by: ***Environment & Social Safeguards Section***
Project Management Unit (PMU)
Office Of the Chief Engineer (Development)
ISLAMABAD ELECTRIC SUPPLY COMPANY
IESCO Head Office, Street 40, G-7/4, Islamabad, Pakistan.
Tel: 051 – 9252 519; 2378095
Fax: 051 – 9252 345; 9252 978
E-mail: iescopmu@iesco.com.pk

(18)

A. BACKGROUND.

1. Islamabad Electricity Supply Company Ltd (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 parts of Azad Jammu & Kashmir (AJK). IESCO was incorporated in April 1998 under the Companies Ordinance 1984. Before this, it was one of the eight AEBs of WAPDA now collectively called DISCOs.

B. RATIONALE.

2. Electricity consumption has grown steadily in recent years. The Government of Pakistan (GoP) has launched a large-scale Generation, Transmission and Distribution expansion program. Nevertheless, power shortages are anticipated, and to minimize future supply deficits, (GoP) is adopting a systematic development plan to increase its electricity supply capacity and strengthen the existing bnetwork for satble and reliable electricity supply.

3. Further to above, the increased pace of economic growth in the recent past and the ongoing investments in the primary network (220 kV & 500 kV) have necessitated investments in the secondary grid system and the distribution system. This is essential as both of these systems are at present unable to adequately deliver the system peak and therefore will be severely constrained to deliver the increased power demand in the immediate future.

4. In addition to generation constraints, the high growth of electricity demand in Pakistan is putting the existing distribution infrastructure under stress resulting in unacceptably high levels of outages, voltage fluctuations and the overloading of lines and transformers. The distribution system constraints cause inefficiencies at the consumer end – such as high levels of un-served energy or investment in costly self or captive generation - which extracts significant economic and financial rent. Export competitiveness is being eroded by high electricity costs and unreliable supplies.

(20)

5. The immediate priority for investment in the distribution system is to address the capacity shortfalls / constraints that currently result in regular system outages and supply interruptions to customers. These works need to be done urgently to avoid a rapid deterioration of power transformers which could result in prolonged outages and load shedding.

6. The 500kV and 220kV transmission lines forming the primary transmission system would carry power from the generating stations to primary load centers. In-order to ensure safe dispersal of power further to the secondary transmission ends, a reliable secondary system comprising of 132kV network (Grid Stations & Transmission Lines) has to be established by setting up new facilities, strengthening the existing secondary system through Rehabilitation, Extensions, Augmentations and Up-gradation of present facilities according to the load requirements.

7. IESCO intends to upgrade/expend its 132 kV Transmission and Grid system to cop the increasing damad of electricity due to rapid incease in population/urbanization in its operational territory, the proposed projects will help to improve the voltage and reduce line losses. The construction of proposed i) 132 kV Grid Station Sohawa, Jhelum & its feeding T/line and ii) 132 kV Grid Station Kallar Kahar, Chakwal & its feeding T/line will meet the demand of electricity in Tehsil Sohawa, District Jhelum and Tehsil Kallar Kahar, District Chakwal.

C. OBJECTIVES.

8. The prime objectives of the proposed projects are:

i) To avoid forced load shedding,

ii) To maintain and upgrade the existing system,

iii) To plan, design & implement system expansion to increase the capacity to cope with the higher load demand,

iv) To reduce the technical losses,

v) To improve the Quality of electricity supply,

[21]

vi) To improve Sustainability, Stability, Reliability and Efficiency of the system, and;

vii) To improve safety conditions for both workers and general public.

D. SCOPE OF PROJECT.

9. The following components are included in the project;

i) *New 132 kV Grid Station at Tehsil Sohawa, District Jhelum and its feeding Transmission line.*

The Grid Station will be constructed in 32 Kanal of land near Chakwal More, Sohawa Town in District Jhelum. The feedng Transmission line of this grid station include only one (01)tubeler pole.

ii) *New 132 KV Transmission Line Feed for Sohawa Grid Station and its feeding Transmission line.*

The Township Housing Society, Kallar Kahar has provided 32 kanal of land for the construction of 132 KV Grid Station in Kallar Kahar, District Chakwal. The feeding Transmission line of this Grid Station involved three (03) Towers.

E. SCOPE OF PROPOSED STUDY.

10. The consultant scope of work covers preparation of Environmental Impact Assessment (EIA) Report for the above proposed components;

11. The specific objectives of the study are to:

a) Assess the existing environmental, social and socio-economic conditions of the project area.

b) Conduct the base line data of environmental, social and socio-economic conditions of the project area.

c) Carry out the water quality tests, air analysis, noise measurements and electromagnetic fields (EMF) as baseline of the project area for the report.

d) Identify adverse environmental and social impacts associated with project components / activities.

e) Propose appropriate mitigation measures to eliminate or minimize the extent of adverse impacts.

f) Develop an Environmental Management Plan (EMP) for the adverse environmental impacts.

g) Develop Environmental Monitoring Plan.

(22)

h) Prepare EIA report in accordance with the national regulatory requirements and international best practices.

i) To assess the types and magnitude of resettlement and other social negative impacts and issues.

j) To assess and prepare budgetary requirments for implementation of EMP.

F. MAJOR COMPONENTS OF THE STUDY.

12. The main structure of the EIA study shall base upon on following body parts;

- Baseline Conditions.
- Analysis of Alternatives.
- Public / Stakeholders Consultations.
- Identification of Environmental / Social Impacts of Project Components and Mitigation Measures.
- Environmental Management Plan (EMP).
- Environmental Monitoring Plan.
- EMP Implementation Cost.

13. The body structure of the EIA report shall follow this recommended pattern:

- Executive Summary
- Chapter 1 – Introduction,
- Chapter 2 – Existing Legal Frame Work,
- Chapter 3 – Project Description,
- Chapter 4 – Analysis of Alternative,
- Chapter 5 – Baseline Conditions of Project Area,
- Chapter 6 – Public Consultation / Stakeholders Concerns,
- Chapter 7 – Environment, Social Assessment & Mitigation Measures,
- Chapter 8 – Environment Management Plan (EMP)
- Chapter 9 – Grievance Redressal Mechanism (GRM),
- Chapter 10 – Conclusions and Recommendations, and;
- Annexure List – As per Requirement.

14. The Consultant will also,

i) Review the existing Legal Frame work of the country in respect of the Environment, Social & Resettlement preview.

[23]

ii) Consider & review the Best International Practices & approaches in the field of environment and conducting the EIA of grid stations and transmission line projects

iii) Conduct air, water, noise analysis and EMF assessments for incorporation as baseline data in the EIA report.

iv) Assess the existing environmental and socio-economic conditions in the project area using the already available information about the area,

v) Assess the various project activities to determine their likely short term and long term social and environmental impact and identify significant environmental and social issues of concern,

vi) Prepare / develop the Digital Maps / Google Maps for the Transmission Line routes as possible in lieu of the information provided by GSC Directorate of IESCO,

vii) Propose appropriate mitigation and monitoring measures that can be incorporated into the design, construction and operation phases of the project to minimize any damaging effects or lasting negative consequences,

viii) Identify environmentally sensitive areas where the project activities would lead to an unacceptable level of adverse environmental and social impacts,

ix) Prepare Environmental Management Plan and Environmental Monitoring Program with cost and institutional requirement for project activity,

x) Conduct a Public Hearing process as per IEE / EIA Regulation, 2000, if required,

xi) Cover all other requirements as set forth by Pakistan Environmental Protection Act 1997 and its regulations as well as various guidelines developed by Pakistan Environmental Protection Agency regarding IEE / EIA and;

xii) Co-ordinate and assist in obtaining No Objection Certificate (NOC) from all concerned EPA(s).

15. The assessments shall be made for the following three phases of the projects:

- Pre-construction / Design Phase.
- Construction Phase.

(24)

ANNEX IV: DRINKING WATER ANALYSIS REPORT

National Cleaner Production Center Foundation

Registered under Section 42 of the Companies Ordinance, 1984

NCPC/EL/F20-8/17062020
June 17, 2020

Test Report of Drinking Water Analysis
EIA for IESCO 132 kV Grid Stations & Transmission Line at Sohawa & Kallar Kahar, District Jhelum & Chakwal, Punjab

Sample Description: Drinking Water	**Contact Person:** Mr. Nayyar Humair
Date of Sampling : 06-06-2020	**Address:** Proposed Site for Sohawa Grid Station, District Jhelum
Date of Reporting: 17-06-2020	**Number of Samples:** 01
Sample No: EL\20\023	

Sr. No	Parameters	Results	Reference Method	PEQSDW	Units
1	Color	Colorless	Sensory Evaluation	<15.0	TCU
2	Electrical Conductivity	1,089	APHA 22nd Edition	NGVS	uS/cm
3	pH	7.4	APHA 22nd Edition	6.5-8.5	-
4	Turbidity	1.8	APHA 22nd Edition	< 5.0	NTU
5	Alkalinity	326	APHA 22nd Edition	NGVS	mg/L
6	Bicarbonate	312	APHA 22nd Edition	NGVS	mg/L
7	Calcium	59	APHA 22nd Edition	NGVS	mg/L
8	Carbonate	BDL	APHA 22nd Edition	NGVS	mg/L
9	Chlorides	110	APHA 22nd Edition	< 250.0	mg/L
10	Hardness	179	APHA 22nd Edition	< 500.0	mg/L
11	Magnesium	26	APHA 22nd Edition	NGVS	mg/L
12	Potassium	3.8	APHA 22nd Edition	NGVS	mg/L
13	Sodium	177	APHA 22nd Edition	NGVS	mg/L
14	Sulphate	77	APHA 22nd Edition	NGVS	mg/L
15	TDS	707	APHA 22nd Edition	< 1000.0	mg/L
16	Nitrate	2.0	APHA 22nd Edition	50.0	mg/L
17	E.Coli	-ve	APHA 22nd Edition	Must not be detectable	+ve/-ve
18	Total Coliform	-ve	APHA 22nd Edition	Must not be detectable	MPN/100ml CFU/100ml
19	Faecal Coliform	-ve	APHA 22nd Edition	Must not be detectable	MPN/100ml CFU/100ml

PEQSDW: Punjab Environmental Quality Standards for Drinking Water **BDL**: Below Detection Limit

NGVS: No Guideline Value Set **MPN:** Most Probable Number

Page 1 of 2

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National Cleaner Production Center Foundation

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Note:

All Parameters results are in mg/L except pH, Colour, Electrical Conductivity, Total Coliform, Fecal Coliform and E. Coli.

REMARKS:

1. This report shall not be reproduced / made part of any investigation / inquiry or for any litigation purpose.
2. NCPC laboratory is an EPA certified laboratory (Certificate No. 168/DD(Lab) /EPA /05 /2019) w.e.f May 28, 2019.

Environmental Lab Incharge
Date: 17-06-2020

Coordinator NCPC
Date: 17-06-2020

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NCPC/EL/F20-8/17062020
June 17, 2020

Test Report of Drinking Water Analysis
EIA for IESCO 132 kV Grid Stations & Transmission Line at Sohawa & Kallar Kahar, District Jhelum & Chakwal, Punjab

Sample Description: Drinking Water	**Contact Person:** Mr. Nayyar Humair
Date of Sampling : 06-06-2020	**Address:** Township Society Kallar Kahar, District Chakwal
Date of Reporting: 17-06-2020	**Number of Samples:** 01
Sample No: EL\20\023	

Sr. No	Parameters	Results	PEQSDW	Units
1	Color	Colorless	<15.0	TCU
2	Electrical Conductivity	210	NGVS	uS/cm
3	pH	7.2	6.5-8.5	-
4	Turbidity	BDL	< 5.0	NTU
5	Alkalinity	160	NGVS	mg/L
6	Bicarbonate	160	NGVS	mg/L
7	Calcium	59	NGVS	mg/L
8	Carbonate	BDL	NGVS	mg/L
9	Chlorides	83	< 250.0	mg/L
10	Hardness	150	< 500.0	mg/L
11	Magnesium	57	NGVS	mg/L
12	Potassium	BDL	NGVS	mg/L
13	Sodium	41	NGVS	mg/L
14	Sulphate	39	NGVS	mg/L
15	TDS	387	< 1000.0	mg/L
16	Nitrate	BDL	50.0	mg/L
17	E.Coli	-ve	Must not be detectable	+ve/-ve
18	Total Coliform	-ve	Must not be detectable	MPN/100ml CFU/100ml
19	Faecal Coliform	-ve	Must not be detectable	MPN/100ml CFU/100ml

PEQSDW: Punjab Environmental Quality Standards for Drinking Water **BDL**: Below Detection Limit

NGVS: No Guideline Value Set **MPN:** Most Probable Number

Page 3 of 2

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Note:

All Parameters results are in mg/L except pH, Colour, Electrical Conductivity, Total Coliform, Fecal Coliform and E. Coli.

REMARKS:

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Environmental Lab Incharge
Date: 17-06-2020

Coordinator NCPC
Date: 17.06.2020

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ANNEX V: AMBIENT AIR ANALYSIS REPORT

National Cleaner Production Center Foundation
Registered under Section 42 of the Companies Ordinance, 1984

NCPC/EL/F20-8/17062020
June 17, 2020

Test Report Ambient Air Analysis
EIA for IESCO 132 kV Grid Stations & Transmission Line at Sohawa & Kallar Kahar, District Jhelum & Chakwal, Punjab

Sample Description: Ambient Air Analysis	**Contact Person:** Mr. Nayyar Humair
Date of Testing: 06-06-2020	**Address:** Proposed Site for Sohawa Grid Station, District Jhelum
Date of Reporting: 17-06-2020	**No. of Samples:** 04
Sample No: EL\20\022	

Parameters	Sample Location				PEQS
	32°08'17''N 73°23'28''E	32°08'22''N 72°23'27''E	32°08'21''N 72°23'32''E	32°08'16''N 72°23'32''E	
Carbon Monoxide (CO)	1.4	1.1	1.2	1.3	10.0 mg/m^3
Sulphur Dioxide (SO_2)	17.4	20.6	18.4	17.6	120.0 $\mu g/m^3$
Nitrogen Dioxide (NO_2)	19.6	18.3	19.8	18.9	80.0 $\mu g/m^3$
Nitrogen Oxide (NO)	8.6	9.2	9.4	9.3	40.0 $\mu g/m^3$

PEQS: Punjab Environmental Quality Standards.

Remarks:
1. This report shall not be reproduced / made part of any investigation / inquiry or for any litigation purpose.
2. NCPC laboratory is an EPA certified laboratory (Certificate No. 168/DD(Lab) /EPA /05 /2019) w.e.f May 28, 2019.

Environmental Lab Incharge
Date: 17-06-2020

Coordinator NCPC
Date: 17-06-2020

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National Cleaner Production Center Foundation

Registered under Section 42 of the Companies Ordinance, 1984

NCPC/EL/F20-8/17062020
June 17, 2020

Test Report of Ambient Air Particulate Matter Analysis EIA for IESCO 132 kV Grid Stations & Transmission Line at Sohawa & Kallar Kahar, District Jhelum & Chakwal, Punjab

Sample Description: Total Suspended Particulate Matter	**Contact Person:** Mr. Nayyar Humair
Date of Testing: 06-06-2020	**Address:** Proposed Site for Sohawa Grid Station, District Jhelum
Date of Reporting: 17-06-2020	**No. of Samples:** 04
Sample No: EL\20\022	

Sr. No	Sample Point	Total Suspended Particulate Matter	Unit	PEQS (24 Hours)
1	32°08'17''N 73°23'28''E	277	µg/Nm^3	500
2	32°08'17''N 73°23'28''E	301	µg/Nm^3	500
3	32°08'17''N 73°23'28''E	313	µg/Nm^3	500
4	32°08'17''N 73°23'28''E	339	µg/Nm^3	500

PEQS: Punjab Environmental Quality Standards.

REMARKS:

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Environmental Lab Incharge
Date: 17-06-2020

Coordinator NCPC
Date: 17.06.2020

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NCPC/EL/F20-8/17062020
June 17, 2020

Test Report Ambient Air Analysis
EIA for IESCO 132 kV Grid Stations & Transmission Line at Sohawa & Kallar Kahar, District Jhelum & Chakwal, Punjab

Sample Description: Ambient Air Analysis	**Contact Person:** Mr. Nayyar Humair
Date of Testing: 06-06-2020	**Address:** Township Society Kallar Kahar, District Chakwal
Date of Reporting: 17-06-2020	**No. of Samples:** 04
Sample No: EL\20\022	

Parameters	Sample Location				PEQS
	32°44'44''N 72°41'34''E	32°46'11''N 72°41'30''E	32°44'45''N 72°41'32''E	32°44'46''N 72°41'28''E	
Carbon Monoxide (CO)	1.7	1.9	1.8	1.6	10.0 mg/m^3
Sulphur Dioxide (SO_2)	17.8	18.4	19.1	18.6	120.0 $\mu g/m^3$
Nitrogen Dioxide (NO_2)	26.3	25.7	25.9	27.1	80.0 $\mu g/m^3$
Nitrogen Oxide (NO)	10.3	9.8	10.4	9.7	40.0 $\mu g/m^3$

PEQS: Punjab Environmental Quality Standards.

Remarks:

1. This report shall not be reproduced / made part of any investigation / inquiry or for any litigation purpose.
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NCPC/EL/F20-8/17062020
June 17, 2020

Test Report of Ambient Air Particulate Matter Analysis EIA for IESCO 132 kV Grid Stations & Transmission Line at Sohawa & Kallar Kahar, District Jhelum & Chakwal, Punjab

Sample Description: Total Suspended Particulate Matter	**Contact Person:** Mr. Nayyar Humair
Date of Testing: 06-06-2020	**Address:** Township Society Kallar Kahar, District Chakwal
Date of Reporting: 17-06-2020	**No. of Samples:** 04
Sample No: EL\20\022	

Sr. No	Sample Point	Total Suspended Particulate Matter	Unit	PEQS (24 Hours)
1	32°44'44''N 72°41'34''E	291	µg/Nm^3	500
2	32°46'11''N 72°41'30''E	311	µg/Nm^3	500
3	32°44'45''N 72°41'32''E	303	µg/Nm^3	500
4	32°44'46''N 72°41'28''E	352	µg/Nm^3	500

PEQS: Punjab Environmental Quality Standards.

REMARKS:

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Environmental Lab Incharge
Date: 17-06-2020

Coordinator NCPC
Date: 17-06-2020

Page 5 of 6

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ANNEX VI: NOISE ANALYSIS REPORT

National Cleaner Production Center Foundation

Registered under Section 42 of the Companies Ordinance, 1984

NCPC/EL/F20-8/17062020
June 17, 2020

Test Report of Noise Monitoring Analysis
EIA for IESCO 132 kV Grid Stations & Transmission Line at Sohawa & Kallar Kahar, District Jhelum & Chakwal, Punjab

Sample Description: Noise Level	**Contact Person:** Mr. Nayyar Humair
Date of Testing: 06-06-2020	**Address:** Proposed Site for Sohawa Grid Station, District Jhelum
Date of Reporting: 17-06-2020	**No. of Samples:** 05
Sample No: EL\20\022	

Sr. No	Sampling Locations	Noise (Commercial Area) 65 dB (A) Day Time 55 dB (A) Night Time
1	32°08'17''N 73°23'28''E	**55.8**
2	32°08'17''N 73°23'28''E	**50.7**
3	32°08'17''N 73°23'28''E	**53.4**
4	32°08'17''N 73°23'28''E	**49.8**
5	32°08'19''N 73°23'73''E	**50.8**

REMARKS:

1. This report shall not be reproduced / made part of any investigation / inquiry or for any litigation purpose.
2. NCPC laboratory is an EPA certified laboratory (Certificate No. 168/DD(Lab) /EPA/05 /2019) w.e.f May 28, 2019.

Environmental Lab Incharge
Date: 17-06-2020

Coordinator NCPC
Date: 17-06-2020

Page 3 of 6

Refinery, P.O. MORGAH, RAWALPINDI (PAKISTAN)
TELEPHONE: (+92-51) 5450424, FAX: (+92-51) 5486876
EMAIL: ncpc.rwp@gmail.com Website: www.ncpc.com.pk

NCPC
Pakistan the Beautiful

RECPnet

National Cleaner Production Center Foundation

Registered under Section 42 of the Companies Ordinance, 1984

NCPC/EL/F20-8/17062020
June 17, 2020

Test Report of Noise Monitoring Analysis
EIA for IESCO 132 kV Grid Stations & Transmission Line at Sohawa & Kallar Kahar, District Jhelum & Chakwal, Punjab

Sample Description: Noise Level	**Contact Person:** Mr. Nayyar Humair
Date of Testing: 06-06-2020	**Address:** Township Society Kallar Kahar, District Chakwal
Date of Reporting: 17-06-2020	**No. of Samples:** 05
Sample No: EL\20\022	

Sr. No	Sampling Locations	Noise (Commercial Area) 65 dB (A) Day Time 55 dB (A) Night Time
1	32°44'44''N 72°41'34''E	**55.8**
2	32°44'11''N 72°41'30''E	**42.7**
3	32°44'45''N 72°41'32''E	**40.1**
4	32°44'46''N 72°41'28''E	**44.7**
5	32°44'51''N 72°41'09''E	**41.8**

REMARKS:

1. This report shall not be reproduced / made part of any investigation / inquiry or for any litigation purpose.
2. NCPC laboratory is an EPA certified laboratory (Certificate No. 168/DD(Lab) /EPA /05 /2019) w.e.f May 28, 2019.

Environmental Lab Incharge
Date: 17-06-2020

Coordinator NCPC
Date: 17-06-2020

Page 6 of 6

Refinery, P.O. MORGAH, RAWALPINDI (PAKISTAN)
TELEPHONE: (+92-51) 5450424, FAX: (+92-51) 5486876
EMAIL: ncpc.rwp@gmail.com Website: www.ncpc.com.pk

ANNEX VII: LAND DOCUMENTS

E-STAMP

PD-CKL-7E7C5BB2A621A61C

Non-Judicial

Rs 1,200/-

Description	AGREEMENT OR MEMORANDUM OF AN AGREEMENT - SALE
First Party	Muhammad Usman Ashad [37405-0246075-7]
Second Party	Muhammad Tafseer [37401-8748577-1]
Agent	Iftikhar Ahmed [37201-6325931-5]
Stamp Duty Paid by	Muhammad Tafseer [37401-8748577-1]
Issue Date	29-Jan-2020, 12:12:26 PM
Paid Through Challan	2020710569918389
Amount in Words	One Thousand Two Hundred Rupees Only

بائعہ
محمد عثمان ارشاد ولد محمد ارشاد خان
37405-0246075-7

بائعہ
عبدالمنان ارشاد ولد محمد ارشاد خان
37405-4339609-1

مشتری
محمد تفسیر ولد محمد منیر
37401-8748577-3

گواہ شد
عامر عباس ولد میاں عباس علی
35202-3198114-5

گواہ شد
افتخار احمد ولد سرکل
37201-6325931-5

﴿وقف نامہ﴾

﴿قطعہ اول﴾

﴿بائعان﴾

محمد عثمان ارشاد ولد محمد ارشاد خان وعبدالمنان ارشاد خان ولد محمد ارشاد خان ساکنان محمود نیریاں ذاکنان قطعاں پلندری

﴿جائیداد مبیعہ﴾

بمقام ۔ اراضی قمداد ی 32K-0M (بتیس کنال) موضع کلر کہار تحصیل کلر کہار ضلع چکوال

﴿بحق﴾

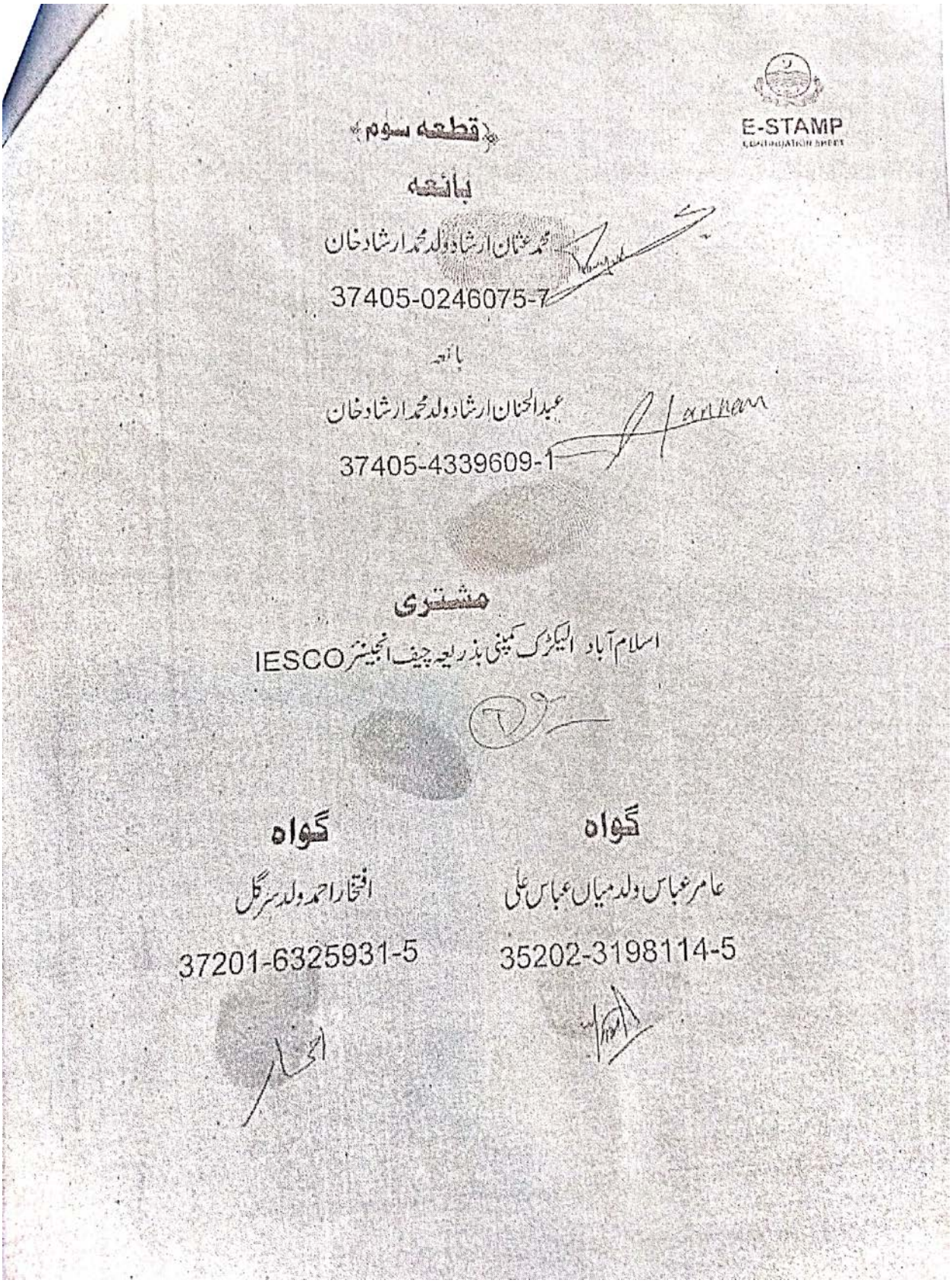
اسلام آباد الیکٹرک سپلائی کمپنی گرڈ اسٹیشن کلر کہار

E-STAMP
CONFIRMATION SHEET

﴿قطعہ دوم﴾

منکہ مسمی عبدالحنان ارشاد ولد محمد ارشاد خان (16 کنال) محمد عثمان ارشاد ولد ارشاد خان (16 کنال) ساکنان مجھومہ نیریاں ڈاکخانہ قلعاں پلندری ضلع سدھنوتی کے رہائشی ہیں جو کہ اراضی تعدادی 236 کنال 11 مرلہ نمبرات خسرہ 4415/3628/4417,3629,3648,3649,3655,3656,3657,3658,3665;3664,3688,3689,3659 3612,3661,3662,3666,3698 قطعہ 18 عدد کھیوٹ نمبر:710 کھتونی نمبر:1165 بمطابق رجسٹر حقداران زمین سال 08-2007 کا حصہ 640/4731 رقبہ بقدر اراضی تعدادی 32K-0M (بتیس کنال مرلہ) بخانہ ملکیت واقع موضع کلر کہار ضلع چکوال ہمارا ملکی ومقبوضہ برو ئے فرد ملکیت مرتبہ حلقہ طارق نواز پٹواری کلر کہار مورخہ 28-01-2020 درج کاغذات مال ہے جو کہ قبل ازیں ہر قسم کے بار سے مبرا ہے حکم امتناعی کا اندراج نہ ہے مجھے خانگی ضروریات کے لئے رقم درکار ہے لہذا باقائمی ہوش وحواس خمسہ وبلا جبر کراہ غیرے باخوشی بارضا ورغبت خود اپنا متذکرہ پلاٹ رقبہ 32K-0M (بتیس کنال) بدست اسلام آباد الیکٹرک سپلائی کمپنی بذریعہ چیف انجینئر IESCO کو واقف نامہ کردی ہے۔ کوئی سقم قانونی یا واقعاتی پیش آوے تو من بیعہ کی ذات خاص ودیگر جائیداد منقولہ وغیر منقولہ اس کی ذمہ دار ہوگی سالم زرثمن بمعہ خرچہ وحرجہ مشتریہ کو ادا کروں گا لہذا روبرو گواہان ذیل بیعہ نامہ ہذا تحریر کروادیا تاکہ سند ہو اور بوقت ضرورت کام آوے۔

مورخہ:۔۔۔۔۔۔۔۔۔۔۔



E-STAMP

﴿قطعہ سوم﴾

بائعہ

محمد عثمان ارشاد ولد محمد ارشاد خان

37405-0246075-7

بائعہ

عبدالحنان ارشاد ولد محمد ارشاد خان

37405-4339609-1

مشتری

اسلام آباد الیکٹرک کمپنی بذریعہ چیف انجینئر IESCO

گواہ

عامر عباس ولد میاں عباس علی

35202-3198114-5

گواہ

افتخار احمد ولد سرگل

37201-6325931-5

ISLAMABAD ELECTRIC SUPPLY COMPANY LIMITED

Tele: Pbx: 051-9252937-39 Ext: 338
Direct: 051-9252312
Fax: 051-9252927

Admn Directorate
IESCO Headquarters
St.# 40, G-7/4, Islamabad

No. 25726-29 /IESCO/HQs/DM(PMC)/7thSTG-8 Date: 26/06/2020

Deputy Commissioner
District, Jhelum.

Subject: **REQUEST FOR TITLE TRANSFER OF LAND FOR PROPOSED 132 KV GRID STATION SOHAWA DISTRICT JHELUM.**

It is submitted that a piece of land measuring 32-Kanal for proposed 132 KV Grid station Sohawa in Mouza Pind Mathay Khan Teshil Sohawa District Jhelum, vide entered Khasra No.4710, land 32 Kanal out of 32 Kanal & 3 Marla of the following Co-owners may please be transferred in the IESCO (**Copy enclosed for ready reference).**

1. **Rehana Abid Wd/o of Abid Ali.**
2. **Subhan Abid S/o Abid Ali.**
3. **Abid Ali S/o Muzaffar Khan.**

IESCO is a Federal Government Department functioning under Federal Ministry of Energy (Power Division). Under land Revenue Act 1967, Section 46 all Government Departments are exempted from levitation of mutation fee. Further as per order of Government of Punjab, Finance Division Notification No (Tax)2-2/93 (P-111) dated 23.04.2003, WAPDA and its corporatized Entities have been granted **"Permanent Exemption"** from Taxes i.e stamp duty and Registration fee etc. **(Copy enclosed)**

It is therefore requested that title of the above mentioned 32 Kanal land be made in the name of "IESCO", being IESCO is exempted from the mutation fee.

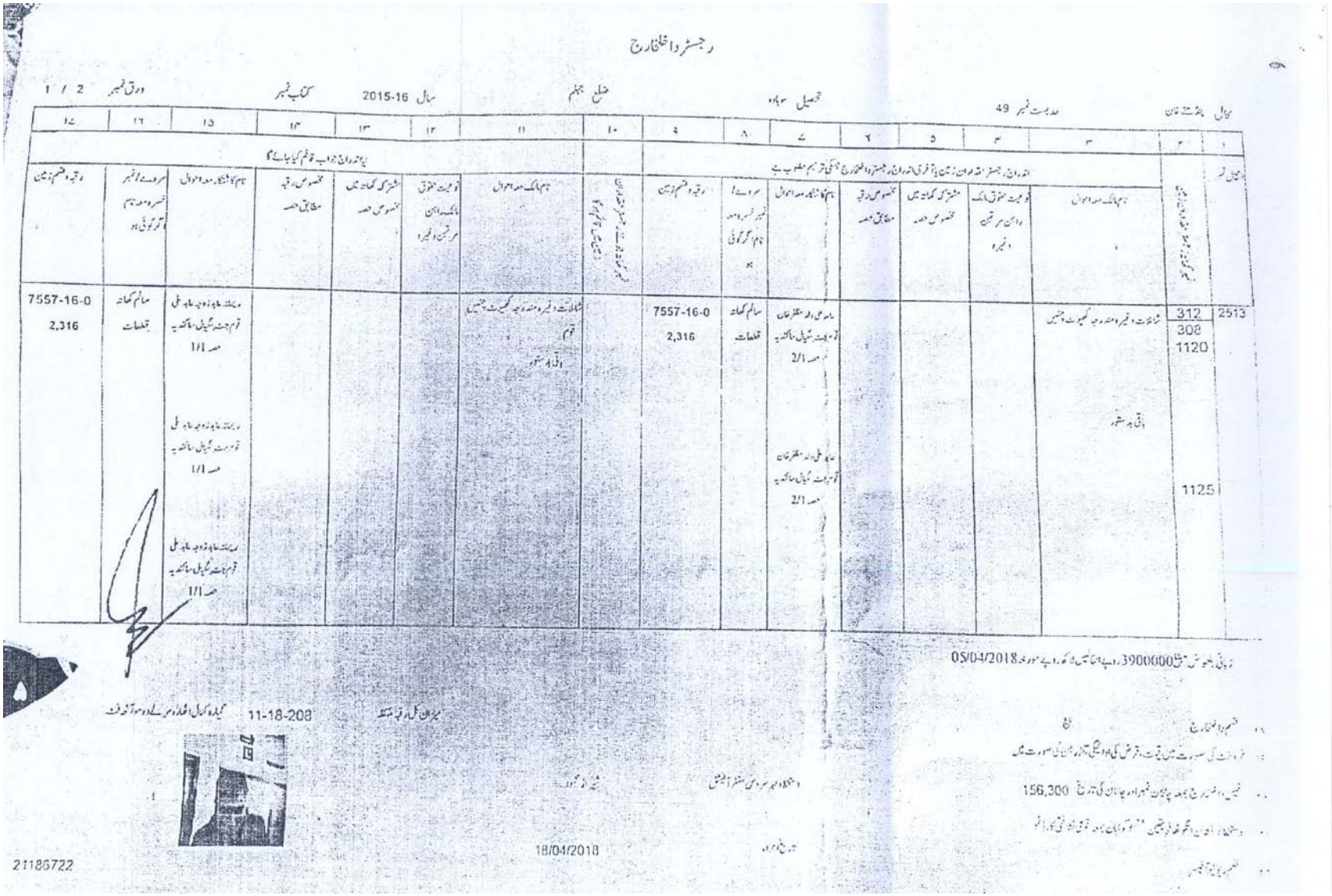
DA/as above:

26/6/2020.

(Nasir Saeed Khattak)
Dy. Manager (PMC)
IESCO, Islamabad.

CC:

1. Chief Engineer (Development) IESCO Islamabad for information please.
2. Assistant Commissioner Sohawa District Jhelum.
3. Sub Registrar Sohawa District Jhelum.
4. Master file.



رجسٹر داخل خارج

ورق نمبر 1 / 2 کتاب نمبر سال 2015-16 ضلع جہلم تحصیل سوہاوہ حدبست نمبر 49

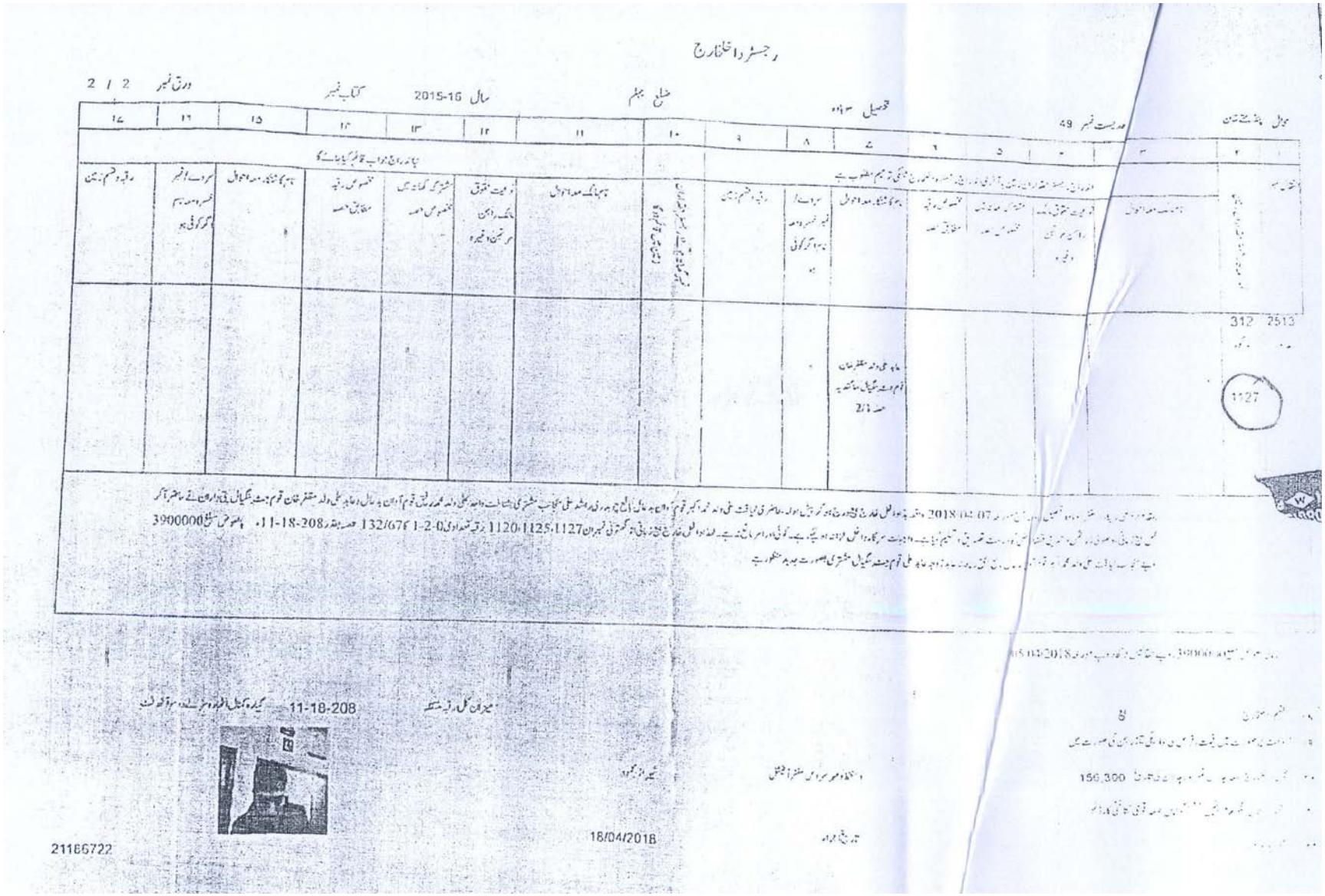
۱	۲	۳	۴	۵	۶	۷	۸	۹	۱۰	۱۱	۱۲	۱۳	۱۴	۱۵	۱۶	۱۷
نمبر شمار	کیفیت جائیداد	ہم حلقہ مواضعات	تعلق ملکیت حقوق مالکانہ راہن مرتہن وغیرہ	منتقل کی گئی حصہ	کنفوص مرقبہ مطابق حصہ	ہم کاشتکار مواضعات	سروے / انتقال نمبر مواضعات نام گرداوری ہو	رقبہ قسم زمین	نمبر شمار مواضعات	ہم حلقہ مواضعات	تعلق ملکیت حقوق مالکانہ راہن مرتہن وغیرہ	منتقل کی گئی حصہ	کنفوص مرقبہ مطابق حصہ	ہم کاشتکار مواضعات	سروے / انتقال نمبر مواضعات نام گرداوری ہو	رقبہ قسم زمین
2513	312 308 1120 1125	شاملات دیہہ مضافات دیہہ کھیوٹ چشمیں				ماہ علی ولد مظفر خان قوم جٹ سکنہ سکنہ 2/1	سالم کھاتہ قطعات	7557-16-0 2,316		شاملات دیہہ مضافات دیہہ کھیوٹ چشمیں قوم راجپوت				ماہ علی ولد مظفر خان قوم جٹ سکنہ سکنہ 2/1	سالم کھاتہ قطعات	7557-16-0 2,316

زرثمن بالعوض 3900000 روپے انتالیس لاکھ روپے مورخہ 05/04/2018

11-18-208

18/04/2018

21186722


رجسٹر دا خنارج

ورق نمبر 2 / 2 کتاب نمبر سال 2015-16 ضلع جہلم تحصیل سوہاوہ حدبست نمبر 49

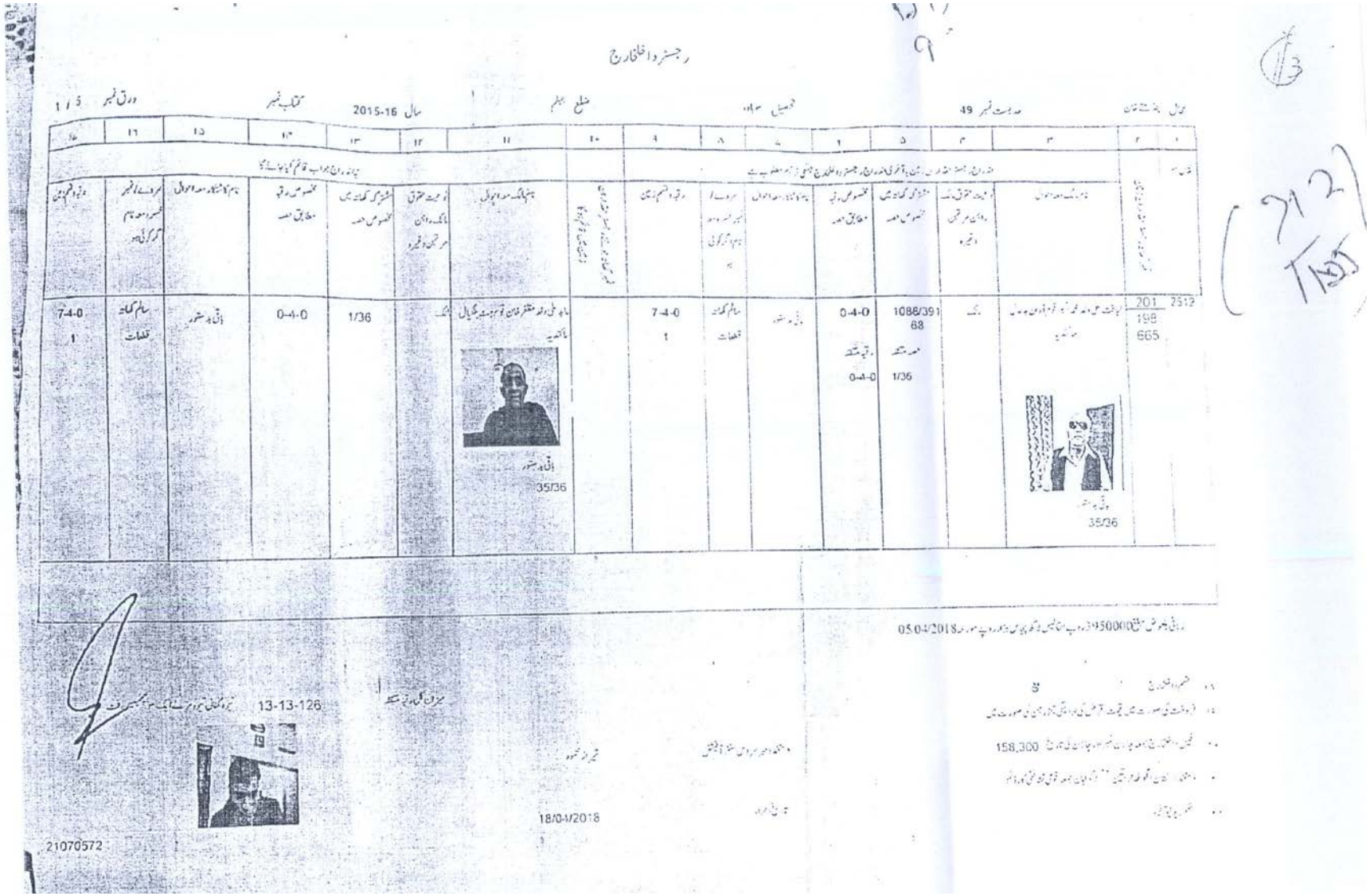
۱	۲	۳	۴	۵	۶	۷	۸	۹	۱۰	۱۱	۱۲	۱۳	۱۴	۱۵	۱۶	۱۷
نمبر شمار	ولدیت، شفاعت، سکنہ	نام مورث	نام مالک	ولدیت، شفاعت، سکنہ	حصہ جس پر رقبہ مقابل حصہ	رقبہ جو منتقل ہوا	سرو نمبر واحد نمبر ہو تو کوئی ہو	رقبہ قسم زمین	جو حصہ منتقل ہوا	جو بھائی حدود اربعہ	ولدیت، شفاعت، سکنہ	مشترکہ کھاتہ کی تفصیل حصہ	تقسیم جس رقبہ مقابل حصہ	سرو نمبر واحد نمبر ہو تو کوئی ہو	جو بھائی حدود اربعہ	رقبہ و قسم زمین
312 2513						ماہ علی ولد مقرب خان قوم ہنڈ سگیال ساکنہ 2/3										

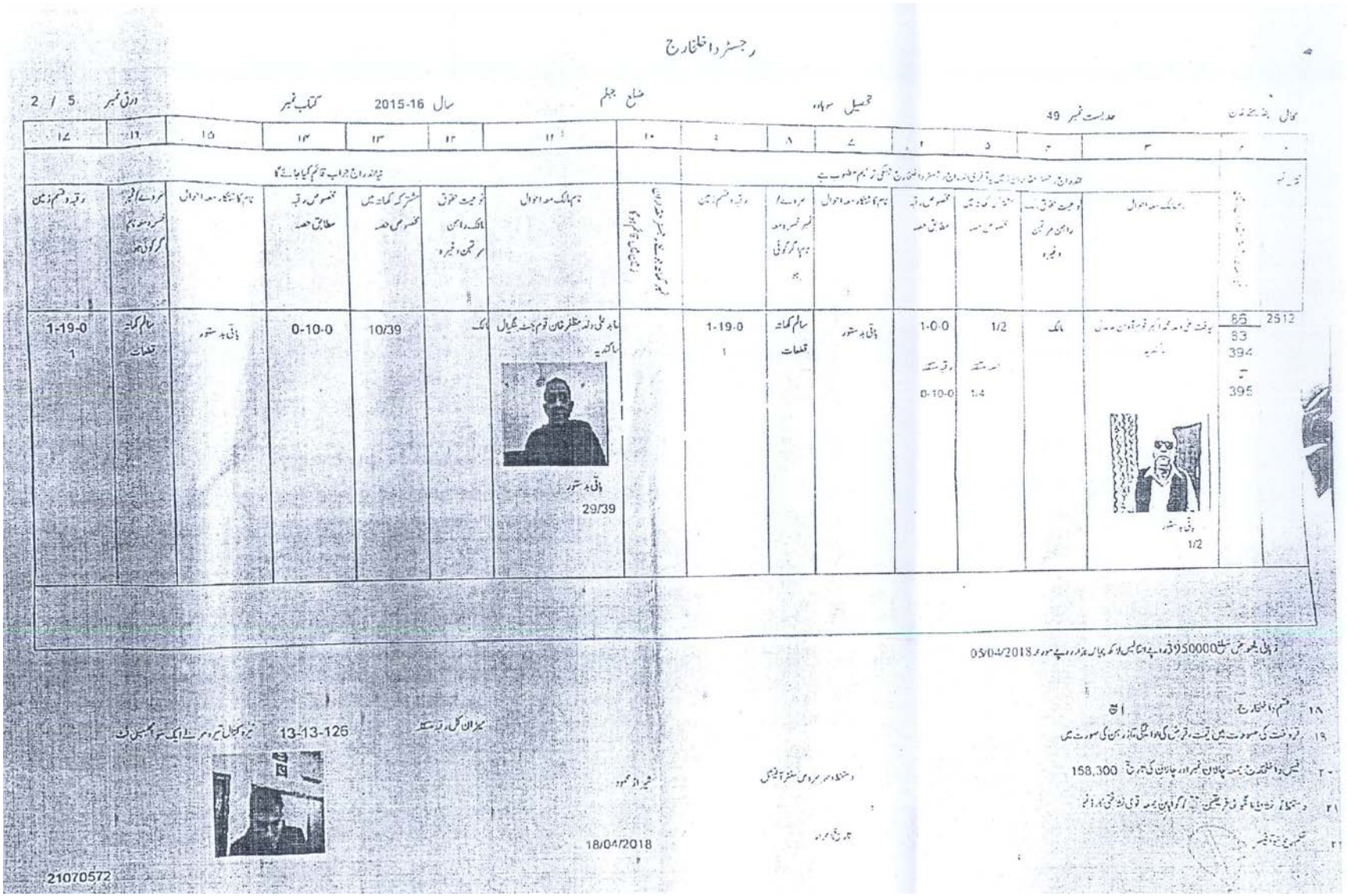
1127

11-18-208 گیارہ کنال اٹھ مرلے

21166722

18/04/2018


رجسٹر واخفارج



رجسٹر داخلخارج

ورق نمبر 2 / 5 — کتاب نمبر — سال 2015-16 — ضلع جہلم — تحصیل سوہاوہ — عدالت نمبر 49

۱	۲	۳	۴	۵	۶	۷	۸	۹	۱۰	۱۱	۱۲	۱۳	۱۴	۱۵	۱۶	۱۷
نمبر شمار	خانہ خالی رہے گا	ہمسایگی معہ احوال	نوعیت حقوق راہن مرتہن وغیرہ	حقوق راہن میں حصہ	خصوص رقبہ مطابق حصہ	ہم کاشتکار معہ احوال	سروے نمبر نمبر مع گرداوری ہو	رقبہ و قسم زمین	خانہ خالی رہے گا	نیا اندراج جو اب قائم کیا جائے گا	ہم ہمسایگی معہ احوال	نوعیت حقوق مالک راہن مرتہن وغیرہ	مشترکہ کھاتہ میں خصوص حصہ	خصوص رقبہ مطابق حصہ	ہم کاشتکار معہ احوال	سروے/گرداور نمبر مع گرداوری ہو
1	2512	85 83 394 و 395	مالک پختہ مکان معہ احوال و غیرہ واقع موضع باقی بدستور 1/2	1/2 حصہ مشترکہ 1/4	1-0-0 رقبہ مشترکہ 0-10-0	باقی بدستور	سالم کھاتہ قطعات	1-19-0 1			عابد علی ولد مظفر خان قوم ہنجہ بگیال مالکانہ باقی بدستور 29/39	مالک	10/39	0-10-0	باقی بدستور	سالم کھاتہ قطعات 1-19-0 1

توثیق بلحوض مبلغ 950000 روپے انتالیس لاکھ پچاس ہزار روپے مورخہ 05/04/2018

۱۸ قسم داخلخارج: ای

۱۹ فروخت کی صورت میں قیمت، قرض کی صورت میں رقم اور گروی نامہ کی صورت میں

۲۰ فیس داخلخارج بمد چالان نمبر اور چالان کی تاریخ: 158,300

۲۱ دستخط فروخت یا مختار فروخت کنندہ / گواہان بمد قومی نمبر وغیرہ

۲۲ تصدیق نمبر وغیرہ

دستخط سررشتہ دار

تاریخ مورخہ

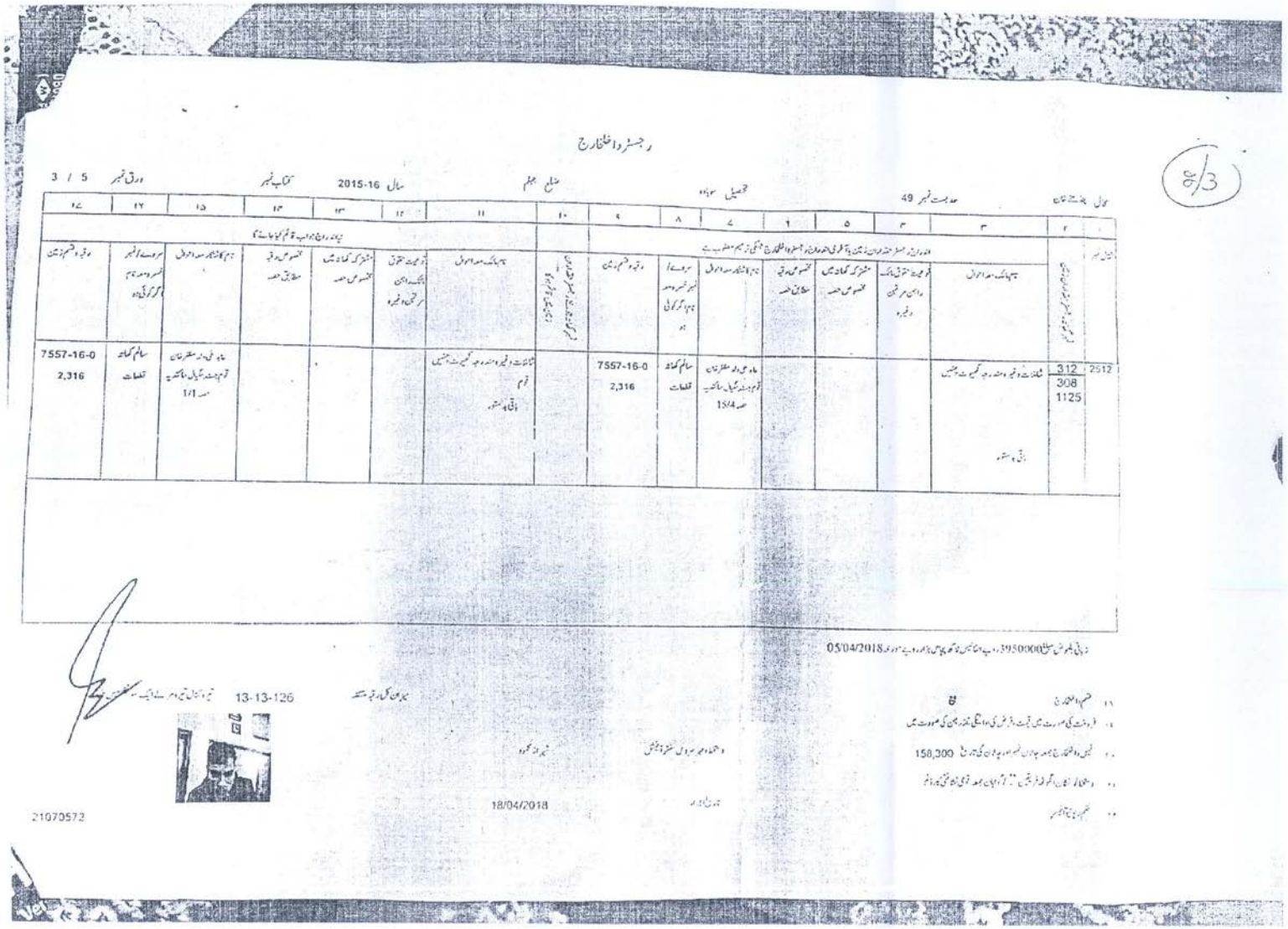
شیراز محمود

18/04/2018

میزان کل رقبہ مشترکہ 13-13-126

نیز وکیل تیرہ مرلے ایک سو پچیس فٹ

21070572



رجسٹر داخلہ خارج

ورق نمبر 3 / 5 کتاب نمبر سال 2015-16 ضلع جہلم تحصیل سوہاوہ حدبست نمبر 49

۱	۲	۳	۴	۵	۶	۷	۸	۹	۱۰	۱۱	۱۲	۱۳	۱۴	۱۵	۱۶	۱۷
نمبر شمار	کوال نمبر	ہمسایگان معہ اولاد	گواہیہ تحقیق بیانگ وارثین مرحومین وغیرہ	مشترکہ کھاتہ میں مخصوص حصہ	مخصوص حصہ ملکیتی	ہم راشدگان معہ اولاد	سروے / نمبر خسرہ معہ ہم گرداوری ہو	رقبہ قسم زمین		ہمسایگان معہ اولاد	گواہیہ تحقیق بیانگ ایں مرحومین وغیرہ	مشترکہ کھاتہ میں مخصوص حصہ	مخصوص رقبہ ملکیتی حصہ	ہم کاشتکار معہ اولاد	سروے / نمبر خسرہ معہ ہم گرداوری ہو	رقبہ قسم زمین
1	2512	شاہدات وغیرہ معہ رجسٹر کنندہ حاضر				ملا حق و ملکزمان قوم ہندہ کیال ساکنہ	سالم کھاتہ	7557-16-0		شاہدات وغیرہ معہ رجسٹر کنندہ حاضر				ملا حق و ملکزمان قوم ہندہ کیال ساکنہ	سالم کھاتہ	7557-16-0
		312				حصہ 15/4	قطعات	2,316		قوم				حصہ 1/1	قطعات	2,316
		308								باقی بدستور						
		1125														
		باقی بدستور														

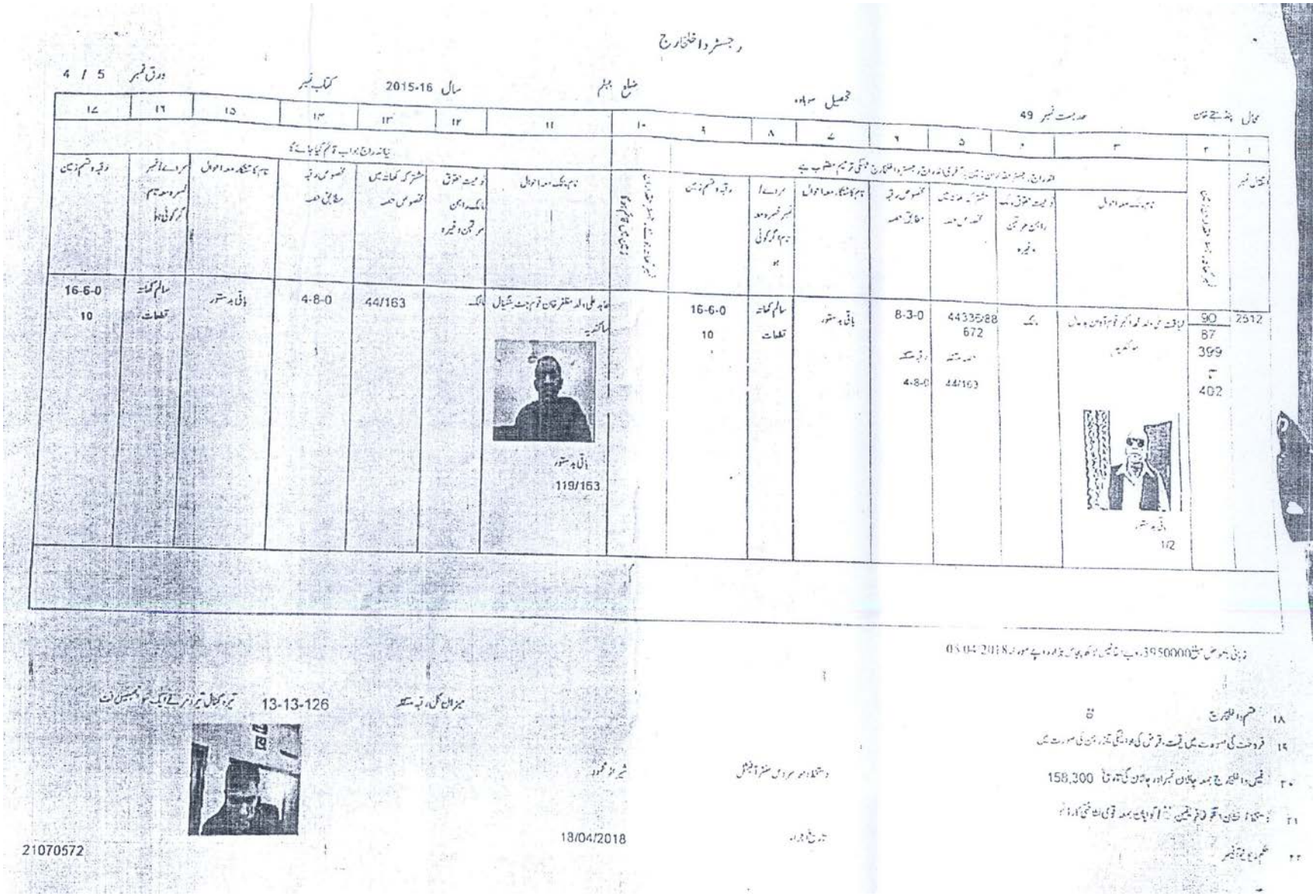
زبانی بلعوض مبلغ 3950000 روپے اٹھاسی ہزار روپے مورخہ 05/04/2018

۱۱ قسم اندراج
۱۲ فروخت کی صورت میں قیمت داخل کی جائے مقدمہ کی صورت میں
۱۳ فیس داخلہ خارج ہمہ پیمانہ فیس ہمہ پیمانہ کی مد میں 158,300
۱۴ اشتہار نمبر قومی اخبار "آوازہ" آزادیہ ہمہ خوبی نقد فیس وصولی
۱۵ نمبر پرچہ داخلہ نمبر

13-13-126

21070572

18/04/2018


رجسٹر داخلہ خارج

ورق نمبر 4 / 5 کتاب نمبر سال 2015-16 ضلع جہلم تحصیل سوہاوہ حدبست نمبر 49 حلقہ پٹواری حلقہ

۱	۲	۳	۴	۵	۶	۷	۸	۹	۱۰	۱۱	۱۲	۱۳	۱۴	۱۵	۱۶	۱۷
نمبر شمار	نمبر خسرہ	نام مالک و ولدیت و قوم و سکونت	حقوق و رہن وغیرہ	مقدار حصہ کل حصص	حصص مورثہ مطابق حصہ	ہمسایگان معہ احوال	مرہونہ / غیر مرہونہ / ہمراہ کوئی اور ہو	رقبہ و قسم زمین	وجوہات انتقال	نام مالک معہ احوال	وجوہات انتقال مالکہ دائمی مرتہن وغیرہ	مشترکہ کھاتہ میں مخصوص حصہ	مخصوص رقبہ مشترکہ حصہ	ہمسایگان معہ احوال	مرہونہ / غیر مرہونہ ہمراہ کوئی اور ہو	رقبہ و قسم زمین
		اندراج بعد سند ہذا بنام ... قرعی مدراج رجسٹر داخلہ خارج ذیل ترمیم مطلوب ہے														
2512	90 87 399 و 402	لیاقت ولد محمد اکبر قوم آرائیں و سکنہ باقی بہ مستور 1/2	ملک	44335/88672 حصہ مملکہ 44/163	8-3-0 رقبہ مملکہ 4-8-0	باقی بہ مستور	سالم کھاتہ تقطعات	16-6-0 10		مزید علی ولد مظفر خان قوم ہنت بشیال ساکنہ باقی بہ مستور 119/163	ملک	44/163	4-8-0	باقی بہ مستور	سالم کھاتہ تقطعات	16-6-0 10

وزنی بموجب سٹیٹ 3950000 ب ان نمبر ہوا کہ بیزار روپے مورخہ 05-04-2018

۱۸ قسم اخراج ۵

۱۹ فروخت کی صورت میں قیمت۔ قرض کی صورت میں رقم

۲۰ فیس واخراج بمد چالان نمبر اور پرچون کی صورت میں 158,300

۲۱ [illegible]

۲۲ عدم درج نمبر

میزان کل، رقبہ مستعد

تیرہ کھیال تیرہ ذمہ سے ایک تو تمہیں ان 13-13-126

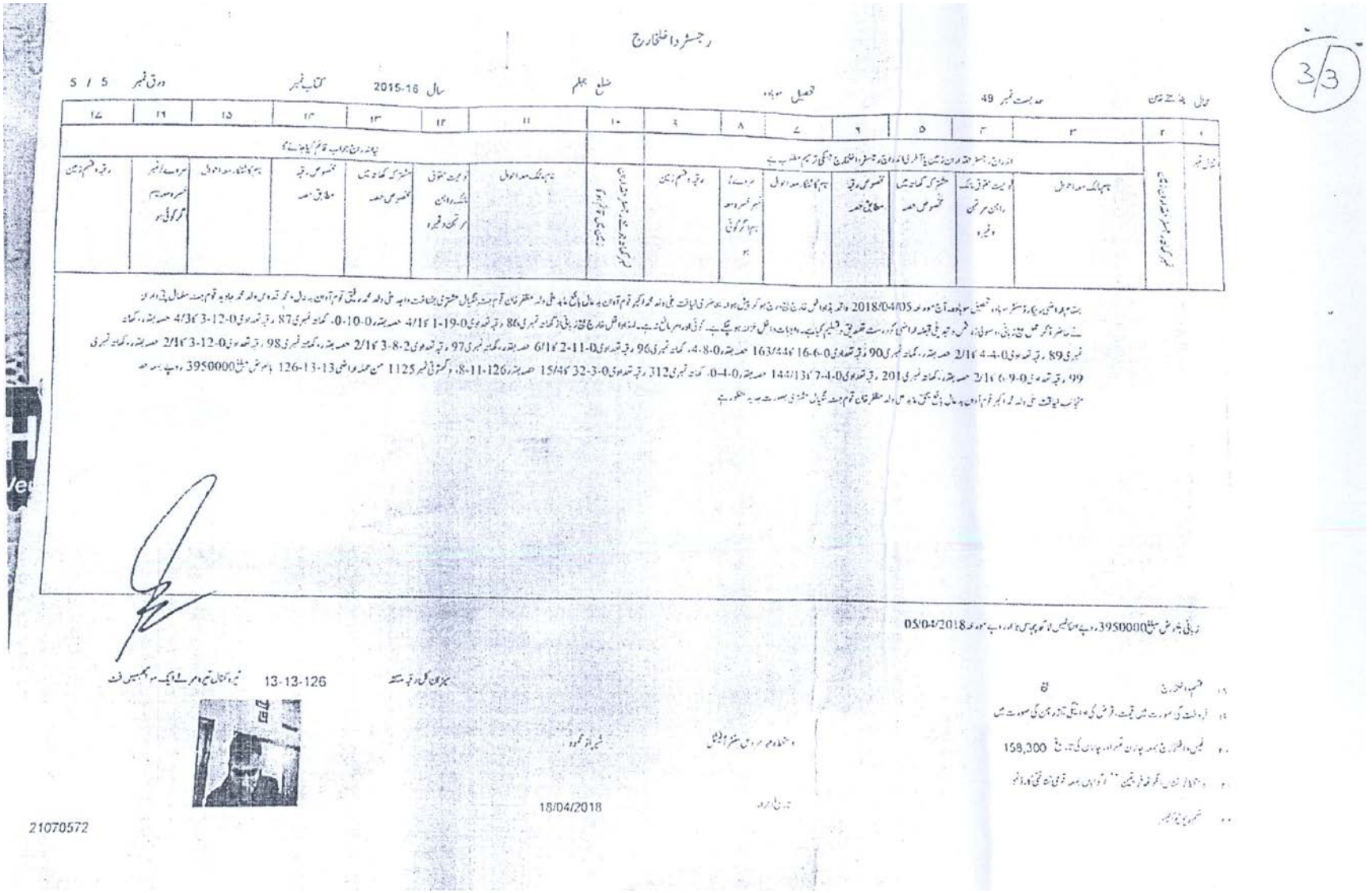
21070572

شیر از محمود

دستخط مہر و دل منشی / محرر

18/04/2018

تاریخ اجراء



رجسٹر داخلہ خارج

ضلع جہلم — تحصیل سوہاوہ — حدبست نمبر 49 — سال 2015-16 — کتاب نمبر — ورق نمبر 5 / 5

۱	۲	۳	۴	۵	۶	۷	۸	۹	۱۰	۱۱	۱۲	۱۳	۱۴	۱۵	۱۶	۱۷
نمبر شمار	نمبر شمار مطابق نقشہ حدبست	ہمسایگان مع احوال	ولدیت مختون بنگ راہن مرتہن وغیرہ	مشترکہ کھاتہ میں مخصوص حصہ	مخصوص رقبہ مطابق خسرہ	ہمسایگان مع احوال	نمبر خسرہ مع ہمسایگان	رقبہ قسم زمین	نمبر شمار مطابق نقشہ حدبست	ہمسایگان مع احوال	ولدیت مختون بنگ راہن مرتہن وغیرہ	مشترکہ کھاتہ میں مخصوص حصہ	مخصوص رقبہ مطابق حصہ	ہمسایگان مع احوال	نمبر خسرہ مع نمبر مرکوبی سہ	رقبہ قسم زمین
		ازاں جملہ حقداران زمین یا آخری مالک رقبہ جس کی ترسیم منتقلی عمل میں آئی ہے								پاشدہ روبرو قائم کیا جائے گا						

بقلم سوہاوہ بروز ہفتہ، تحصیل سوہاوہ، آج مورخہ 2018/04/05 واقعہ ہذا حاضر تحدار ہیں جو کہ ذریعہ ہوا دار عرضی لیاقت علی ولد محمد اکبر قوم آوان ساکن موضع بگیال مشتری اشتہارت و احمد علی ولد محمد یعقوب قوم آوان ساکن موضع مذکور بائع حسب سوال نمبر 2 اور 3 سے ساختہ اکبر خاں پٹواری حلقہ، قرض وصولی قیمت و انتقال کورہ ہست تصدیق و تسلیم کیا ہے۔ کوئی اور امر باقی نہ ہے۔ لہٰذا واقعہ خارج کیا جاتا ہے۔ کوئی اور امر باقی نہ ہے۔ دعوات داخل خارج کیا جاتا ہے۔

نمبری 89، رقبہ تعدادی 0-4-0 2/1 حصہ بتہ، کھاتہ نمبر، کھتونی نمبری 90 رقبہ تعدادی 0-16-6 163/44 حصہ بتہ، کھتونی نمبری 96 رقبہ تعدادی 0-8-0، کھاتہ نمبری 97 رقبہ تعدادی 0-3-8 2/1 حصہ بتہ، کھتونی نمبری 98 رقبہ تعدادی 0-12-0 2/1 حصہ بتہ، کھاتہ نمبری 99، رقبہ تعدادی 0-9-0 2/1 حصہ بتہ، کھاتہ نمبری 201، رقبہ تعدادی 0-7-4 144/13 حصہ بتہ، کھتونی نمبری 312 رقبہ تعدادی 0-32-3 15/44 حصہ بتہ، کھتونی نمبر 1125 من جملہ واضی 13-13-126 بامبلغ مبلغ 3950000 روپے بسمہ

مشتری لیاقت علی ولد اکبر قوم آوان بائع یعقوب ولد علی ولد مظفر خان قوم وسنہ بگیال مشتری بسمت مدعیہ حلفوہ ہے

زرثمن بابلغ مبلغ 3950000 روپے انہائیس لاکھ پچاس ہزار روپے مورخہ 05/04/2018

13-13-126 — نمبر شمار تیرہ مرلے ایک سو چھبیس فٹ

مہر

18/04/2018

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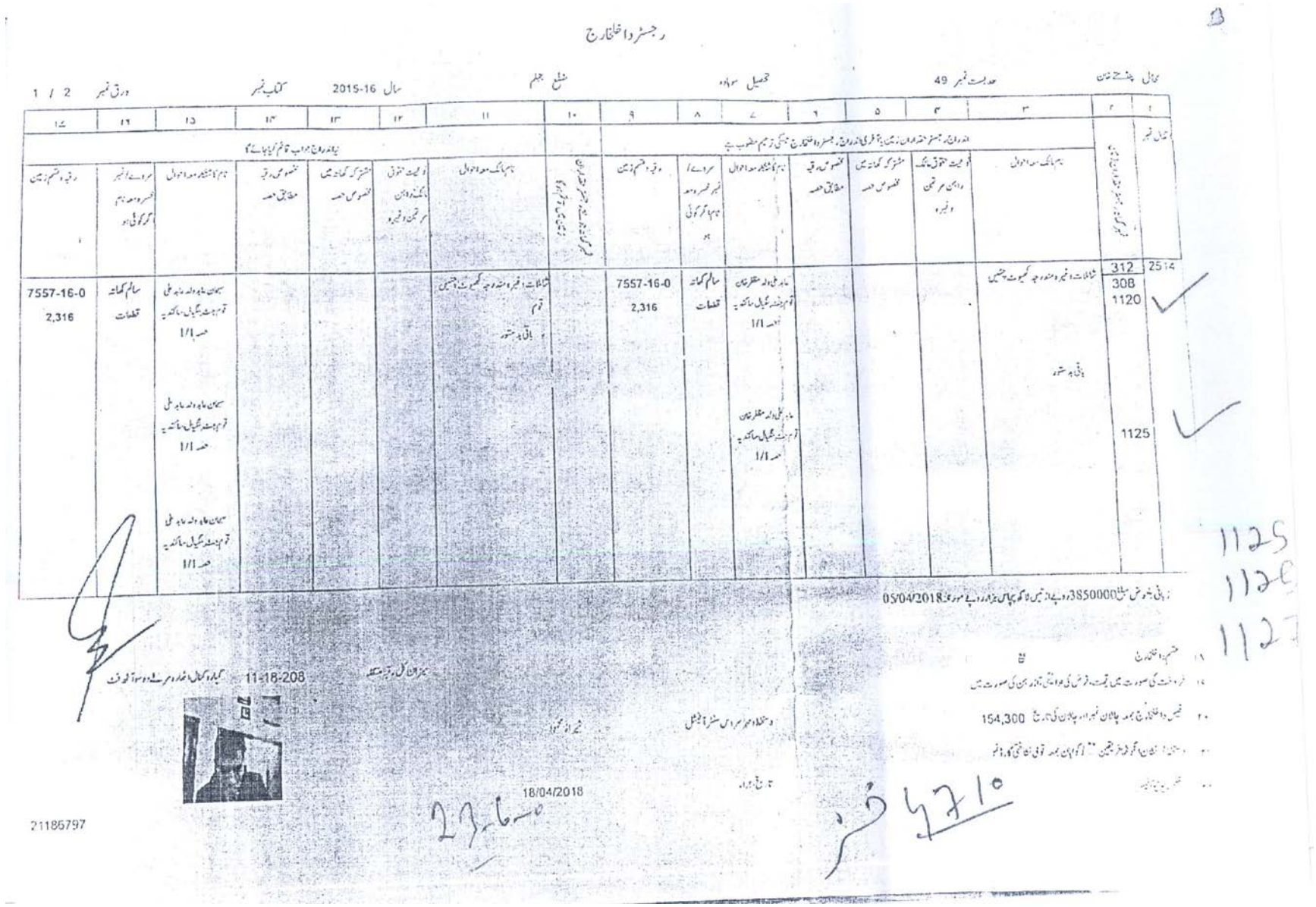

رجسٹر داخلخارج

تحصیل سوہاوہ ضلع جہلم سال 2015-16 کتاب نمبر ورق نمبر 1 / 2

حدبست نمبر 49 محال چنے نان

۱	۲	۳	۴	۵	۶	۷	۸	۹	۱۰	۱۱	۱۲	۱۳	۱۴	۱۵	۱۶	۱۷
نمبر شمار	نمبر خسرہ / مساحت	ہمسایگان معہ احوال	ثبت حقوق مالک راہن مرتہن وغیرہ	مشترکہ کھاتہ میں خصوصی حصہ	خصوصی حصہ مشاعی	نام کاشتکار معہ احوال	سرحدے / نمبر خسرہ معہ جو کوئی ہو	رقبہ و قسم زمین	قسم مذکور کی وجہ	ہمسایگان معہ احوال	ثبت حقوق متولی مالک راہن مرتہن وغیرہ	مشترکہ کھاتہ میں خصوصی حصہ	خصوصی حصہ مشاعی	نام کاشتکار معہ احوال	سرحدے / نمبر خسرہ معہ جو کوئی ہو	رقبہ و قسم زمین
2514	312	شاملات و غیرہ متدوجہ کیموت جنیں				ماہ علی ولد مظفر یمن قوم ہنسدہ جگیال ساکنہ یہ حصہ 1/1	سالم کھاتہ قطعات	7557-16-0 2,316		شاملات و غیرہ متدوجہ کیموت جنیں قوم باقی بدستور				سیمان ماہ ولد ماہ علی قوم ہنسدہ جگیال ساکنہ یہ حصہ 1/1	سالم کھاتہ قطعات	7557-16-0 2,316
	308															
	1120	باقی بدستور														
	1125					ماہ علی ولد مظفر یمن قوم ہنسدہ جگیال ساکنہ یہ حصہ 1/1								سیمان ماہ ولد ماہ علی قوم ہنسدہ جگیال ساکنہ یہ حصہ 1/1		
														سیمان ماہ ولد ماہ علی قوم ہنسدہ جگیال ساکنہ یہ حصہ 1/1		

زرِ ثمن مبلغ 3850000 روپے (تینتیس لاکھ پچاس ہزار روپے) مورخہ 05/04/2018

۱۸ حسب داخلخارج

۱۹ فروخت کی صورت میں قیمت، قرض کی صورت میں رقم

۲۰ فیس داخلخارج بمد چالان نمبر ، چالان کی رقم 154,300

۲۱ دستخط انگوٹھا نشان گواہ ظفر یمین ، گواہان بمد قومی شناختی کارڈ نمبر

۲۲ تصدیق

11-18-208 گواہ کمال خداد مرسلہ دوسوآٹھ

سیمان کل رقبہ ہنسدہ

وستخط مہر مراس منشی تحصیل

تاریخ وصولی

18/04/2018

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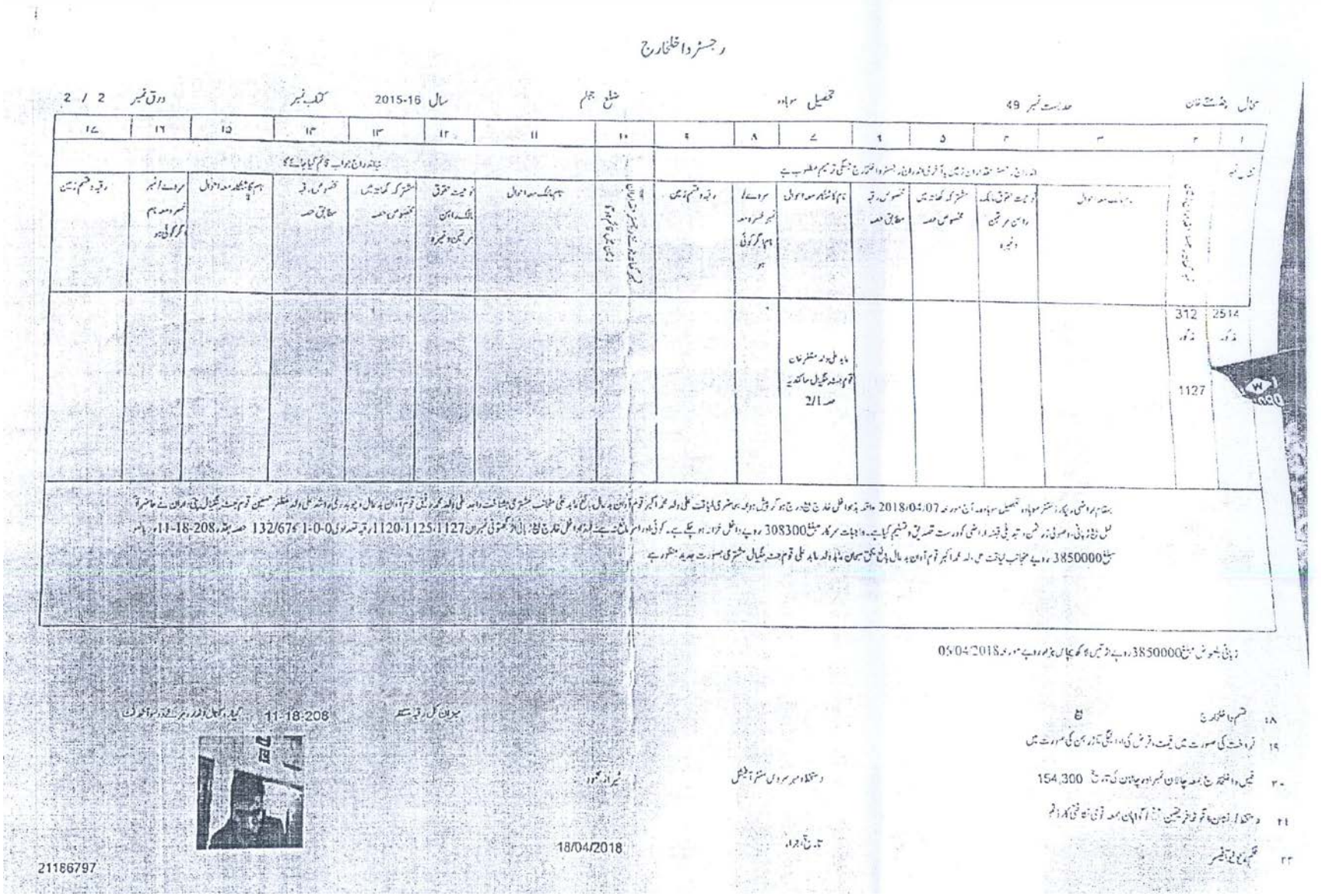
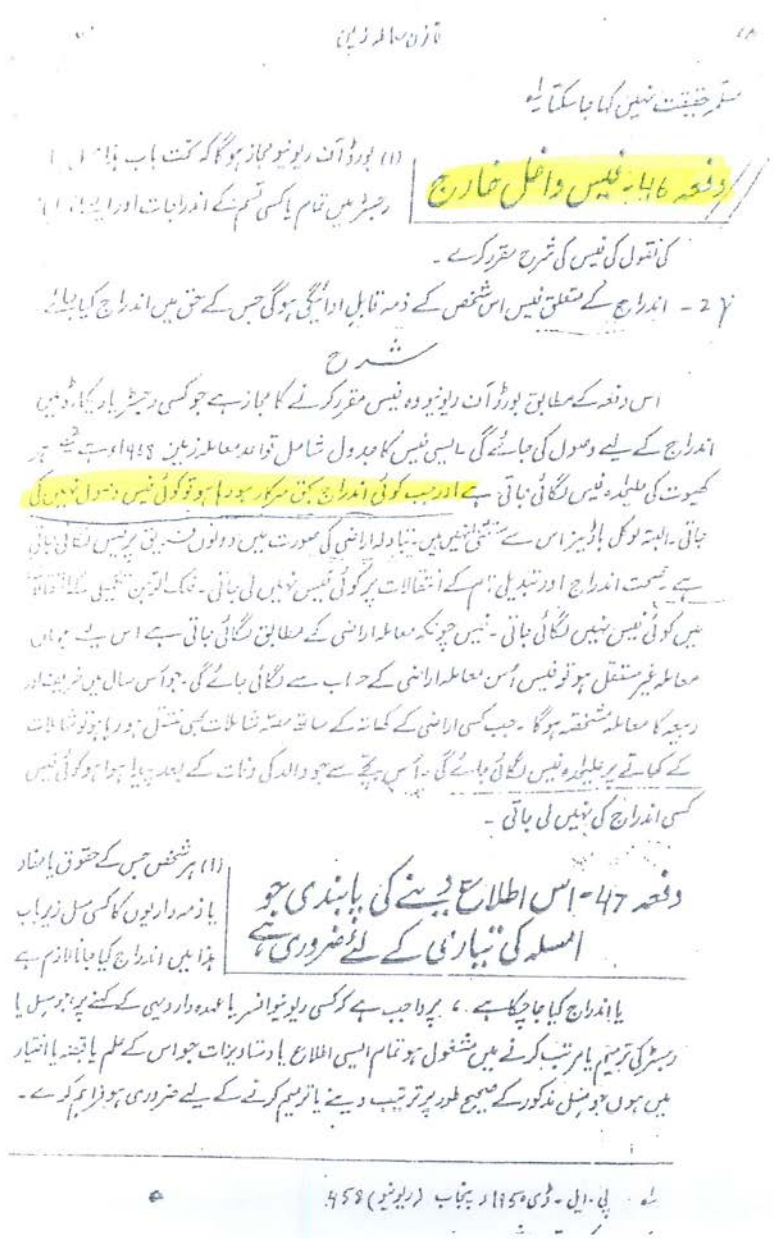


رجسٹر داخلخارج

سوال پرشت خان — حدبست نمبر 49 — تحصیل سوہاوہ — ضلع جہلم — سال 2015-16 — کتب نمبر — ورق نمبر 2 / 2

۱	۲	۳	۴	۵	۶	۷	۸	۹	۱۰	۱۱	۱۲	۱۳	۱۴	۱۵	۱۶	۱۷
نمبر شمار	نمبر خسرہ / مساحت	نام موضع و حدود	نوعیت حقوق مالکانہ، راہن مرتہن وغیرہ	مشترکہ کھاتہ میں مخصوص حصہ	مخصوص رقبہ مطابق حصہ	نام کاشتکار معہ اولاد	سرو ے / انتقال نمبر خسرہ معہ ہمراہ گرداور	رقبہ قسم زمین	نمبر شمار مطابق رجسٹر داخلخارج	ہمسایگان معہ اولاد	نوعیت حقوق مالکانہ، راہن مرتہن وغیرہ	مشترکہ کھاتہ میں مخصوص حصہ	مخصوص رقبہ مطابق حصہ	ہمسایگان معہ اولاد	سروے انتقال نمبر خسرہ معہ ہمراہ گرداور	رقبہ قسم زمین
2514	312 کنال 7 مرلہ 1127					مایو ولد سنظر خان قوم وٹو سکنہ شکیال ساکنہ یہ حصہ 2/1										

بمقام موضع سوہاوہ، تحصیل سوہاوہ آج مورخہ 2018/04/07 حاضر ہوا فاضل خان ولد رحیم خان قوم آوان ساکن بھالنہ علی ولد محمد اکبر قوم آوان ساکن بھالنہ علی ولد سنظر خان قوم وٹو سکنہ شکیال ساکنہ یہ سال رقبہ مندرجہ کالم نمبر 6 بحساب 1/2 حصہ مشترکہ مالیت 1120-1125-1127 کنال 312-7-0 مرلہ بعوض مبلغ 3850000 روپے بحق خریدار مسمی فاضل خان ولد رحیم خان قوم آوان ساکن بھالنہ علی ولد محمد اکبر قوم آوان ساکن بھالنہ علی ولد سنظر خان قوم وٹو سکنہ شکیال مشتری بصورت بیعہ منظور ہے۔ زبانی بحوالہ مبلغ 3850000 روپے ثمن ہا گواہان پیش ہوئے۔ کوئی دعوی اور اعتراض نہ ہے لہذا فاضل خان ولد رحیم خان قوم آوان ساکن بھالنہ علی ولد محمد اکبر قوم آوان ساکن بھالنہ علی ولد سنظر خان قوم وٹو سکنہ شکیال مشتری بصورت بیعہ منظور ہ



دفعہ 46- فیس داخل خارج

(1) بورڈ آف ریونیو مجاز ہوگا کہ کتاب باب ہذا کے تحت رجسٹر میں تمام یا کسی قسم کے اندراجات اور ایسے اندراجات کی نقول کی فیس کی شرح مقرر کرے۔

2- اندراج کے متعلق فیس اس شخص کے ذمہ قابل ادائیگی ہوگی جس کے حق میں اندراج کیا جائے۔

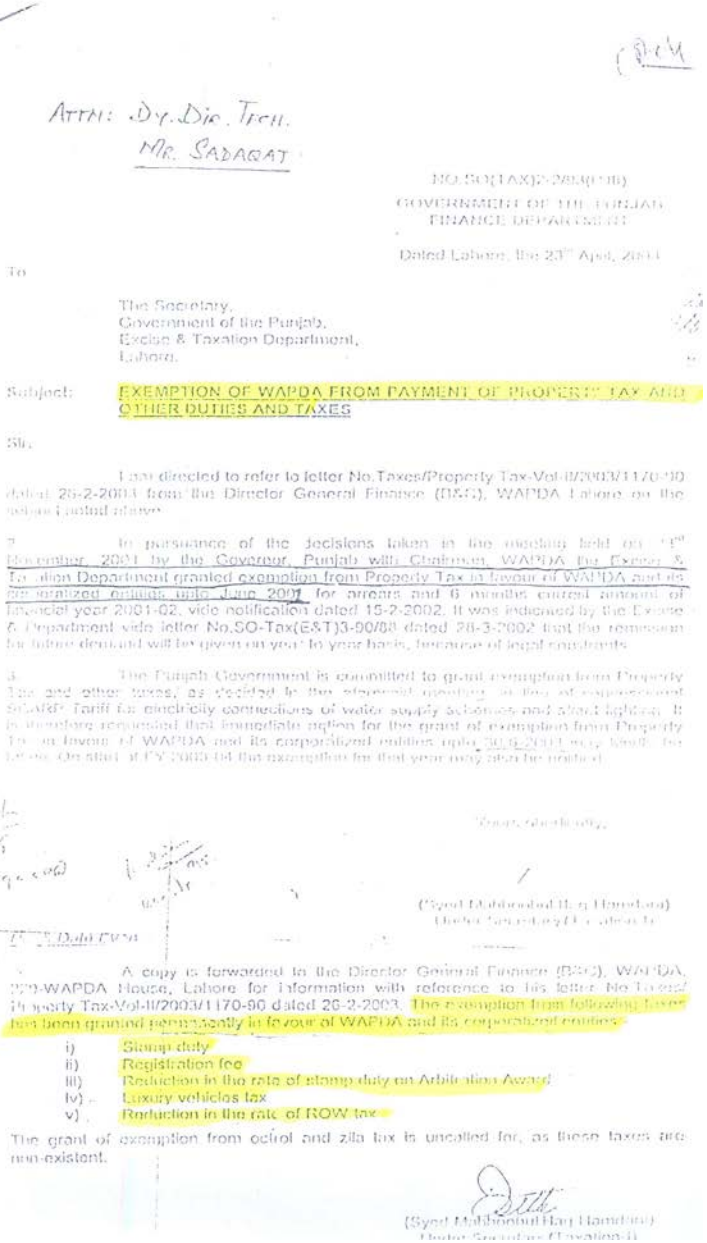
شرح

اس دفعہ کے مطابق بورڈ آف ریونیو وہ فیس مقرر کرنے کا مجاز ہے جو کسی رجسٹر یا ریکارڈ میں اندراج کے لیے وصول کی جائے گی۔ ایسی فیس کا جدول شامل قواعد معاملہ زمین 1945ء ہے جس پر کھیوٹ کی علیحدہ فیس لگائی جاتی ہے اور جب کوئی اندراج بحق سرکار ہو رہا ہو تو کوئی فیس وصول نہیں کی جاتی۔ البتہ لوکل بارڈیز اس سے مستثنیٰ نہیں ہیں۔ تبادلہ اراضی کی صورت میں دونوں فریق پر فیس لگائی جاتی ہے۔ صحت اندراج اور تبدیلی نام کے انتقالات پر کوئی فیس نہیں لی جاتی۔ خاک الوطن تعلیمی [illegible] میں کوئی فیس نہیں لگائی جاتی۔ فیس چونکہ معاملہ اراضی کے مطابق لگائی جاتی ہے اس لیے جہاں معاملہ غیر مستقل ہو تو فیس اس معاملہ اراضی کے حساب سے لگائی جائے گی۔ جو اس سال میں خریف اور ربیعہ کا معاملہ مشتقہ ہوگا۔ جب کسی اراضی کے کھاتہ کے ساتھ مسئلہ شاملات بھی منتقل ہو رہا ہو تو شاملات کے کھاتے پر علیحدہ فیس لگائی جائے گی۔ اس پرچے سے جو والد کی وفات کے بعد پیدا ہوا ہو کوئی فیس کسی اندراج کی نہیں لی جاتی۔

دفعہ 47- اس اطلاع دینے کی پابندی جو المسلہ کی تیاری کے لئے ضروری ہے

(1) ہر شخص جس کے حقوق یا امتناع یا ذمہ داریوں کا کسی مال زیر باب ہذا میں اندراج کیا جانا لازم ہے یا اندراج کیا جا چکا ہے، پر واجب ہے کہ کسی ریونیو افسر یا عہدہ دار دیہی کے کہنے پر جو سیل یا رجسٹر کی ترمیم یا مرتب کرنے میں مشغول ہو تمام ایسی اطلاع یا دستاویزات جو اس کے علم یا قبضہ یا اختیار میں ہوں جو مسل مذکور کے صحیح طور پر ترتیب دینے یا ترمیم کرنے کے لیے ضروری ہو فراہم کرے۔

پی۔ ایل۔ ڈی 1973 پنجاب (ریونیو) 458



ATTN: Dy. Dir. Tech.
MR. SADAQAT

NO.SO(TAX)5-28(Q-III)
GOVERNMENT OF THE PUNJAB
FINANCE DEPARTMENT
Dated Lahore, the 23rd April, 2003

To

The Secretary,
Government of the Punjab,
Excise & Taxation Department,
Lahore.

Subject: EXEMPTION OF WAPDA FROM PAYMENT OF PROPERTY TAX AND OTHER DUTIES AND TAXES

Sir,

I am directed to refer to letter No.Taxes/Property Tax-Vol-II/2003/1170-90 dated 26-2-2003 from the Director General Finance (D&C), WAPDA Lahore on the subject noted above.

2. In pursuance of the decisions taken in the meeting held on 19th November, 2001 by the Governor, Punjab with Chairman, WAPDA the Excise & Taxation Department granted exemption from Property Tax in favour of WAPDA and its corporatized entities upto June, 2001 for arrears and 6 months current amount of financial year 2001-02, vide notification dated 15-2-2002. It was indicated by the Excise & Taxation Department vide letter No.SO-Tax(E&T)3-90/88 dated 28-3-2002 that the remission for future demand will be given on year to year basis, because of legal constraints.

3. The Punjab Government is committed to grant exemption from Property Tax and other taxes, as decided in the aforesaid meeting, in lieu of concessional Tariff for electricity connections of water supply schemes and street lightings. It is therefore requested that immediate action for the grant of exemption from Property Tax in favour of WAPDA and its corporatized entities upto 30-6-2003 may kindly be taken. On start of FY 2003-04 the exemption for that year may also be notified.

(Syed Dilbarshad Haq Hamdani)
Deputy Secretary (Taxation-II)

A copy is forwarded to the Director General Finance (D&C), WAPDA, 379-WAPDA House, Lahore for information with reference to his letter No.Taxes/Property Tax-Vol-II/2003/1170-90 dated 26-2-2003. The exemption from following taxes has been granted permanently in favour of WAPDA and its corporatized entities:

i) Stamp duty
ii) Registration fee
iii) Reduction in the rate of stamp duty on Arbitration Award
iv) Luxury vehicles tax
v) Reduction in the rate of ROW tax

The grant of exemption from octroi and zila tax is uncalled for, as these taxes are non-existent.

(Syed Makhdoom Haq Hamdani)
Deputy Secretary (Taxation-II)

ANNEX VIII: METEOROLOGICAL DATA OF PROJECT AREA

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year : 2018			Precipitation, Past 24 hrs.(mm)									
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.2	0.0	0.0	0.0
2	0.0	0.0	15.4	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
3	0.0	0.0	0.0	0.0	13.0	0.0	11.0	0.0	8.4	0.0	0.6	0.0
4	0.0	0.0	5.5	0.0	0.0	0.0	3.2	0.0	0.0	11.6	0.0	0.0
5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.4	18.3	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	10.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	40.5	0.0	0.0	0.4	25.0	0.0	0.0	0.0
9	0.0	0.0	0.0	2.8	0.0	0.0	0.0	16.4	0.0	20.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	10.9
11	0.0	0.0	0.0	19.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6
12	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6
13	0.0	10.3	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.2	0.0	0.0	0.0	0.0	7.5	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	2.0	0.0	61.7	0.0	39.2	0.0	0.0	0.0
16	0.0	0.0	0.0	12.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	1.8	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	6.8	0.0	4.0	9.8	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	4.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	14.5	0.0	26.3	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.3	0.0	0.0	0.0	0.0	15.0	4.4	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	1.0	0.0	0.0	0.0	0.0	20.4	0.0	0.0	0.0	0.0	0.0
25	0.0	8.1	0.0	0.0	0.0	0.0	29.2	0.0	0.0	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	0.0	29.9	0.0	0.0	0.0	0.0	0.0
29	0.0	***	0.0	0.0	0.0	0.0	22.0	0.0	0.0	0.0	0.0	0.0
30	0.0	***	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	0.0	***	0.0	***	0.0	***	0.0	0.0	***	0.0	***	0.0
TOTAL	0.6	24.4	21.4	54.9	77.5	50.2	190.7	50.1	89.2	34.4	0.6	18.1

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year : 2018			Temperature, daily maximum (øC)									
1	20.0	19.5	25.5	36.0	38.5	42.0	33.0	35.5	36.5	33.5	28.0	24.0
2	20.0	19.0	25.0	33.0	37.5	41.5	38.5	35.0	35.0	33.0	27.5	24.5
3	19.5	20.0	23.5	32.0	37.0	41.2	39.5	35.2	34.0	32.5	21.0	22.2
4	18.5	22.0	18.5	32.0	31.0	41.0	31.0	36.0	32.0	31.5	22.0	21.5
5	16.0	19.5	21.5	32.0	34.0	40.7	32.0	35.8	33.5	30.2	23.0	21.5
6	15.5	20.8	23.5	33.5	31.5	40.2	34.3	37.5	34.0	29.5	23.0	21.5
7	16.0	20.0	24.0	33.2	29.0	37.0	38.0	35.5	36.2	31.0	24.5	19.0
8	17.0	20.0	26.5	34.5	28.0	39.5	39.2	31.0	36.0	32.0	27.0	20.0
9	18.0	20.0	27.5	31.5	30.0	41.5	40.0	28.5	34.5	31.5	26.0	20.2
10	19.0	21.0	24.0	30.0	32.5	32.5	40.2	33.0	35.0	24.0	24.3	19.0
11	20.0	20.0	26.0	30.5	35.5	35.5	39.5	35.5	34.0	28.0	25.0	12.5
12	19.5	16.5	28.0	27.0	37.5	38.5	36.5	35.0	35.0	28.5	23.5	11.0
13	21.5	11.0	29.0	28.0	32.0	41.5	36.5	36.0	37.0	27.5	23.0	15.0
14	20.5	12.5	30.0	29.7	29.5	43.5	35.0	35.0	36.0	28.0	21.5	15.5
15	20.0	17.5	21.0	32.0	32.5	42.5	35.5	32.5	33.2	28.2	21.0	15.5

16	20.5	20.0	25.5	33.2	28.0	38.2	32.5	33.5	29.5	29.5	21.5	16.5
17	21.5	22.0	26.0	24.5	33.0	36.0	33.0	35.0	30.5	28.3	22.5	18.0
18	19.0	23.0	26.5	28.5	34.0	32.5	33.6	36.0	32.5	27.0	24.5	18.0
19	19.0	23.5	28.0	30.0	33.5	34.0	34.5	31.0	34.0	27.5	24.0	19.5
20	20.5	24.0	27.0	30.5	33.0	38.0	31.5	35.0	35.0	28.2	24.0	21.5
21	22.5	23.0	24.0	15.5	35.0	34.5	32.0	36.2	35.2	28.0	24.5	18.0
22	23.5	24.0	21.0	24.0	35.0	37.5	34.5	36.5	35.0	29.0	25.0	19.0
23	20.0	24.0	26.2	29.5	35.5	36.5	34.0	34.0	31.5	29.0	24.0	19.0
24	16.0	24.8	28.0	33.0	37.0	38.2	26.0	37.2	31.0	28.0	22.5	17.0
25	16.5	14.5	29.0	35.5	37.5	38.3	30.5	36.0	32.0	28.5	24.5	16.2
26	18.0	21.0	31.0	35.5	39.5	41.0	33.6	35.5	32.0	28.5	27.0	17.5
27	19.0	23.8	33.0	36.5	40.0	41.0	32.6	32.5	33.2	28.5	25.2	16.2
28	20.0	24.5	32.0	37.2	39.2	35.5	32.0	33.5	33.0	29.2	25.5	15.5
29	20.0	***	32.0	38.0	40.5	33.0	32.0	36.5	32.5	29.0	25.0	17.2
30	18.2	***	33.5	37.2	41.2	28.0	31.8	37.0	33.0	29.0	24.5	17.5
31	19.5	***	35.0	***	41.5	***	34.2	37.0	***	29.2	***	18.5
AVE.	19.2	20.4	26.8	31.5	34.8	38.0	34.4	34.8	33.7	29.2	24.1	18.3

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year : 2018	Temperature, daily minimum (øC)											
1	4.0	7.0	13.5	17.0	22.5	28.5	25.5	26.5	24.5	20.5	15.0	9.0
2	2.5	6.5	13.5	17.5	26.0	26.0	26.0	25.0	24.5	19.5	15.0	8.0
3	3.0	3.8	12.5	18.0	19.0	28.5	21.0	25.5	22.5	17.5	10.0	8.5
4	3.5	4.8	9.5	19.5	19.0	28.5	20.5	27.5	23.5	16.5	7.0	7.5
5	2.0	4.0	9.5	18.5	21.5	31.0	19.0	26.5	23.0	17.5	8.0	8.0
6	2.0	4.5	10.5	17.8	20.5	20.0	23.5	27.0	24.0	17.0	8.5	7.5
7	3.0	4.5	10.0	16.5	16.5	27.6	25.6	25.0	25.0	18.0	9.5	6.5
8	3.5	5.0	10.5	20.6	14.2	29.0	26.5	24.0	20.0	18.5	10.0	6.0
9	4.0	4.5	11.0	15.8	17.0	27.6	30.5	22.5	23.0	14.0	11.0	6.0
10	4.0	6.0	10.5	17.6	20.5	22.0	28.2	25.0	24.5	14.5	10.0	9.0
11	5.0	4.6	11.0	16.0	22.0	26.6	30.0	26.0	22.5	15.5	11.5	6.5
12	5.0	7.0	12.5	12.6	24.6	25.5	27.0	26.0	24.0	14.5	11.0	4.5
13	6.5	6.5	14.0	13.0	18.5	29.5	24.4	26.5	25.0	15.5	11.0	3.5
14	7.0	5.0	14.0	18.0	20.5	27.5	25.0	21.5	21.5	15.0	10.5	4.5
15	6.0	5.5	10.0	17.5	18.5	29.0	23.0	22.5	17.5	16.5	9.0	4.0
16	2.0	6.0	10.5	15.5	18.5	25.0	25.0	23.0	18.5	16.0	9.0	4.5
17	3.5	8.5	10.5	15.5	19.5	21.0	24.0	25.0	19.0	14.5	10.0	4.5
18	3.0	6.5	10.5	16.5	21.5	21.5	24.0	24.0	20.0	12.5	10.0	5.0
19	4.5	7.0	11.0	16.0	18.0	22.5	21.5	22.0	20.0	14.8	10.0	3.5
20	5.0	7.5	13.5	15.0	20.5	27.0	21.9	26.0	22.0	12.0	10.5	4.0
21	5.0	11.0	12.0	10.5	19.5	20.5	25.5	27.5	23.5	13.5	10.0	5.0
22	5.5	9.5	8.5	13.5	20.2	25.5	26.0	24.8	19.5	13.0	10.0	4.0
23	3.4	9.5	11.5	15.5	19.0	23.0	24.4	26.5	20.0	13.8	7.5	2.0
24	2.0	12.5	14.0	18.8	20.0	25.0	22.5	24.5	21.0	13.5	9.5	3.0
25	4.5	9.5	14.0	19.0	21.0	26.6	24.5	24.0	22.0	13.5	10.0	3.5
26	4.5	9.5	15.5	18.0	22.5	25.0	26.0	22.5	20.5	15.5	9.0	1.0
27	4.5	10.6	16.8	20.0	21.0	27.5	23.5	24.0	22.0	14.5	9.5	1.0
28	4.0	9.0	13.8	21.0	24.4	24.0	21.0	23.5	21.0	15.5	8.5	2.5
29	4.0	***	15.0	21.5	22.0	24.0	20.9	24.5	18.5	15.5	9.5	2.0
30	5.5	***	16.0	22.5	24.6	24.0	21.0	25.0	20.0	16.5	9.5	2.0
31	7.0	***	16.5	***	23.5	***	25.5	25.5	***	16.5	***	2.0
AVE.	4.2	7.0	12.3	17.2	20.5	25.6	24.3	24.8	21.8	15.5	10.0	4.8

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Year : 2018 Relative humidity at 0000 UTC (%)

1	77	87	79	81	54	37	81	88	92	75	80	76
2	76	86	95	82	28	40	77	88	88	78	80	75
3	76	58	94	77	87	48	84	92	92	86	83	82
4	76	56	100	69	78	54	91	82	92	69	87	81
5	92	77	94	82	71	56	87	82	84	61	75	87
6	83	58	88	73	74	87	76	85	84	69	81	80
7	77	56	76	76	95	65	70	85	81	77	76	87
8	84	56	88	70	100	65	65	88	100	73	71	87
9	77	63	89	90	86	65	58	92	92	100	64	75
10	69	65	83	86	78	83	63	92	92	85	82	94
11	63	70	76	95	75	64	76	88	92	85	73	93
12	72	80	73	89	62	61	68	92	88	80	77	93
13	73	100	80	84	91	54	77	88	88	80	77	92
14	66	93	90	68	74	53	77	81	87	80	88	93
15	65	93	88	81	86	60	96	92	100	77	94	93
16	57	86	82	95	86	66	92	92	82	80	88	92
17	78	87	76	90	78	83	92	75	91	80	77	78
18	84	68	71	90	67	79	92	89	82	68	77	65
19	78	66	72	85	77	76	85	92	79	74	83	70
20	79	73	73	81	66	64	92	85	79	68	68	79
21	72	67	69	94	61	79	88	81	80	69	77	86
22	72	82	94	80	51	70	85	92	79	70	71	71
23	77	76	83	80	54	69	88	85	91	70	76	78
24	84	69	79	60	47	66	100	84	91	84	76	85
25	85	94	69	74	42	58	96	84	84	84	72	85
26	85	94	70	72	40	69	88	88	83	75	60	62
27	78	82	71	62	42	59	92	88	76	70	65	84
28	77	87	69	60	37	76	100	84	76	71	88	65
29	78	***	70	61	40	84	92	88	66	76	88	84
30	75	***	32	48	47	84	92	71	74	72	65	71
31	73	***	45	***	32	***	92	78	***	77	***	78
AVE.	76.1	76.0	78.0	77.8	64.7	65.8	84.3	86.2	85.5	76.2	77.3	81.3

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Year : 2018 Relative humidity at 1200 UTC (%)

1	45	55	47	44	29	26	45	58	55	63	52	45
2	57	34	57	46	23	25	48	53	66	47	68	58
3	56	32	90	37	36	31	68	61	70	38	46	52
4	66	55	55	55	32	34	61	56	62	43	35	53
5	59	21	49	41	36	44	42	56	44	44	35	59
6	55	25	42	37	45	34	27	65	37	38	32	67
7	40	21	40	33	51	32	32	75	75	43	29	68
8	41	26	61	56	43	35	40	82	70	45	43	56
9	39	26	38	42	31	84	35	67	67	61	39	61
10	35	38	40	52	30	39	50	62	63	57	46	88
11	35	46	42	52	32	28	55	61	62	54	50	94
12	35	94	44	24	44	18	56	61	50	44	55	79
13	37	83	38	30	42	26	62	67	62	40	69	74
14	38	61	58	36	40	29	54	62	51	58	64	74
15	37	48	37	31	66	45	85	65	58	41	54	52
16	41	44	30	72	33	36	70	55	46	45	45	57
17	40	20	26	47	30	45	68	55	37	23	34	49
18	39	28	31	38	55	42	58	75	40	34	47	45

19	30	39	35	33	26	36	73	58	47	31	48	54
20	27	39	41	89	23	47	65	54	44	34	38	53
21	47	41	80	44	24	33	58	76	56	34	42	54
22	50	40	35	27	19	34	71	74	58	35	49	45
23	64	40	35	25	16	29	100	61	78	39	40	60
24	61	89	28	26	18	26	96	55	58	42	34	51
25	49	51	25	28	15	16	77	57	60	34	40	51
26	42	46	29	27	14	30	76	51	43	34	44	46
27	38	45	36	30	15	42	73	54	44	45	68	48
28	31	37	24	32	14	60	67	48	45	43	79	44
29	41	***	13	22	14	71	56	40	42	47	48	46
30	47	***	12	17	11	56	55	44	36	54	35	57
31	55	***	25	***	18	***	68	73	***	62	***	44
AVE.	44.4	43.7	40.1	39.1	29.8	37.8	61.0	60.7	54.2	43.6	46.9	57.5

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year : 2018					Wind direction at 0000 UTC (degree)							
1	C	C	C	C	S	C	C	C	C	C	C	C
2	C	C	C	C	C	C	C	C	C	C	SE	C
3	C	C	C	C	C	C	C	C	C	C	C	C
4	C	C	C	C	C	C	C	C	C	SW	C	C
5	C	C	C	C	NW	C	W	C	C	C	C	S
6	C	C	SW	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	SW	NW	C	C	C	C	C
9	C	C	SW	C	C	C	C	C	C	N	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	SW	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	C	C
13	C	C	C	C	C	C	C	C	SW	C	C	C
14	C	C	C	C	C	C	C	SE	C	C	C	C
15	C	C	C	C	C	SW	SW	C	S	C	C	C
16	C	C	C	C	C	C	C	C	SW	C	C	C
17	C	C	C	C	C	C	C	C	C	C	C	C
18	C	C	C	C	C	C	NW	C	C	C	C	C
19	C	C	C	C	C	C	C	C	C	C	C	C
20	C	C	C	NW	C	C	C	C	C	C	C	C
21	C	C	NW	C	C	C	C	C	C	C	C	C
22	C	C	C	C	C	C	C	C	SW	C	C	C
23	C	C	C	C	C	C	C	C	C	C	C	C
24	C	C	C	C	C	C	C	NE	C	C	C	C
25	C	NW	C	C	S	C	C	NE	C	C	C	C
26	C	C	C	C	C	C	C	C	C	C	C	C
27	C	C	C	C	C	SE	C	C	C	C	C	C
28	C	C	C	C	C	C	SE	C	C	C	C	C
29	C	***	C	SW	C	C	C	C	C	C	C	C
30	C	***	NW	C	C	C	C	C	C	C	C	C
31	C	***	C	***	C	***	C	C	***	C	***	C
MEAN	0	225	270	270	209	198	270	59	214	248	225	180

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year : 2018					Wind direction at 1200 UTC (degree)							
1	C	C	NW	SE	E	SW	SE	SW	S	SW	SW	C
2	C	C	S	SE	SW	SW	S	SW	SW	SW	NE	C

3	C	C	NW	C	SE	NW	SE	NW	C	SE	N	C
4	C	C	NW	C	NE	SW	SE	SW	S	C	N	C
5	C	N	N	C	SE	S	NW	SW	C	C	NW	SW
6	C	C	NW	SE	SE	C	NW	SE	NW	C	NW	C
7	C	C	C	NE	NE	C	SW	E	SE	SE	C	C
8	C	NW	C	SE	C	SW	SW	SE	S	S	S	C
9	C	NW	NW	S	NW	NW	SW	NE	SW	W	NE	C
10	NW	SW	NW	SE	NW	N	S	SW	S	NW	C	NE
11	C	W	N	C	SE	NW	SW	SW	SW	SE	C	NW
12	C	SW	E	NW	E	NW	SE	SW	SW	SW	C	C
13	NW	NW	SE	NW	NW	SE	S	S	S	NW	C	C
14	C	NW	NW	N	E	SW	C	SW	C	SW	C	C
15	C	C	C	C	NW	SE	SE	SW	NW	C	NW	C
16	SE	NW	NE	N	NW	SE	C	C	W	C	NW	C
17	C	NW	NW	C	N	N	C	SE	NW	N	C	N
18	C	NE	NE	NW	S	SE	W	C	NW	N	C	NW
19	NW	NW	NW	C	N	SW	SE	SW	C	NE	C	C
20	NW	C	E	NW	NW	SW	C	SW	SW	NW	NW	C
21	C	NW	W	NW	NW	C	E	NE	S	NW	C	C
22	C	NW	C	NW	NW	SW	SW	S	S	C	NW	C
23	C	NW	N	NW	N	SW	C	S	C	NW	NW	C
24	C	NE	NW	N	C	SW	SW	S	C	C	C	C
25	C	NW	NW	NW	SE	W	C	S	C	W	C	NW
26	E	NW	NW	C	E	NW	C	S	NW	N	C	C
27	SW	N	C	SE	NE	SE	NE	SW	SW	SW	C	NW
28	SW	C	NW	SW	NW	SE	SW	C	SE	NW	C	C
29	E	***	NW	NW	S	SE	C	W	SW	C	C	C
30	NW	***	NW	NW	NW	E	SW	NE	SW	C	C	C
31	C	***	C	***	SW	***	SW	C	***	C	***	C
MEAN	238	222	209	213	4	217	193	200	220	259	213	216

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year : 2018	Wind speed at 0000 UTC (knots)											
1	0	0	0	0	2	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	2	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	2	0	0
5	0	0	0	0	2	0	2	0	0	0	0	2
6	0	0	2	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	2	2	0	0	0	0	0
9	0	0	2	0	0	0	0	0	0	2	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	2	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	2	0	0	0
14	0	0	0	0	0	0	0	2	0	0	0	0
15	0	0	0	0	0	2	2	0	2	0	0	0
16	0	0	0	0	0	0	0	0	2	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	2	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	2	0	0	0	0	0	0	0	0
21	0	0	2	0	0	0	0	0	0	0	0	0

22	0	0	0	0	0	0	0	0	2	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	8	0	0	0	0
25	0	2	0	0	2	0	0	2	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	2	0	0	0	0	0	0
28	0	0	0	0	0	0	2	0	0	0	0	0
29	0	***	0	2	0	0	0	0	0	0	0	0
30	0	***	2	0	0	0	0	0	0	0	0	0
31	0	***	0	***	0	***	0	0	***	0	***	0
AVE.	0.0	0.1	0.3	0.1	0.2	0.2	0.3	0.5	0.3	0.1	0.1	0.1

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year : 2018	Wind speed at 1200 UTC (knots)											
1	0	0	2	2	2	2	2	2	2	2	2	0
2	0	0	2	2	2	2	4	2	2	2	2	0
3	0	0	2	0	2	2	2	2	0	2	2	0
4	0	0	2	0	2	2	2	2	2	0	2	0
5	0	2	2	0	2	2	2	2	0	0	2	2
6	0	0	2	2	2	0	2	2	2	0	2	0
7	0	0	0	2	2	0	2	2	2	2	0	0
8	0	2	0	2	0	2	2	2	2	2	2	0
9	0	2	2	2	2	2	2	2	2	2	2	0
10	2	2	2	2	2	2	2	2	2	2	0	2
11	0	2	2	0	2	2	2	2	2	2	0	2
12	0	2	2	2	2	2	2	2	2	2	0	0
13	2	2	2	2	2	2	2	2	2	2	0	0
14	0	2	2	2	2	2	0	2	0	2	0	0
15	0	0	0	0	4	2	2	2	2	0	2	0
16	2	2	2	2	2	2	0	0	2	0	2	0
17	0	2	2	0	2	2	0	2	2	2	0	2
18	0	2	2	2	2	2	2	0	2	2	0	2
19	2	2	2	0	2	2	2	2	0	2	0	0
20	2	0	2	2	2	2	0	2	2	2	2	0
21	0	2	2	2	2	0	2	2	2	2	0	0
22	0	2	0	2	2	2	2	2	2	0	2	0
23	0	2	2	4	2	2	0	2	0	2	2	0
24	0	2	2	2	0	2	2	2	0	0	0	0
25	0	2	2	2	2	2	0	2	0	2	0	2
26	2	2	2	0	2	2	0	2	2	2	0	0
27	2	2	0	2	2	2	2	2	2	2	0	2
28	2	0	2	2	2	2	2	0	2	2	0	0
29	2	***	2	2	2	2	0	2	2	0	0	0
30	2	***	2	2	2	2	2	2	2	0	0	0
31	0	***	0	***	2	***	2	0	***	0	***	0
AVE.	0.6	1.4	1.6	1.5	1.9	1.8	1.5	1.7	1.5	1.4	0.9	0.5

ANNEX IX: EIA TEAM PROFILE

1. Mr. M. Irshad Ramay – NCPC Coordinator

Mr. M. Irshad Ramay did his M.S in Environmental Engineering and Management from Asian Institute of Technology Bangkok-Thailand, B.Sc. in Chemical Engineering from Punjab University Lahore and Graduation from LEAD International. Mr. Ramay started his professional career from Pakistan Refinery Limited as a Process Engineer in year 1990 and then served in Hoechst Chemicals as Assistant Manager Production/HSE and Attock Refinery Limited as Deputy Manager in Technical Services. He has a wide range of experience in the field of Environment, Energy Auditing, Occupational Health and Safety, Waste Management, Process Engineering, Trouble Shooting of refineries process and projects handling. Mr. Ramay's Professional Proficiency is in the following sectors;

- Environmental Monitoring
- Environmental Impact Assessment, Initial Environmental Examination, Environmental Audit
- Energy Audits
- Environmental Management System training at Japan
- Environmental case studies at Costa Rica, Switzerland, Zimbabwe and Kenya
- Refinery operations training at Japan
- Reformer and Hydrotreater unit's operation graduation certificates from UOP
- Petrochemicals plants commissioning training at Thailand
- Study the Indian Oil Corporation developed indigenous techniques for environmental protection at India
- Pakistan groundwater quality update presented at WHO international conference Bangkok-Thailand
- Education of waste minimization, cleaner production techniques, wastewater treatment, environmental impact assessment and energy conservation
- Environmental Impact Assessment of Indian Refineries/ Gas Installations

2. Dr. Muhammad Anwar Baig - Hydrologist

Dr. Muhammad Anwar Baig has more than 35 years of experience in research and development in the field of environment including air, water, soil and noise monitoring. He is a PhD in Environmental Sciences from University of Arizona, Tucson, AZ, USA. His employment history is mentioned below:

- 2009 to date, Director NCPC
- 1998-todate, **Professor**, Institute of Environmental Eng. National University of Sciences & Technology Rawalpindi.
- 1993 -98, **Lecturer/Research Associate**, Center of Excellence in Water Resources Engineering, University of Engineering and Technology, Lahore.

- 1990 – 93, **Graduate Research Fellow**, University of Arizona, Tucson, AZ, USA
- 1988 – 90, **Research Scholar**, University of California, Riverside, CA, USA.
- 1983 – 88, **Lecturer/Research Associate**, Center of Excellence in Water Resources Engineering, University of Engineering and Technology, Lahore.
- 1981- 83, **Research Officer (Planning),** Punjab Agricultural Research Board (PARB), Government of the Punjab, Planning and Development Department.
- Oct – May 1980-81, **Officer In charge Divisional Soil & Water Testing Laboratory**, Sargodha Govt. of the Punjab
- May – Sept 1980, **Water Management Officer** at OFWM Department, Gov. of Punjab

3. Mr. M. Azhar Qureshi - Flora Fauna Expert

Mr. Qureshi is Masters in Zoology with specialization in Microbiology and Entomology from University of the Punjab and a fellow of LEAD-Pakistan, Cohort-5. He is Chairman Soon Valley Development Programme and member of various societies including Zoological Association of Pakistan, Pakistan Society of Sugar Technologists and Margalla Hills Society. Mr. Qureshi is directly responsible for management & operation of a development organization known as Eco-Conservation Initiatives (ECI) with focus on sustainable agriculture, water management, human resource development, environmental conservation and changing livelihood patterns.

4. Mr. Tahir Hussain - Quality & Environment Expert

Mr. Tahir has more than ten years of experience in the field of testing and analysis of drinking water, waste water, noise, air, petroleum products etc. He is responsible for optimization of gas chromatographs testing, monitoring of refinery effluents & flue gases, product certification / plant monitoring, monitoring of Naphtha/Afghanistan Export testing, calibration and maintenance of laboratory equipment, Internal Audits for ISO 9001, ISO14001 & OHSAS 18001, ISO/IEC 17025.

5. Mr. Tariq Khan – Biologist & Botanist

Mr. Tariq Khan is M.Phil Environmental Sciences and Master's in Botany (Plant Sciences). He is working as Flora Fauna Expert at NCPC and Senior Executive (Plant Taxonomist) in horticulture department at Attock Refinery Ltd. Morgah, Rawalpindi. Mr. Tariq has 06 years of industrial as well as consultation experience: (i) Plant Taxonomist in Qarshi Herbs Research Center for 1.5 years; (ii) as Botanist for EIAs and IEEs with Halcrow, Hagler Bailly Pakistan and Innovation for Poverty Reduction Project (IPRP) for 1.5 years. He also worked as research scientist in National Herbarium NARC, Islamabad for 2.5 years.

6. Ms. Aroosa Zaheer – Environmental Engineer

Ms. Aroosa is an enthusiastic Environmental Engineer with BS Environmental Engineering from University of Engineering and Technology, Taxila. She is responsible for conducting the environmental studies like EIA/IEE, Environmental Monitoring and Environmental Audits etc. along with field visits. She has proficiency in Environmental Risk Assessments with sound report writing skills.

7. Mr. Nayyar Humair Siddiqui – Chemist

Mr. Nayyar is a Chemist with Masters in Chemistry. He has his expertise in sampling and testing of water and wastewater. He has specialized in Monitoring of Effluent water. He has competency in Field surveys, Air Monitoring, PM10, noise levels analysis, flue gas monitoring and ambient air monitoring, sampling and testing.

8. Ms. Sadaf Yasin – Environmentalist

Ms. Sadaf Yasin is an enthusiastic Environmentalist with MPhil in Environmental Sciences from Quaid-i-Azam University, Islamabad. She has competency in conducting environmental studies like EIA/IEE along with report writing. She is also working for capacity building and community development domain of NCPC.

9. Mr. Sohail Akram Basra – Environmental Engineer

Mr. Sohail is an Environmental Engineer with BE Environmental Engineering from University of Engineering and Technology, Taxila. He is responsible for conducting the environmental studies like EIA/IEE, Environmental Monitoring and report writing along with field visits.

10. Mr. Ali Azfar – Chemical Engineer

Mr. Ali Azfar is a Chemical Engineer with B.Sc. Chemical Engineering from University of the Punjab. He is responsible for conducting field visits, analytical testing and reporting. He also holds sound skills for conducting Environmental and Social Monitoring, Environmental Audits and Energy audits.

11. Mr. Naveed Akhtar – Sociologist

Mr. Naveed Akhtar is a Sociologist at NCPC. He possesses a Master's degree in Sociology from University of Arid Agriculture, Rawalpindi. He is specialized in conducting social surveys or social assessments. He has conducted Housing, Socio-economic, Educational, Commercial, Tourism and Health surveys for master planning of Balakot town (NWFP) and Rawalakot town (AJK). He has prepared reports on Population Growth & its Implications; Depression Prevail in Society; Effects of Water Contamination on Human Health; Immediate Causes of All Demographic Changes etc. His thesis was on "Farmers Perception about the Efficiency of Small Dams in District Rawalpindi".