



Initial Environmental Examination

June 2017

Islamic Republic of Pakistan: Proposed
Multitranche Financing Facility II (MFF II)
Second Power Transmission Enhancement
Investment Program

Prepared by National Transmission and Despatch Company
Limited for the Asian Development Bank.

Power Transmission Enhancement Investment Programme II

TA 8488 (PAK)

Initial Environmental Examination

Sub-Project 2: Construction of new 220 kV D.I. Khan-Zhob Transmission Line with Zhob Sub-station

June 2017

Prepared by National Transmission & Despatch Company Limited (NTDC)
for the Asian Development Bank (ADB)

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CURRENCY EQUIVALENTS

As of 20 th June 2017	Currency Unit – Pak Rupees (Pak Rs.)
Pak Rs 1.00 = \$ 0.009	US\$1.00 = Pak Rs. 105.8

CONVERSIONS

1 meter	= 3.28 feet
1 hectare	= 2.47 acre

LOCAL TERMINOLOGY

Kacha	Weak structure (composed of mud/clay)
Pakka	Robust/strong structure (composed of bricks/concrete)
Tehsil	Area of land with a city or town that serves as its administrative centre

Acronyms

ADB	Asian Development Bank
ACGIH	American Government Individual Hygienist
ANSI	American National Standards Institute
AOI	Area of Influence
BEIS	Biological Exposure Indices
BOQ	Bill of Quantities
CLL	Concurrent Legislative List
CO	Carbon Monoxide
COI	Corridor of Impacts
EA	Executing Agency
EC	Electrical Conductivity
EHS	Environment & Health Guidelines
EHV	Extra High Voltage
EIA	Environmental Impacts Assessment
EMF	Electric and Magnetic Field
EMMP	Environmental Management & Monitoring Plan
EMU	Environmental Management Unit
EPA	Environmental Protection Agency
ESIC	Environment and Social Impacts Cell
ft	feet
GHGs	Green House Gases
GOP	Government of Pakistan
GRM	Grievance Redress Mechanism
GSO	Grid Station Operation
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEE	Initial Environmental Examination
IPIECA	International Petroleum Industry Conservation Associates
km	Kilo Meter

MFF	Multi tranche Finance Facility
NCS	National Conservation Strategy
NEP	National Environmental Policy
NEPRA	National Electric Power Regulatory Authority
NEQS	National Environmental Quality Standards
NESC	National Electrical Safety Code
NGOs	Non-Government Organizations
NOC	No Objection Certificate
NTDC	National Transmission and Despatch Company
Ops	Operational Policies
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PEL	Permissible Exposure Limit
PEPA	Pakistan Environmental Protection Act
PMU	Project Management Unit
PPEs	Personal Protective Equipment's
RE	Resident Engineer
REA	Rapid Environmental Assessment
RoW	Right of Way
SOP	Standard Operating Procedure/Practices
SPS	Safeguard Policy Statement
TL	Transmission Line
TLC	Transmission Line Construction
TLV	Threshold Limit Value
TOR	Terms of Reference
TPS	Thermal Power Station
UNDP	United Nations Development Program
WAPDA	Water and Power Development Authority
WMP	Waste Management Plan

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EXECUTIVE SUMMARY

1. INTRODUCTION

1. The condition of the power transmission system in Pakistan is inadequate to meet the rapidly growing demand for electrical power. This situation limits national development and economic growth. To enable the transmission system to deliver newly added generating capacity, the existing network has to be expanded. The overall contribution of power infrastructure also requires institutional arrangements and capacity that support strategic management of the sector, and planning and management of investments.
2. Due to inflow of new power, the existing system needs up gradation and installment of new grids and transmission lines. The proposed 220 kV Zhob Grid Station and associated Transmission line is also a step towards improved energy transmission system. This document is the Initial Environmental Examination (IEE) for the construction of the proposed station and transmission line. The proposed Grid Station and Transmission line are being funded by Asian Development Bank (ADB).
3. The proposed project is classified as category 'B' according to ADB Environment safeguards, based on the detailed site visits and subsequent preparation of the Rapid Environmental Assessment (REA) Checklist. The potential impacts are site-specific, few (if any) of them are irreversible, and in most cases mitigation measures can be designed more readily than for category 'A' projects. Thus, an initial environmental examination (IEE) has been prepared.

2. LEGISLATIVE AND REGULATORY REQUIREMENTS

4. The project will comply with ADB Safeguard policy, 2009, the national legislation relating to the environment in Pakistan, and other international protocols and obligations. The national legislation relating to the environment in Pakistan in order to obtain the required regulatory clearances is as follows:
 - ADB's Environmental Safeguard Guidelines, 2009, describe ADB's policies and procedures for any project funded by ADB.
 - The Pakistan National Conservation Strategy (NCS), which outlines the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources.
 - Pakistan Environmental Protection Act 1997, which empowers the EPA to delegate powers to the Provincial EPAs, identifies categories of projects to which the IEE/EIA provisions will apply, develop guidelines for conducting IEE and EIAs and procedures for their submission, review and approval, develop environmental emission standards for parameters such as air, water and noise, etc.
 - The National Environmental Quality Standards (NEQS), 2010 specify the maximum allowable concentrations of pollutants in municipal and liquid industrial effluents, maximum allowable concentration of pollutants in gaseous emissions from industrial sources, etc.
 - The other provincial and departmental applicable laws and regulations include Forest Act, 1927. The Telegraphy Act, 1910 which makes a provision of installing poles/towers without acquiring any land, Provincial Wildlife (Protection, Preservation, Conservation and Management) Acts, Ordinances and Rules (Act, 1972), Antiquities Act, 1975, Provincial Local Government Ordinances, 2001, etc.

3. Description of the Project

5. This Tranche II subproject consists of the development of a new 220 KV Zhob Grid Station and new D.I Khan – Zhob Transmission Line, about 220 km in length. The transmission line route passes through 9 villages in D.I Khan district of KP Province, FR D.I Khan of FATA and Zhob district of Baluchistan province. There will be installation of 660 towers i.e. each tower will be erected at a distance of 335 m as reported by Survey & Investigation Section of NTDC.
6. The existing land use of the Grid station site and Transmission line corridor is mostly rocky/barren land with some part consisting of agricultural land. Some scattered forest trees and few fruit trees are likely will be affected by the sub-project.
4. **ANALYSIS OF ALTERNATIVES**
7. An analytical overview of the alternatives has been considered for this sub-project. The analysis has been carried out critically so as to justify the need of the project. The various alternatives, which have been considered during the study, are; i). No project option, ii) Alternatives of Location, iii) Alternative Construction logistics and iv) Alternate Labor Options.
5. **ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS**
8. The physical environment was observed within 500 meters area of Influence around the project boundary and 150 meters from either side of the center line of transmission line along the project route. The physical, biological and social environments of the project area are provided below.

Physical Environment

9. **Topography and Geology:** A part of the project area lies in the alluvial plain of D.I Khan district, while rest of the area falls in FR D.I Khan and Zhob district, which mostly consists of rugged rocky/barren areas. The greater part of the area consists of extensive series of calcareous sandstones and shale.
10. **Seismology:** The project area lies in seismic Zone 2B & 3 which is a low hazard zone and slightly high hazard corresponding to peak ground acceleration (PGA) values of 0.16 to 0.24 and 24.0 to 32.0 m/sec².
11. **Hydrology and Geohydrology:** River Indus and related Chishma Right Bank Canal are the major surface water sources in the project area in D.I Khan district while the water bodies in rest of the project area are river Khora with its tributaries i.e Spinkai Ghasha , Kharmeri nala, Tangi Khwar, Mandi river, Khamistani river and Zhob river tributaries. It is perennial and flows throughout the year. It also causes floods in the monsoon season, when it receives excessive rainfall water from upstream. The water table is fairly near to deep the surface at 30 to 150 feet. Some parts of the project area have the seasonal water table position and dug wells generally run dry.
12. **Climate:** The climate of the D.I Khan district and FR D.I Khan is hot and dry during summer and cold and dry in winter. The mean maximum and minimum temperatures during summer are about 46°C and 28°C respectively. The mean maximum and mean minimum temperatures during winters are about 27°C and 6°C respectively. The Zhob district of Baluchistan has highest mean temperature of 37°C to 23°C in summers and 13 to -10° C in winter. The annual rainfall is approximately 295 mm to 1048 mm in D.I Khan and FR D.I Khan areas, while in Zhob district the average annual rainfall is 285 mm.

Biological Environment

13. The proposed Transmission line area is mostly covered with cereal crops and also some scattered forest trees. Naturally grown shrubs are also present on the land. Jungli Kikar (Wild Acacia niloica), Sufaida (Eucalyptus), Aak (Calotropis), Sheesam (Dilbergia Sisso) and Jandh (Prosopis cineraria) were observed on the project land. Orchards of Citrus, Guava and date fruits are present in the project area. The tract inhabits a variety of fauna and mammals, reptiles and birds.

Social and Cultural Environment

14. The major castes in D.I Khan districts are Baluch and Jatts in addition to Pathan families. In FR D.I Khan, the major castes are Wazir, Battani, Gandapur and Sherani while in Zhob district, Mandokhel, Kakar, Sherani, Harpals, Babers Sherani and Syed are the major castes. Major occupations are farming, business, service and labor. The total population of D.I Khan district was 0.853 million, FR D.I Khan had 0.389 million and Zhob district had 0.275 million persons according to the census report, 1998. There are no officially protected heritage sites or historic, religious or archeologically important sites located within or near the project area. Women work in the fields along with men and also teach at schools.

6. STAKEHOLDERS AND PUBLIC CONSULTATIONS

15. In accordance with ADB guidelines, the consultation process was carried out to share the information with the stakeholders/public on the proposed works and the expected impacts on the physical, biological and especially socio-economic conditions of the project corridor.
16. At various locations along the project site, stakeholders/public consultations were carried out along the project corridor. Most of the public were in favor of the project. The major concerns/issues raised by the stakeholders were regarding loss of trees and crops etc. and their compensation process; to ensure accessibility of the field activities by community people; conflicts due to the uses of common resources by the contractor during the construction activities and compensation for losses. All the concerns/issues have been taken care of and addressed accordingly in the respective chapters of the report.

7. ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT AND MITIGATION MEASURES

17. For the sake of impacts assessment, Area of Influence (AOI) was established consisting of a 2 km wide strip across the project boundary where trees, etc., will be affected, and direct and indirect impacts of the Project are envisaged. The major impacts on physical, biological and social environments and their mitigation measures are described below.
18. **Land Resources:** The proposed Transmission line will not require Land Acquisition, only the crop and trees compensation will be paid to the owners. The other impacts on the land resources will include physical disfiguration, soil erosion and contamination during the construction activities, drainage and waste disposal. Proper mitigation measures have been considered to minimize the other impacts on the land resources.
19. **Water Resources:** River Chenab crosses in the middle of the project area but project activities will cause no impact on it. Transmission line may also have to pass a small canal used for agriculture and domestic purpose. Apart from this major river, some small drains are present in the AOI. It is anticipated that the project activities will not cause any impact on these surface water bodies as these are not near the campsite, which lies within the GS boundary, and no construction activity will be done near them. Subsurface water resources may be contaminated at construction campsites.

20. **Ambient air quality and noise Levels:** To control the effects on the ambient air quality and noise level, proper tuning of vehicles, sprinkling of water on katcha tracks etc. have been proposed. In order to mitigate high noise levels, temporary acoustic barriers shall be used, wherever felt necessary.
21. **Biological Resources:** It is estimated that the implementation of project activities will cause cutting of about 6,000 trees. Compensatory trees will be planted at a ratio of 3:1.
22. **Social and Cultural Environment:** The major social impacts will include disturbance to accessibility, communicable diseases, security of public as well as workers. So to resolve the social conflicts, proper mitigation measures have been proposed.
23. **Environmental and Social Risk Assessment:** An effort has also been made to assess the environmental and social risks during the construction as well as operation stages. Proper mitigations (where required) have also been proposed.
24. **Environmental and Social Benefits of the Project:** Along with negative impacts of the Project, some major expected positive impacts have also been identified including availability of electricity as per demand, installation of industry, employment opportunities and other linked benefits.
8. **ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN**
25. A comprehensive environmental management and monitoring plan (EMMP) has been prepared to effectively manage and monitor the environmental and social impacts of the project. The salient features of EMMP are provided below.
26. **Environmental Management Plan:** To manage the environmental and social impacts of the Project, significant negative impacts and their mitigations have been covered in this section. For the ease to understand and identify the impacts and to implement their mitigations, a mitigation matrix has been developed as a ready reference for the proponent and contractor to minimize the negative impacts or to manage activities in such a manner to avoid any adverse negative impacts.
27. **Environmental and Social Monitoring Plan:** Keeping in view the impacts and existing institutional setup of NTDC, an environmental and social management plan has been developed. Environment and Social Impact Cell (ESIC) of NTDC will be responsible for the overall environmental and social issues of the project. Responsibilities have been assigned to each key player of the project including Client, Consultant and Contractor.
28. The total preliminary estimated cost for compensation of trees and shrub losses, environmental and social management costs has been calculated to be PKR 6.72 million.
9. **CONCLUSIONS AND RECOMMENDATIONS**
29. Based on the available preliminary plans, field surveys and assessment of the impacts, the Project is not expected to cause any significant environmental and/or social impacts along the project corridor. Furthermore, adoption of the proposed EMP will help in mitigating or minimizing any adverse impacts due to the implementation of the Project.

1. Introduction

1.1. General

30. The condition of the power transmission system in Pakistan is inadequate to meet the rapidly growing demand for electrical power. This situation limits national development and economic growth. In order to enable the transmission system to deliver newly added generating capacity, the existing network has to be expanded. The overall contribution of power infrastructure also requires institutional arrangements and capacity that support strategic management of the sector and planning and management of investments.
31. The Power generation capacity of Pakistan is 19,855 MW including all resources such as hydel, thermal and Independent Power Producers (IPPs). For dispersal of power from these hydropower projects, which are mostly located in northern part of the country, large and extensive power transmission network consisting of 500 kV, 220 kV transmission lines and grid stations will be required. All the power plants in WAPDA's power system are operated in an integrated manner to supply power to the national grid consisting of a large network of High Voltage and Extra High Voltage (HV & EHV) transmission lines and grid stations. National Transmission and Dispatch Company (NTDC) is responsible for construction, maintenance and operation of transmission lines and grid stations of 220 kV, 500 kV and above.
32. The project is part of the NTDC's overall power development program and is proposed to strengthen the transmission system to fulfill the need of secure, safe and reliable power supply and to meet not only the existing requirement but also the future demand of the country for sustained economic growth.
33. Due to inflow of new power, the existing system requires upgradation and installment of new grids and transmission lines. The proposed 220 kV Transmission line from Dera Ismail Khan to Zhob along with 220 KV substation is also a step towards improved energy transmission system. This document is the Initial Environmental Examination (IEE) for the construction of 220 transmission line nearly 220 km in length and new grid station at Zhob. The proposed grid station and transmission line are being funded by Asian Development Bank (ADB).
34. The proposed sub-project aims to meet rapidly growing demand for electrical power. The feasibility study for the sub-project was prepared by consultants and has demonstrated the need for the proposed improvements based on electricity demand and network studies and that significant benefits can accrue in the form of reduced load on transformers and reduction in transmission line losses. Thus, there is a clear and immediate future need for this sub-project.
35. The proposed project will help to fulfill the overall objective of the MFF to encourage economic growth and improve transmission efficiency by creating a series of national improvements. The improved transmission efficiency will contribute to expansion of economic opportunities by improving capacity and efficiency and security of supply of power.

36. The proposed project is classified as category 'B' according to ADB environment safeguards, based on the site visits and preparation of the ADB Rapid Environment Checklist (REA). The expected impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category 'A' projects. An initial environmental examination (IEE) has thus been conducted.

1.2. Project Details

37. This report presents the Initial Environmental Examination (IEE) for the construction of a new 220 kV Transmission line from Dera Ismail Khan to Zhob with a length of 220 km along with 220 kV Grid station at Zhob. The **Figure 1.1** presents the location map of the proposed project site.
38. The IEE study takes into account the natural environment (air, water, land, flora & fauna), human health and safety. This study evaluates the project's potential environmental risks and impacts in its areas of influence and outlines planning, designing and implementation by preventing, minimizing, mitigating or compensating for adverse environmental impacts and enhancing positive impacts throughout project implementation.
39. The Social Assessment (SA) has been conducted to evaluate the project's potential positive and adverse effects on the affected people and to examine project alternatives where adverse effects may be significant. The breadth, depth and type of analysis in the social assessment are proportional to the nature of the project and scale of its potential effects, positive or adverse, on the affected people.
40. The IEE has been conducted for the proposed project under MFF- Tranche II, of the Asian Development Bank (ADB) project, Power Transmission and Enhancement Multi-Tranche Finance Facility (PTMFF). Thus, this IEE presents the results and conclusions of environmental assessment for the proposed construction of new 220 kV Transmission line from Dera Ismail Khan to Zhob along with 220 kV Grid station at Zhob and is submitted on behalf of Government of Pakistan (GoP), Ministry of Water and Power, and National Transmission and Dispatch Company (NTDC). An IEE has been carried out to fulfill the requirements of ADB safeguard policy statement, 2009.
41. The Power Transmission Enhancement MFF loan has to be approved by ADB and the sub project under consideration falls under tranche 2 of the MFF. The total cost of the 220 kV DC Transmission line is estimated at PKR 6625 million. ADB will fund the design, civil works and procurement of equipment. The PC-1 has been approved and detailed designs are being prepared. The **Figure 1.2** shows the site of the proposed project of 220 KV Transmission line and Grid station.
42. The environmental assessment requirements of the Government of Pakistan (GoP) for power transmission projects are not identical to those of ADB. The environmental regulations of the GoP categorize development projects into two schedules according to their anticipated potential environmental impacts. The proponents of projects that have more adverse environmental

impacts (Schedule II) are required to submit an environmental impact assessment (EIA). The base line data was developed and analyzed to identify potential environmental impacts of the project. An Environmental Assessment Checklist methodology was adopted to identify the high risk activities and suggest their mitigation measures. Where possible, eliminating the risk by altering the scope or method of execution of work was preferred rather than minimizing the risk with control measures.

43. The GoP has requested the Asian Development Bank (ADB) to provide finance for the proposed subproject, to help fulfill the overall objective of the MFF to encourage economic growth and improve transmission efficiency by creating a series of national improvements. The improved transmission efficiency will contribute to expansion of economic opportunities by improving capacity and efficiency in Quetta Electric Supply Company (QESCO) region of Baluchistan province.

1.3. Scope of the IEE Study and Personnel

44. This sub-project will involve construction of a new 220 kV Zhob Grid station and associated D/C transmission line with a length of 220 km and extension of 220 KV D.I Khan Grid station (2 Line bays). This IEE study includes field reconnaissance of the entire transmission line route and Zhob Grid station.
45. The study area included the site of transmission line corridor within the RoW (15 m either side of transmission line) and the whole area on both sides of the transmission line including all irrigation facilities, water supply, habitable structures, schools, health facilities, hospitals, religious places and sites of heritage or archaeological importance and critical areas (if any) within 200 meters of the transmission line alignment.
46. The study process began with scoping and field reconnaissance during which a Rapid Environmental Assessment (REA) Checklist was prepared to establish the potential impacts and categorization of project activities. The environmental impacts and concerns requiring further study in the environmental assessment were then identified. The methodology of the IEE study was then elaborated in order to address all interests. Subsequently, both primary and secondary baseline environmental data was collected from the proposed works and the intensity and likely location of impacts were identified with relation to the sensitive receivers; based on the work expected to be carried out. The significance of impacts from the power transmission work was then assessed and, for those impacts requiring mitigation, measures were proposed to reduce impacts to acceptable limits.
47. Public consultation (PC) was carried out in July & August, 2016 in accordance with ADB guidelines. Under ADB requirements, the environmental assessment process must also include meaningful public consultation during the completion of the draft IEE. In this IEE, the PC process included verbal disclosure of the sub-project works as a vehicle for discussion. Interviews were conducted with local families and communities and line departments along the transmission line

alignment. Written records of the responses have been passed to the project proponent, NTDC. The responses from respondents have been included in this IEE.

1.4. Project Benefits

48. The benefits associated with the proposed 220 kV transmission line and 220 KV Zhob substation mainly include:

- Overall power supply position in Baluchistan area will be improved.
- The project will help to provide uninterrupted power supply to underdeveloped areas of Baluchistan.
- Voltage profile of Zhob and its surrounding areas will be improved.
- Implementation of the project will help to uplift the social life of the area, creation of new jobs and business opportunities.
- Additional revenues to government exchequer from the levy of taxes on finished goods, electricity duty due to additional sale of power & GST etc.

a) The other benefits of the proposed 220/132 kV transmission line & substation are as follows:

- Improvement in reliability of NTDCL and QESCO system networks.
- Increase in the available system capacity to meet future load growth at/around proposed project.
- Serve as 220 kV source of power to feed QESCO load center.
- Improvement in power supply position of QESCO.

1.5. Social Benefits

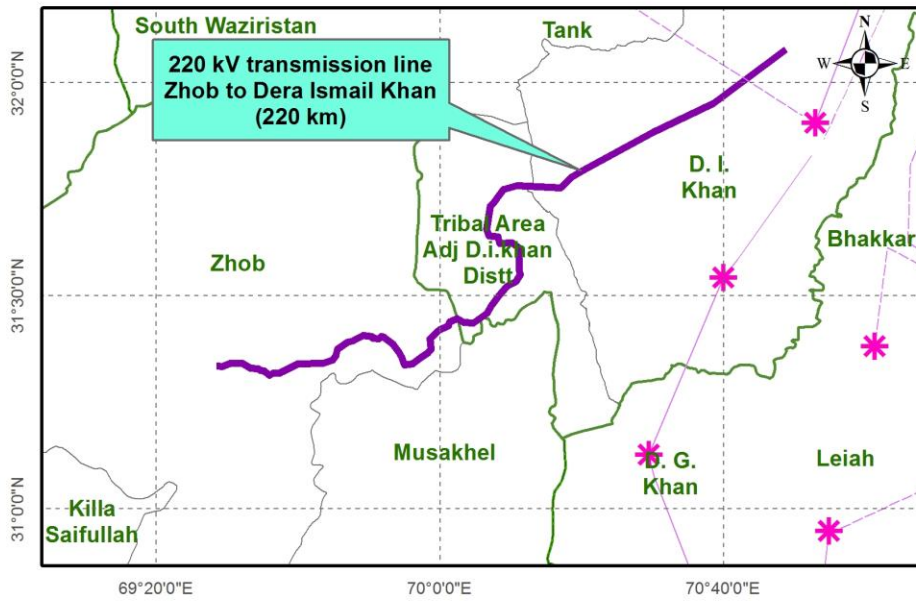
49. The expected social benefits from the proposed sub-project are as follows:

- Provision of more reliable supply of electricity to the consumers.
- Fulfillment of power demand for rural electrification program etc.
- Improvement in living standard of local population.
- Creation of small business services.
- Creation of new job opportunities for local communities.
- Development of new accommodation facilities and the local people will be exposed to new income generation opportunities.
- Socio economic uplifts of the community such as improved production, incomes and market activities.
- Tube wells electrification which will provide additional water for irrigation, increase cropped areas and also production.

- Developments of new industries in the area will create gainful employment to the increasing work force.
 - Additional revenues to Government exchequer from the levy of taxes on finished goods, electricity duty due to additional sale of power & GST etc.
50. In the overall analysis, the improvement in ecological environments coupled with higher production is envisaged to bring out substantial economic gains for the people living in the project area.

1.6. Structure of Report

51. This IEE reviews information on existing environmental attributes of the Study area. Geological, hydrological and ecological features, air quality, noise, water quality, soils, social and economic aspects and cultural resources are included. The report predicts the probable impacts on the environment due to the proposed sub-project. This IEE also proposes various environmental management measures. Details of all background environmental quality, environmental impact/pollutant generating activities, pollution sources, predicted environmental quality and related aspects have been provided in this report. The report follows ADB guidelines and includes:
- Executive Summary
 - Introduction
 - Policy, Legal and Administrative Framework
 - Description of the Project
 - Description of Environmental and Social Baseline Conditions
 - Assessment of Environmental Impacts and Mitigation Measures
 - Information Disclosure, Public Consultation and Participation
 - Environmental Management and Monitoring Plan
 - Conclusion and Recommendations



Project:

**Tranche II - Sub-project 2:
Construction of new 220 kV
D.I. Khan-Zhob T/L with
Zhob sub-station**

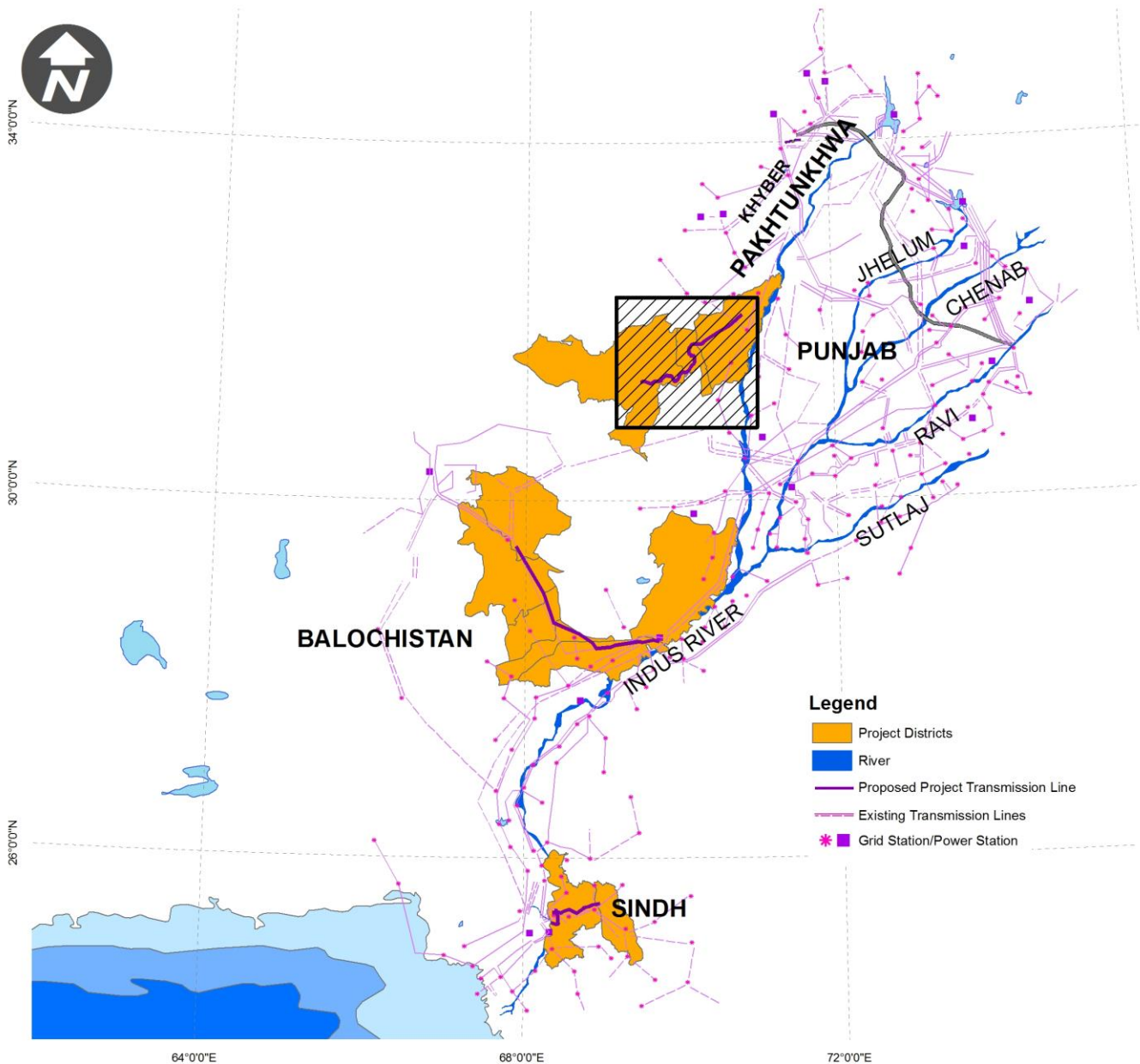
Drawing Title:

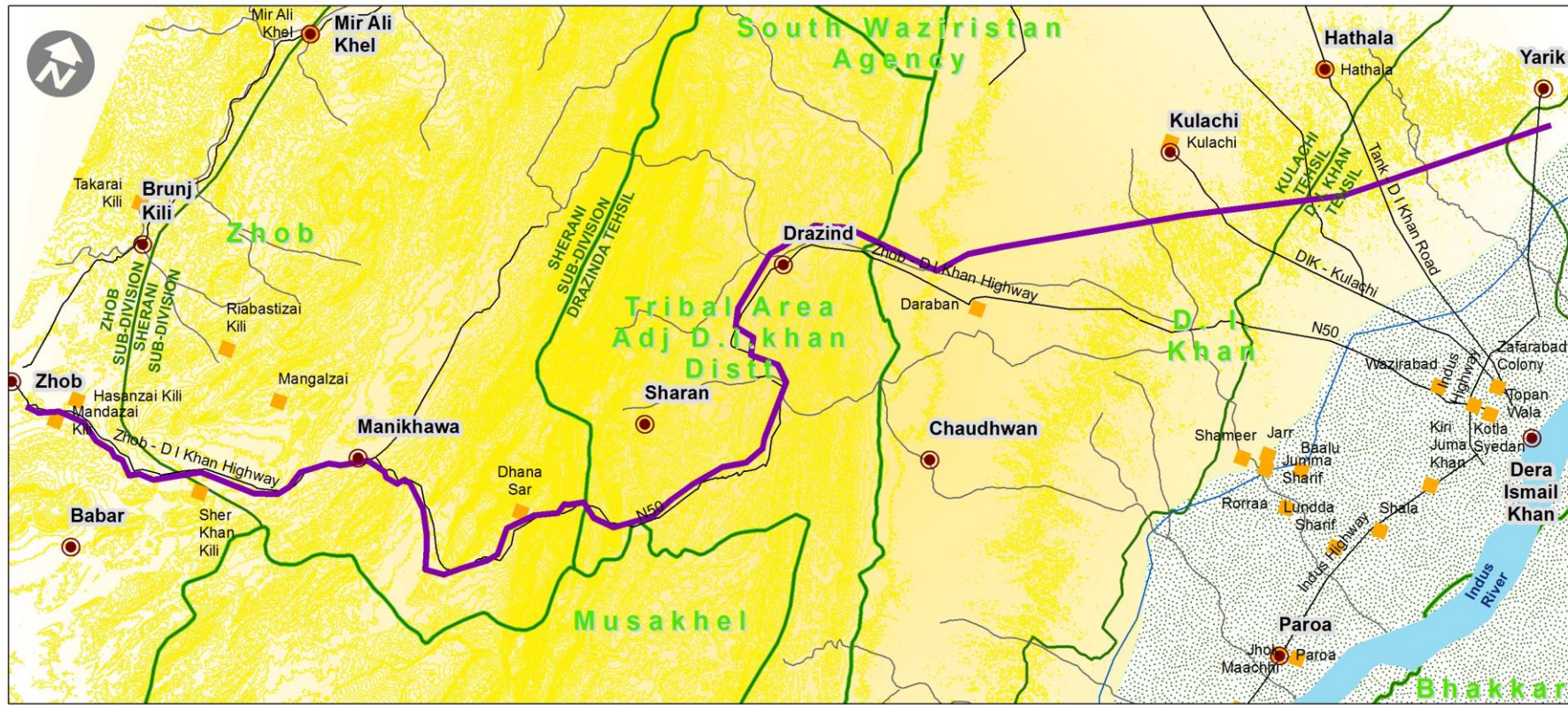
Key Map of Sub-project 2

Drawing Number:

Figure 1.1

Drawing Date: June 2017





Legend

- Major City/Town
- Transmission Line
- Community
- Main Road
- Major Nullah
- Main Canal
- River
- Major_Nullah
- Taluka Boundary
- District Boundary

Scale: 0 3.5 7 14 21 28 Kilometers

Drawing Number:

Figure 1.2

Drawing Date: June - 2017

Drawing Source: Google Earth

Project:

**Tranche II - Sub-project 2:
Construction of new 220 kV
D.I. Khan-Zhob T/L with
Zhob sub-station**

Drawing Title:

Project Area Map

2. Policy, Legal and Administrative Framework

52. Direct legislation on environmental protection is contained in several statutes, namely the Pakistan Environmental Protection Act (1997). In addition, the Land Acquisition Act (1894) also provides powers in respect of land acquisition for public purposes. There are also several other items of legislation and regulations that have an indirect bearing on the subproject or general environmental measures.

2.1. Statutory Framework

53. The Constitution of Pakistan distributes legislative powers between the federal and the provincial governments through two 'lists' attached to the Constitution as Schedules. The Federal list covers the subjects over which the federal government has exclusive legislative power, while the Concurrent list contains subjects regarding which both the federal and provincial governments can enact laws. "Environmental pollution and ecology" is included in the concurrent list; hence both the federal and the provincial governments can enact laws on this subject. However, to date, after 18th Constitutional Amendment, federal ministry of Environment has been dissolved and the provincial governments are authorized to formulate environmental laws and regulations. The key environmental laws affecting this subproject are discussed below.

2.2. Pakistan Environmental Protection Act, 1997

54. The Pakistan Environmental Protection Act, 1997 is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The act is applicable to a wide range of issues and extends to air, water, soil, marine, and noise pollution, as well as to the handling of hazardous wastes.
55. The key features of the law that have a direct bearing on the proposed subproject relate to the requirement for an Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) for development subprojects. Section 12(1) requires that: "No proponent of a subproject shall commence construction or operation unless he has filed with the Federal Agency an Initial Environmental Examination [IEE] or, where the subproject is likely to cause an adverse environmental effect, an Environmental Impact Assessment [EIA], and has obtained from the Federal Agency approval in respect thereof." The Pakistan Environmental Protection Agency has delegated the power of review and approval of environmental assessments to the provincial environmental protection agencies, in this case the Baluchistan and KPK EPAs.

2.3. Baluchistan Environmental Protection (Amendment) Act, 2012

56. After 18th Constitutional Amendment in the Constitution of Pakistan, the Federal Ministry of Environment has been dissolved and subject of environment has been handed over to provinces. EPA Baluchistan has formulated its own act. The major content of the act is same as of PEPA, 1997. Minor amendments/changes have been made viz.,

- The Name of Act has been changed into “Baluchistan Environmental Protection (Amendment) Act, 2012”.
- For the words “Federal Government”, wherever occur, the word “Government” shall be substituted;
- For the words “Federal Agency”, wherever occur, the words “Provincial Agency” shall be substituted; and
- For the word “National”, wherever occurs, the word “Baluchistan” shall be substituted.
- All the other clauses, sub-clauses, sections and sub-sections are almost same.

2.4. KPK Environmental Protection Act, 2014

57. In accordance with provincial regulatory requirements, an IEE satisfying the requirements of the KPK Environmental Protection Act (2014) is to be submitted to KP environmental protection agency (KP-EPA) for review and approval, and subsequent issuance of NOC before the commencement of construction.

2.5. Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000

58. The Pakistan Environmental Protection Act, 1997 (PEPA, 1997) provides for two types of environmental assessments: Initial Environmental Examinations (IEE) and Environment Impact Assessments (EIA). EIAs are carried out for subprojects that have potentially ‘significant’ environmental impacts, whereas IEEs are conducted for relatively smaller subprojects with a relatively less significant impact. The Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 (the ‘Regulations’), prepared by the Pak-EPA under the powers conferred upon it by the PEPA, categorizes subprojects for IEE and EIA. Schedules I and II, attached to the Regulations, list the subprojects that require IEE and EIA, respectively.
59. The Regulations also provide the necessary details on the preparation, submission, and review of IEEs and EIAs. The following is a brief step-wise description of the approval process:
- (i) A subproject is categorized as requiring an IEE or EIA using the two schedules attached to the Regulations.
 - (ii) An EIA or IEE is conducted as per the requirement and following the Pak-EPA guidelines.
 - (iii) The EIA or IEE is submitted to the concerned provincial EPA if it is located in the provinces or the Pak-EPA if it is located in Islamabad and federally administrated areas. The Fee (depending on the cost of the subproject and the type of the report) is submitted along with the document.
 - (iv) The IEE/EIA is also accompanied by an application in the format prescribed in Schedule IV of the Regulations.
 - (v) The EPA conducts a preliminary scrutiny and replies within 10 days of the submittal of a report, a) confirming completeness, or b) asking for additional information, if needed, or c) returning the report requiring additional studies, if necessary.
 - (vi) The EPA is required to make every effort to complete the IEE and EIA review process within 45 and 90 days, respectively, of the issue of confirmation of completeness.
 - (vii) Then the EPA accords their approval subject to certain conditions:

- (viii) Before commencing construction of the subproject, the proponent is required to submit an undertaking accepting the conditions.
 - (ix) Before commencing operation of the subproject, the proponent is required to obtain from the EPA a written confirmation of compliance with the approval conditions and requirements of the IEE.
 - (x) An EMP is to be submitted with a request for obtaining confirmation of compliance.
 - (xi) The EPAs are required to issue confirmation of compliance within 15 days of the receipt of request and complete documentation.
 - (xii) The IEE/EIA approval is valid for three years from the date of accord.
 - (xiii) A monitoring report is to be submitted to the EPA after completion of construction, followed by annual monitoring reports during operation.
60. Distribution lines and grid substations of 11 kV and above are included under energy subprojects in Schedule II, under which rules EIA is required by GoP. Initial Environmental Examination (IEE) is required for distribution lines and grid stations less than 11 kV and large distribution subprojects (Schedule I). A review of the need for EIA/ IEE submission is therefore required by the relevant EPA(s), in this case the KPK and Balochistan Environmental Protection Agencies (EPAs) as the proposed subproject will be located in both these provinces.

2.6. National Environmental Quality Standards (NEQS)

61. The National Environmental Quality Standards (NEQS) were first promulgated in 1993 and have been amended in 1995 and 2000. The following standards that are specified in the NEQS may be relevant to the Tranche this subproject of Tranche-IV:
62. Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment facilities, and the sea (three separate sets of numbers).
63. Maximum allowable concentration of pollutants (2 parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles.

2.7. ADB Policies

ADB's Safeguard Policy Statement (SPS), 2009

64. The Asian Development Bank's Safeguard Policy Statement (SPS) 2009 requires that environmental considerations be incorporated into ADB's funded project to ensure that the project will have minimal environmental impacts and be environmentally sound. Occupational health & safety of the local population should also be addressed as well as the project workers as stated in SPS. A Grievance Redress Mechanism (GRM) to receive application and facilitate resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance is also established and provided in Chapter 8.

65. All loans and investments are subject to categorization to determine environmental assessment requirements. Categorization is to be undertaken using Rapid Environmental Assessment (REA) checklists, consisting of questions relating to (i) the sensitivity and vulnerability of environmental resources in project area, and (ii) the potential for the project to cause significant adverse environmental impacts. Projects are classified into one of the following environmental categories:

Category A: A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA) is required.

Category B: A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE) is required.

Category C: A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

Category FI: A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary (FI).

66. As a result of the completion of the REA checklist, the sub-project has been classified as Category “B” and thus a detailed and comprehensive IEE study has been prepared including the EMP.

ADB’s Public Communication Policy 2011

67. The PCP aims to enhance stakeholders’ trust in and ability to engage with ADB, and thereby increase the development impact of ADB operations. The policy promotes transparency, accountability, and participatory development. It establishes the disclosure requirements for documents ADB produces or requires to be produced.

ADB’s Accountability Mechanism Policy 2012

68. The objectives of the Accountability Mechanism is providing an independent and effective forum for people adversely affected by ADB-assisted projects to voice their concerns and seek solutions to their problems, and to request compliance review of the alleged noncompliance by ADB with its operational policies and procedures that may have caused, or is likely to cause, them direct and material harm. The Accountability Mechanism a “last resort” mechanism.

2.8. Other Environment Related Legislations

69. The **Table 2.1** provides a summary of all legislations, guidelines, conventions and corporate requirements.

Table 2.1: Environmental Guidelines and Legislations

Legislation/Guideline	Description
National Environmental Policy (2005) (NEP)	NEP is the primary policy of Government of Pakistan addressing environmental issues. The broad Goal of NEP is, “to protect, conserve and restore Pakistan’s environment in order to improve the quality of life of the citizens through sustainable development”. The NEP identifies a set of sectoral and cross-sectoral guidelines to achieve its goal of sustainable development. It also suggests various policy instruments to overcome the environmental problems throughout the country.
Khyber Pakhtunkhwa Wildlife and Biodiversity Act, 2015	It empowers the government to declare certain areas reserved for the protection of wildlife and control activities within in these areas. It also provides protection to endangered species of wildlife. As no activities are planned in these areas, no provision of this law is applicable to the proposed project.
Balochistan Wildlife (Protection, Preservation, Conservation and Management) Act, 2014	It is an Act to provide protection, preservation, conservation, sustainable and management to the Wildlife, and establishment and management of protected areas in the province of Balochistan.
Balochistan Antiquities Act, 2014	It is an Act to provide for preservation and protection of antiquities in the province of Balochistan and for the matters connected therewith or ancillary thereto.
The KPK Antiquities Act (2016)	It ensures the protection, preservation, development and maintenance of antiquities in the province of KPK. The Act defines “antiquities” as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the GoKPK to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the subproject proponents are obligated to ensure that no activity is undertaken in the proximity of a protected antiquity, report to the Department of Archaeology, GoKPK, any archaeological discovery made during the course of the project.
The Forest Act (1927)	The Act empowers the provincial forest departments to declare any forest area as reserved or protected. It empowers the provincial forest departments to prohibit the clearing of forest for cultivation, grazing, hunting, removing forest produce, quarrying and felling, lopping and topping of trees, branches in reserved and protected forests. No protected forest is situated in the Project area.
The Antiquities Act (1975)	It ensures the protection of Pakistan’s cultural resources. The Act defines “antiquities” as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the GOP to prohibit excavation in any area

Legislation/Guideline	Description
	that may contain articles of archaeological significance. Under the Act, the subproject proponents are obligated to ensure that no activity is undertaken in the proximity of a protected antiquity, report to the Department of Archaeology, GOP, any archaeological discovery made during the course of the project.
Pakistan Penal Code (1860)	It authorizes fines, imprisonment or both for voluntary corruption or fouling of public springs or reservoirs so as to make them less fit for ordinary use.
NATIONAL ENVIRONMENTAL AND CONSERVATION STRATEGIES	
National Conservation Strategy	Before the approval of NEP, the National Conservation Strategy (NCS) was considered as the Government's primary policy document on national environmental issues. At the moment, this strategy just exists as a national conservation program. 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.
Biodiversity Action Plan	The plan recognizes IEE/EIA as an effective tool for identifying and assessing the effects of a proposed operation on biodiversity.
Environment and Conservation	There is a well-established framework for environmental management in Pakistan. The Ministry of Environment deals with environment and biological resources. Within the ministry, the NCS unit established in 1992 is responsible for overseeing the implementation of the strategy. Two organizations, the Pakistan Environmental Protection Council (PEPC) and the Pak EPA are primarily responsible for administering the provisions of the PEPA, 1997. The PEPC oversees the functioning of the Pak EPA. Its members include representatives of the government, industry, non-governmental organizations and the private sector. The Pak EPA is required to ensure compliance with the NEQS, establish monitoring and evaluation systems, and both identify the need to and institution of legislations whenever necessary. It is thus the primary implementing agency in the hierarchy. The Provincial Environmental Protection Agencies are formed by the respective provinces.
INTERNATIONAL CONVENTIONS	
The Convention on Conservation of Migratory Species of Wild Animals (1981.21)	The Convention requires countries to take action to avoid endangering migratory species. The term "migratory species" refers to the species of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries. The parties are also required to promote or cooperate with other countries in matters of research on migratory species. There are no endangered species of plant life or animal life in the vicinity of the Project.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)	The convention requires Pakistan to impose strict regulation (including penalization, confiscation of the specimen) regarding trade of all species threatened with extinction or that may become so, in order not to endanger their survival further.
International Union for Conservation of Nature and Natural Resources Red List (2000)	Lists wildlife species experiencing various levels of threats internationally. Some of the species indicated in the IUCN red list are also present in the wetlands of Pakistan.

Legislation/Guideline	Description
Kyoto Protocol/Paris Agreement	<p>SF₆ gas is listed in the Kyoto Protocol as one of the six greenhouse gases subject to monitoring. SF₆ has to be used in closed systems in order to avoid emissions. 194 member states agreed to extend the Kyoto protocol until 2020 with the aim of reducing the emission of greenhouse gases.</p> <p>The Paris Convention agreed to reduce climate-damaging greenhouses gases under the United Nations Framework Convention on Climate Change (UNFCCC) as of 2020. 195 member states negotiated and adopted this agreement on the twenty-first session of the Conference of the Parties under the framework convention on climate change in Paris on 12 December 2015.</p>
IEC 62271-4 directive	This directive stipulates SF ₆ gas recovery down to a final vacuum of < 20 mbar. The IEC requirements are exceeded by far when using DILO devices as DILO service carts enable a final vacuum of < 1 mbar depending on the type of device.
IEC 60480 guideline	This guideline stipulates the limit values for the re-use of SF ₆ gas in medium and high voltage switchgear.
EMF Exposure limits by IFC for 'general public' and 'occupational exposure'	These exposure limits have been provided for monitoring of EMF limits in order to prevent any adverse health effects in the general public as well as amongst workers.

2.9. Comparison of International and Local Environmental Legislations

70. The ADB SPS requires application of pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards. The SPS states that when host country regulations differ from these standards, the EA will achieve whichever is more stringent.
71. A comparison of applicable local and international guidelines for ambient air quality has been provided in **Table 2.5** below. In the case of most pollutants, the NEQS standards for ambient air quality are more stringent in comparison to USEPA and WHO/IFC standards. The applicable and most stringent parameters for each respective pollutant are highlighted in green.
72. Similar to the standards for air quality, the comparison of noise standards provided in **Table 2.6** clearly shows that NEQS standards for noise are more stringent in comparison to the WHO/IFC standards. The only exception is the daytime noise level standard for Industrial areas where the World Bank/IFC standard is more stringent (70 dB(A)) in comparison to NEQS (75 dB(A)) and so for this particular parameter, the WHO/IFC standard will be used. Apart from this one exception, the NEQS standards have been used for this sub-project.
73. As far as regulations regarding other environmental parameters are concerned such as acceptable effluent disposal parameters, the local regulations i.e. NEQS take

precedence over any other international regulations such as WHO/IFC since these specific IFC standards only cover a limited number of parameters relating to effluent disposal etc and the NEQS are generally more stringent.

2.10. Implications of national policies and regulations on proposed project

74. The Pak-EPA formulated regulations in 2000 for 'Review of IEE and EIA' which categorise development projects under three schedules - Schedules I, II and III. Projects are classified on the basis of expected degree and magnitude of environmental impacts and the level of environmental assessment required is determined from the schedule under which the project is categorised.
75. The projects listed in Schedule-I include those where the range of environmental issues is comparatively narrow and the issues can be understood and managed through less extensive analysis. Schedule-I projects require an IEE to be conducted, rather than a full-fledged EIA, provided that the project is not located in an environmentally sensitive area.
76. The proposed sub-project has been categorized as Schedule-I and thus an IEE study has been conducted.
77. This IEE study will be submitted to the relevant provincial EPAs for review and any comments in order to receive the respective NOC from each province where the scope of work is to be conducted. Each provincial EPA will respond within 10 working days from receipt of the IEE report and confirm the completeness of the report for detailed review or request additional information to be provided in order for the review to take place.
78. Each provincial EPA will make every effort to review the IEE report within 45 days of the issuance of completeness of the report. Upon completion of the review, an NOC will be issued, with conditions from the EPA if felt necessary.

2.11. Implications of ADB's safeguard policies on proposed project

79. The objectives of ADB's safeguards are to:
- avoid adverse impacts of projects on the environment and affected people, where possible;
 - minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
 - help borrowers/clients to strengthen their safeguard systems.
80. ADB's SPS sets out the policy objectives, scope and triggers, and principles for three key safeguard areas:
- environmental safeguards,

- involuntary resettlement safeguards, and
- Indigenous Peoples safeguards.

81. The objective of the environmental safeguards is to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. ADB's policy principles are summarized in **Table 2.2** below.

Table 2.2: ADB Policy Principles

	Policy principle	Summary
1	Screening and categorization	Screening process initiated early to determine the appropriate extent and type of environmental assessment.
2	Environmental assessment	Conduct an environmental assessment to identify potential impacts and risks in the context of the project's area of influence.
3	Alternatives	Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts, including no project alternative.
4	Impact mitigation	Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts. Prepare an environmental management plan (EMP).
5	Public consultations	Carry out meaningful consultation with affected people and facilitate their informed participation. Involve stakeholders early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation. Establish a grievance redress mechanism.
6	Disclosure of environmental assessment	Disclose a draft environmental assessment in a timely manner, in an accessible place and in a form and language(s) understandable to stakeholders. Disclose the final environmental assessment to stakeholders.

7	Environmental management plan	Implement the EMP and monitor its effectiveness. Document monitoring results, and disclose monitoring reports.
8	Biodiversity	Do not implement project activities in areas of critical habitats.
9	Pollution prevention	Apply pollution prevention and control technologies and practices consistent with international good practices. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges. Avoid the use of hazardous materials subject to international bans or phaseouts.
10	Occupational health and safety Community safety.	Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities
11	Physical cultural resources	Conserve physical cultural resources and avoid destroying or damaging them. Provide for the use of “chance find” procedures.

2.12. EMF Exposure Guidelines

82. 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), there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment.
83. However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern. Table 2.3 lists exposure limits for general public exposure to electric and magnetic fields published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) while Table 2.4 provides the exposure limits for occupational exposure.
84. It is important to mention that no national guidelines on EMF exposure exist at present.

Table 2.3: ICNIRP exposure limits for general public exposure to electric and magnetic fields

Frequency	Electric Field (V/m)	Magnetic Field (uT)
50 Hz	5000	100
60 Hz	4150	83

Source: ICNIRP (1998): “Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz).

Table 2.4: ICNIRP exposure limits for occupational exposure to electric and magnetic fields

Frequency	Electric Field (V/m)	Magnetic Field (uT)
50 Hz	10,000	500
60 Hz	8300	415

Source: ICNIRP (1998): “Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz).

Table 2.5: Comparison of International and local Air Quality Standards*

Pollutants	USEPA		WHO/IFC		Pak. NEQS	
	Avg. Time	Standard	Avg. Time	Standard	Avg. Time	Standard
SO ₂	3 hrs	0.5 ppm	24 hr	20 ug/m ³	Annual Mean	80 ug/m ³
	1 hr	75 ppb	10 min	500 ug/m ³	24 hrs	120 ug/m ³
CO	8 hrs	9 ppm (11 mg/m ³)	-	-	8 hrs	5 mg/m ³
	1 hr	35 ppm (43 mg/m ³)			1 hr	10 mg/m ³
NO ₂	Annual Mean	100 ug/m ³ (53 ppb)	1 yr	40 ug/m ³	Annual Mean	40 ug/m ³
	1 hr	100 ppb	1 hr	200 ug/m ³	24 hrs	80 ug/m ³
O ₃	8 hrs	0.07ppm (148 ug/m ³)	8 hrs	100 ug/m ³	1 hr	130 ug/m ³
TSP	-	-	-	-	Annual Mean	360 ug/m ³
					24 hrs	500 ug/m ³

PM ₁₀	24 hrs	150 ug/m ³	1 yr	20 ug/m ³	Annual Mean	120 ug/m ³
			24 hr	50 ug/m ³	24 hrs	150 ug/m ³
PM _{2.5}	Annual Mean	15 ug/m ³	1 yr	10 ug/m ³	Annual Average	15 ug/m ³
	24 hrs	35 ug/m ³	24 hr	25 ug/m ³	24 hrs	35 ug/m ³
					1 hr	15 ug/m ³

*: The standards highlighted in green for each respective pollutant are the most stringent based on a comparison between local and international regulations and thus shall be applicable for the proposed project.

Table 2.6: Comparison of International and Local Noise Standards*

Category of Area/Zone	Limit in dB(A) Leq			
	NEQS		WHO/IFC	
	Day Time	Night Time	Day Time	Night Time
Residential area (A)	55	45	55	45
Commercial area (B)	65	55	70	70
Industrial area (C)	75	65	70	70
Silence zone (D)	50	45	55	45

*: The standards highlighted in green for each respective Area/Zone are the most stringent based on a comparison between local and international regulations and thus shall be applicable for the proposed project.

3. Description of the Project

3.1. General

85. This Chapter provides an overview of the project including the proposed Transmission line and Grid station, project components, design considerations, construction procedures, operation and maintenance activities.
86. The sub-project is located in the districts of D.I Khan in Khyber Pakhtunkhwa (KPK), Zhob in Baluchistan province along with FR DI Khan of Federal Administrative Tribal Area (FATA). The main objectives of the sub-project is to enhance the transmission capacity of NTDC system by addition of new 220 kV Transmission line conducting the DI Khan 220 KV substation to new 220 KV Zhob S/C to meet the growing power demand of QESCO.
87. The addition of new 220 kV Transmission line in NTDC system is a part of NTDC's overall power development program and is proposed to strengthen the transmission system. In the recent years, there was quantum jump in the power demand as a result of which NTDC systems were stressed and congested at various strategic locations. Thereby, the system was stretched beyond capacity and this caused overloading which resulted in even forced outages. This has necessitated that the transmission system be strengthened and expanded to fulfill the need for secure, safe and reliable power supply and to meet not only the existing requirements but also the future demand of the country for sustained economic growth.

3.2. Scope of Work

88. The scope of work consists of the following components:
 - I. New 220 kV Substation with 2x160MVA transformers at Zhob Substation
 - II. Extension of two line bays at 220 kV D.I Khan Substation
 - III. 220 kV D/C Transmission line from D.I. Khan to Zhob (220 km)

3.3. Sub-Project Alignment

89. The sub-project is on 'Turn-key' basis i.e. construction by a contractor/ developer and turn-over to NTDC in a ready-to-use condition which includes design, supply and installation. In this context, the proposed design provided by NTDC will be finalized by the contractor at the stage of implementation. The Survey & Investigation (S&I) wing of NTDC has marked the route alignment of transmission line on grand trunk sheet (G.T. Sheet). Thus, it is pointed out that although the proposed alignment/ route alignment of transmission line including design and right-of-way was provided by the concerned section of NTDC (i.e. Survey & Investigation), but still this will be finalized by the contractor/ developer. Once the detailed design work has been completed, NTDC will review these designs before contracts are finalized and modifications will be incorporated, if considered necessary. Certification to ADB that the detailed designs comply

with IEE (including EMP) recommendations will be required before contracts can be made effective.

90. The construction of 220 km connecting transmission line from 220 KV DI Khan substation to 220 kV Zhob substation, passes through 9 villages belonging to 5 villages in DI Khan district, one in FR DI Khan and one in Zhob district. There will be installation of 660 towers on lines, i.e. each tower will be erected at a distance of 335 m as reported by Survey & Investigation section of NTDC.

3.4. Width of RoW

91. In consultation with the Survey & Investigation section of NTDC and the E&SIC (PMU), NTDC, the width of RoW for T/L was taken to be 30 meters, i.e. 15 meters on either side from the center of transmission line and it was 225 m² (i.e. 15m x15m) in case of tower spotting.

3.5. Categorization of the Project

92. The transmission line route passes through agricultural land in the villages of Pusha, Muddy, Hassani, Kot Essakhel, Drabban, Derazanda and Manda Zai Kelley. There will be no major environmentally significant impact, except some forest tree removal and temporary disturbance to crops. The water bodies are Chishma Right Bank Canal, River Khora with its tributaries i.e Spinkai Ghasha , Kharmeri nala, Tangi Khwar, Mandi river, Khamistani river and Zhob river tributaries. There will be no major disturbance to environmental settings of the area, if routine environmental management procedures and engineering controls are implemented thoroughly.
93. Categorization is based on the most environmentally sensitive component and the Zhob Grid Station and Zhob – DI Khan Transmission line subproject is categorized as a Category “B” sub-project under ADB’s requirements, thus an IEE has been conducted.
94. The aspects of the project with potential for significant environmental impacts need to be assessed in detail and environmental assessment has therefore focused on significant impacts from the construction aspects as well as consultation with the public all along the proposed alignment of the transmission line and grid station. This report has also surveyed the transmission line corridor and immediate hinterland that may be affected by knock on effects from impacts such as waste disposal.

3.6. Need for the Project

95. The conditions of the power distribution system in Pakistan are inadequate to meet rapidly growing demand for electrical power. This situation limits national development and economic growth. Electricity demand is expected to grow by 7.80% per annum during next 10 years over the period 2009-19. The existing power distribution infrastructure has to be improved and upgraded to ensure a reliable power supply to increasing number of industrial, agricultural, commercial, and domestic consumers. The overall contribution of power infrastructure also

requires institutional arrangements and capacity that support strategic management of the sector, and planning and management of investments. Overall the proposed MFF facility has been designed to address both investment and institutional aspects in the electrical power sector.

96. As the result of this, enhancement in capacity of NTDC transmission system is required for power evacuation. The proposed project has therefore been prepared to meet the requirement which will also result in overall power efficiency and stability to deliver adequate & quality power to the consumers.

- Main objective of project is to enhance the transmission capacity of NTDC system by addition of new 220 kV T. Line to meet the growing power demand of DISCOs, particularly QESCO.
- This improvement in system will help to bridge the demand supply gap to eliminate the sever load shedding of the country.
- Improvement and enhancement in overall power system efficiency, reliability and power supply position in QESCO area, particularly in the vicinity of Zhob and Sherani districts of Baluchistan.
- Improvement in voltage profile of 132 kV Grid stations in QESCO area.

3.7. Design Aspects

3.7.1 Design Standards for Grid Station & Transmission Line

97. The layout plan of a substation which involves various installations of equipment, control room and ancillary facilities are standardized by NTDC. NTDC has developed design parameters for the planning and design of transmission systems in Pakistan. The design parameters are based on standard NTDC's existing specifications and practices for the existing as well as proposed Grid stations and transmission lines. The parameters considered for the system and human safety are described below in detail. The interconnection scheme for NTDC existing network **Figure 3.1**, NTDC planned network **Figure 3.2** and planned Electrical network QESCO **Figure 3.3** are shown below.

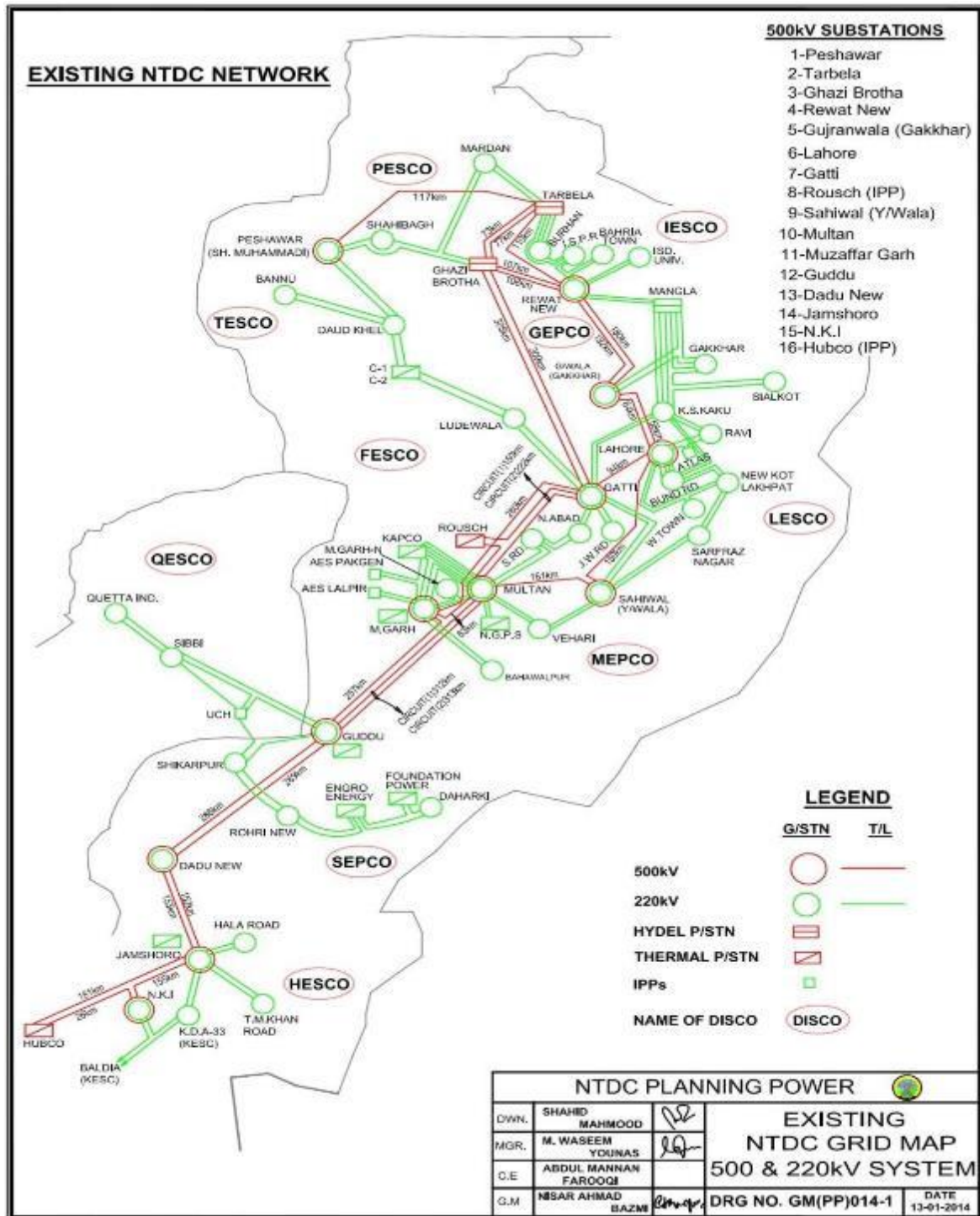


Figure 3.1: Interconnection Schemes of existing NTDC Network

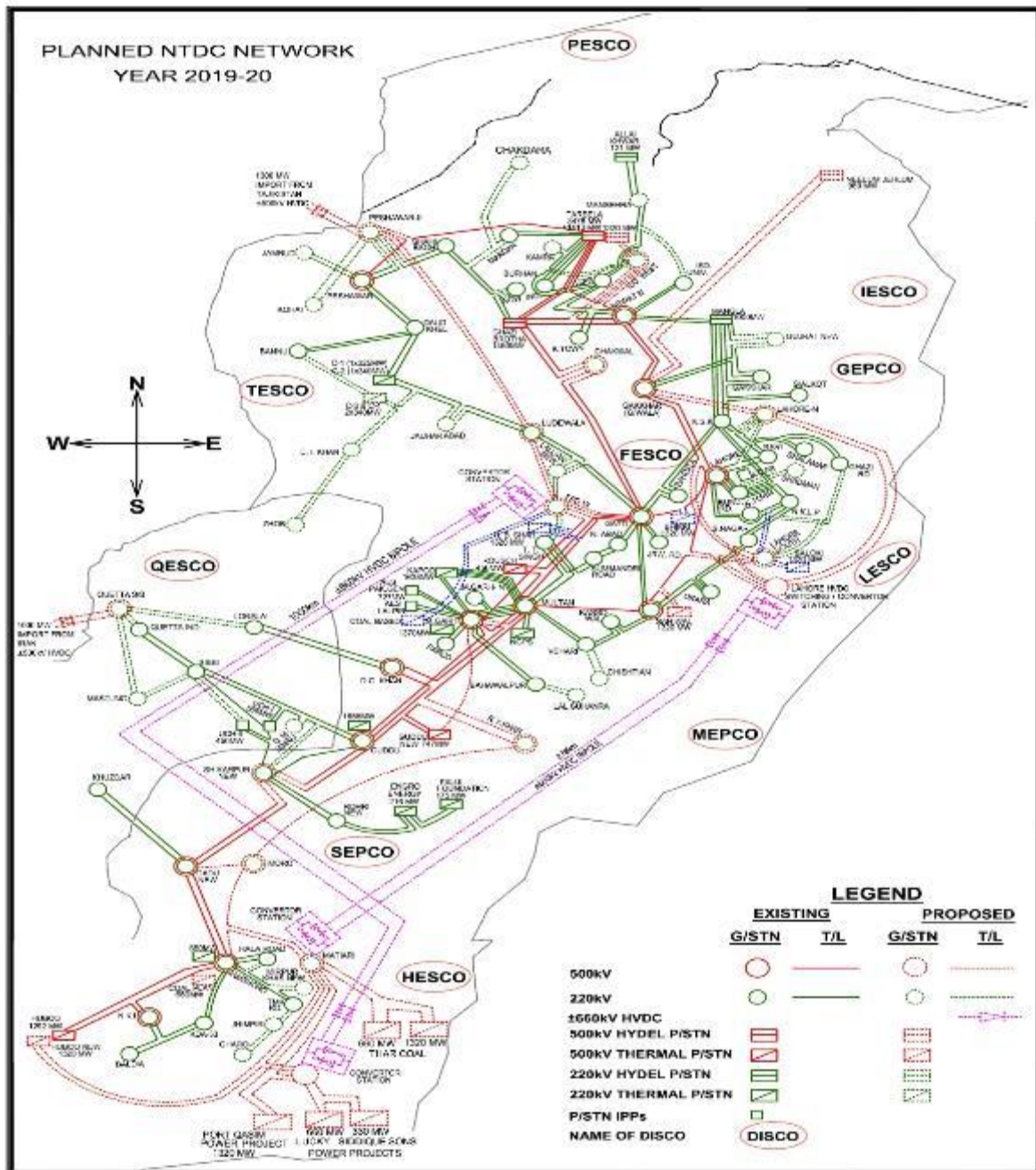


Figure 3.2: Planned NTDC Network

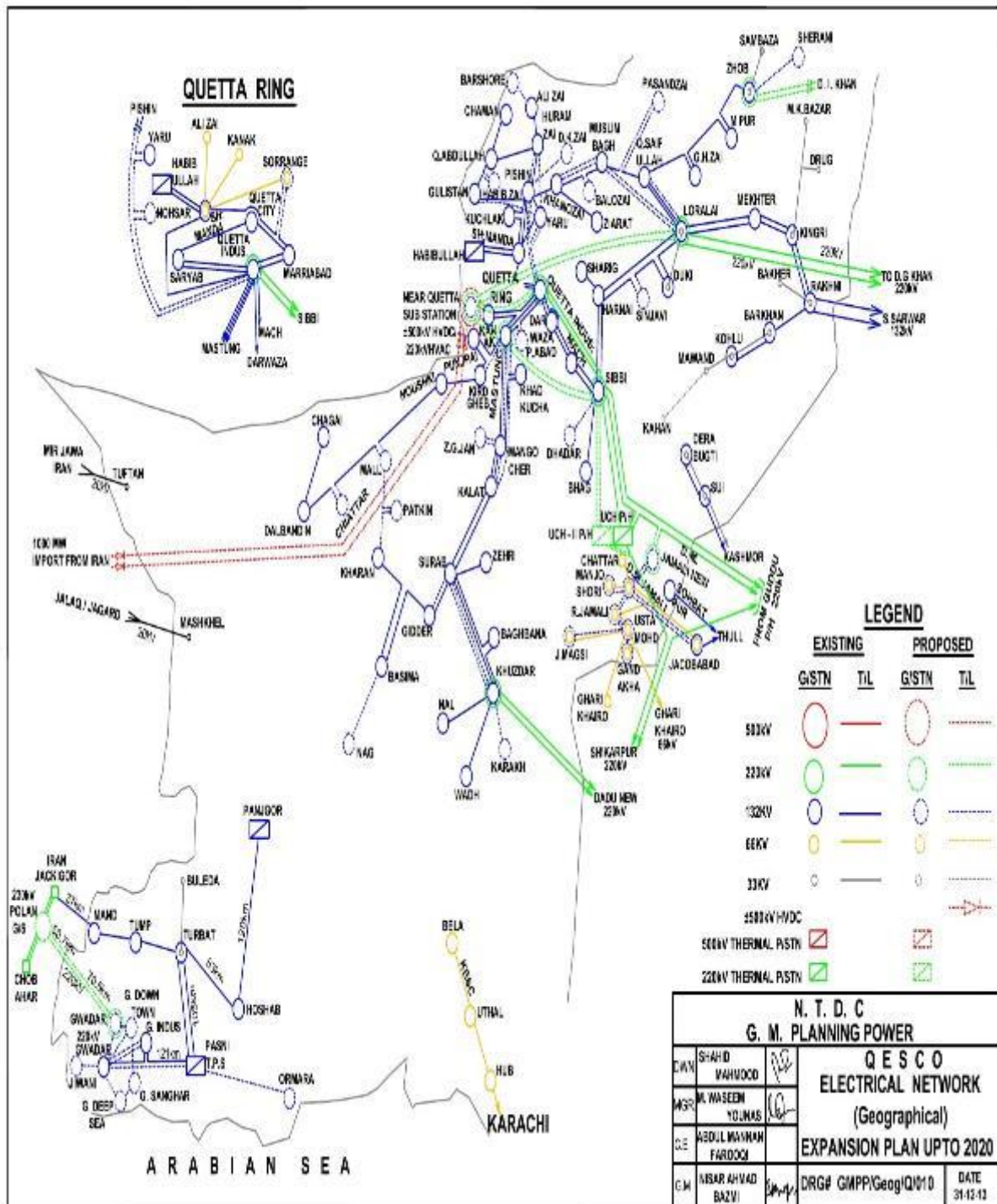


Figure 3.3: Planned QESCO Network

3.8. Climatic Consideration

98. Local climatic conditions, i.e. the temperature, wind velocity, thunder storm levels, relative humidity, etc., control the selection of materials to be used. The following climate parameters were considered in the design criteria.

Maximum Temperature	41.5°C
Minimum Temperature	2.1°C
Annual Mean temperature	29.6°C (maximum) to 14.6°C (minimum)
Maximum Rainfall	420 mm/month
Annual Relative Humidity	60.1%

3.9. Civil Works and Other Facilities

99. Civil works will need to be conducted to develop the foundations for installation of grid station equipment and erection of towers will be required for construction of 220 kV double circuit transmission line and extension at 220 kV D.I Khan. Necessary provision has been made in the cost estimates accordingly.

3.10. Equipment & Machinery

100. Detail of equipment and machinery required for construction of 220 kV substation at Zhob & 220 kV double circuit transmission line and extension at 220 kV D.I Khan substation is tabulated below.

Table 3.1 Equipment and machinery 220 kV Zhob Grid Station:

Sr. No.	Item	Unit	Qty.
	220 kV equipment		
1.	Circuit Breaker	Set	6
2.	Bus Isolator	Set	14
3.	Line Isolator	Set	2
4.	C.T	No.	24
5.	CVT	No.	10
6.	Lightning arrestor	No.	12
7.	Autotransformer 220/132 kV	No.	2
	132 kV equipment		

1.	Circuit Breaker	Set	10
2.	Bus Isolator	Set	20
3.	Line Isolator	Set	6
4.	C.T	No.	36
5.	PT	No.	12
6.	Lightning arrestor	No.	9
7.	Aux.T/F 132/11kV, 6.3 MVA	No.	1

Table 3.2 Equipment and machinery 220 kV Dera Ismail Khan – Zhob T/Line

Sr. No.	Item	Unit	Qty.
1.	TOWERS		
	Light angle (DA1)	No.	83
	Heavy angle (DD1)	No.	80
	Suspension (DS1)	No.	534
	Total		667
2.	Conductor (Rail)	kms	2772
4.	OPGW	kms	231
5.	INSULATORS		
	Suspension 100 kN	No.	52983
	Tension 100 kN	No.	79191
	Total		132174
6.	HARDWARE	Lot	1

Table 3.3 Equipment and machinery of Extension at 220 kV D.I Khan Grid Station

Sr. No.	Item	Unit	Qty.
	220 kV equipment		
1.	Circuit Breaker	Set	3
2.	Bus Isolator	Set	6
3.	Line Isolator	Set	2
4.	C.T	No.	12
5.	CVT	No.	6
6.	Lightning arrester	No.	6

3.11. Governance Issues of the Sector Relevant to the Project

101. There is no major governance issue in execution of the project.

3.12. Tower Structures for Transmission Line

102. All the towers shall be self-supporting type, lattice steel structures, fabricated from galvanized structural steel shapes. The steel employed will be in accordance with the latest edition of the standards. All towers will be equipped with danger plates, number plates and anti-climbing devices.

103. The normal foundations (inverted T shaped) as shown in **Figure 3.4** would be laid/ applied for the erection of new towers which would be placed on plain field. The tower height will be 5 to 10 meters higher and the foundation span will be changed 1 to 5 meters wider.

104. The choice of foundation is usually influenced by the type of terrain encountered and the underlying geotechnical conditions. The actual size and type of foundation to be installed will depend on the soil bearing capacity (actual sub-soil conditions).

105. All towers will be equipped with danger plates, number plates and anti-climbing devices. The other tower designs to be used are provided as **Figures 3.5 and 3.6** below.

3.13. Safety Parameters

106. For EHV lines, safety considerations are of two types. One is related with the safety of the system, while others are those that are related to the public. It is for this reason that NTDC (WAPDA) has

adopted a 50 m wide (25 m either side from the centerline) corridor as the ROW for the allied 500 kV transmission line and 30 m for 220 kV Transmission line in this project. The aspects are to be considered in this regard are as follows:

(a) System Safety

107. Conductor to Tower Clearance: For the safety of the system, it is imperative that any factor that may interrupt the power supply should be considered in the design. The clearance of the conductor from tower legs and trusses is of prime importance. Therefore, in the design, a minimum clearance of 1.55 m has been adopted under extreme wind conditions. This is based on regulations of GOP/WAPDA and minimum requirements of National Electric Safety Code (ANSI C2). With this clearance, there is 99% probability of withstanding switching surge of 3-sigma margin due to maximum over voltage under adverse climatic conditions.
108. Earthing of the System: Every tower is connected to an earthing system. This is to keep tower footings resistance at a level lower than 10 ohms. For this, two earth electrodes of copper-clad steel rods are sunk vertically into the ground to a minimum depth of 3 meters and the locations where the required resistance not achieved crow footing will be done.
109. Lightning Performance: The tower geometry, clearance and insulation of the system are designed to perform safely within the permitted lightning intensities. In this respect, consideration has been given to the tower footing resistance and Isokeraunic level of the area. The accepted level is one trip out/ 100 km/ year due to lightning.
110. Security Arrangements: Given the prevailing law and order and security position in the area around the proposed project area, necessary armed security staff is necessary. Reinforced security will be required at work base, labor camp, material depot, equipment yard and the locations where work is in progress.
111. Work Uniform and Health and Safety Equipment: Grid Station and allied transmission line construction is a special job and the labor working on such works requires special protective uniform and personal protection equipment to cope up with safety and health requirements. It will be ensured that the labor engaged in handling rough construction materials, mixing of concrete and handling transmission lines etc. shall have long boots, overall dresses, goggles, gloves and safety hats. They will invariably have their company identity cards worn around their necks with the help of a ribbon. As an overall Safety, Health and Environment measure, any one going into the construction area will also wear safety helmet and safety shoes. Special arrangements must be made for fire protection by way of providing appropriate type of fire extinguishers with firefighting training to concerned personnel.

(b) Public Safety

112. General Aspects: In view of public safety, NTDC has adopted a policy such that the existing orchards having fruit trees with a height of not exceeding 2.5 meters are allowed to remain under the lines. Similarly, open wells, including Persian wheels, are allowed to remain under the

transmission lines. However, tube wells and peter pumps are not permitted under the high voltage conductors. This is for the reason that piping and cranes used to refurbish such wells could come in contact with the lines.

113. No residential or other public buildings like factory, school, hospital, etc. are permitted within the corridor. However, farm buildings, which are not used for residential purposes are allowed to remain under the high voltage lines, provided a 7.0 m minimum clearance is maintained. The height of the towers can be increased to accommodate such buildings.
114. Conductor to Ground Clearance: The conductor to ground clearance is desirable to be worked out based on over voltage due to switching surge. In this consideration, safe clearance is required to be provided for moving objects under the line with a height of 4.5 m, withstanding switching surge of 3-sigma margin with 99.7% probability under adverse atmospheric conditions. This should keep the maximum voltage gradient at ground level and maximum current induced in a person less than the internationally allowable values. As such, the total conductor to ground clearance shall in no way be less than 7.0 meters. This is in accordance with the regulations of Government of Pakistan (GOP) and NTDC practice.

3.14. Tower Erection and scale of the project

115. Tower erection is carried out on the concreted pile pad locations with the help of derrick poles or cranes. The required working area for this activity is about 500 m² for each tower. The tower is erected in panels. The panels are assembled on the ground, lifted in parts with the help of derrick poles/crane and then joined together with nuts and bolts, which are tightened at the specified torque.
116. In aligning the high-voltage transmission line the design aims to avoid cultivated fields and pass through the area as thinly populated as possible. As such, the accessibility will not be a problem. There are tracks and katcha ways and the contractor may have to develop a few tracks for transporting the materials. This should result in very little, if any, damage to the vegetation or disruption of the farmland in the vicinity of the route of transmission line. The TL route is easily accessible mostly through metalled road or by kacha tracks or village roads. Almost all the village tracks are linked to the metalled roads and are thus accessible to vehicles. The contractor is unlikely to need to transport the materials manually. In any event, care will be taken that the disruption to the vegetation is kept to a minimum.
117. The environmental impacts are likely to be localized near the supporting tower construction at most places and impacts are reviewed in the environmental impact section of the report. The impacts will need to be reviewed and amended if necessary if the locations change and when the detailed designs are available.
118. The whole project tract is flat and no considerable elevation difference exists except a small depression is present at some locations.

3.15. Analysis of Alternatives

119. The sub-project of Tranche-II of MFF will contribute to the improvement of the overall performance of the power transmission sector, improving transmission efficiency, broadly widening access to power to drive economic opportunities. The beneficiaries of the sub-project will be people, companies, and government and non-government agencies in Pakistan that use power transmission services. Power users will benefit in terms of secure power and improved power safety and potentially increased productivity.

3.16. 'Do Nothing' Scenario

120. Based on the available information, the predictions have indicated that without the tranche-II power transmission sub-projects, the supply will not be reliable. This sub-project is a part of an overall strategic improvement to the system.
121. In the absence of the sub-project, the potential for interruptions to power supply will increase and socio-economic development of the province could be affected in the short to medium term. In an un-enhanced state, the wear and tear on existing facilities will rise. In the short term, the power supply would improve and more reliable access to secure power would be available.

3.17. Alternative Construction Methods

122. The feasibility and constructability of the transmission line towers is well established locally and installation of equipment is well practiced in the international context (even if some types of equipment are new to Pakistan). The process basically includes the transportation of equipment to site and the assembly of pre-fabricated units' in-situ. Thus, the impacts from construction activities are very manageable from the environmental viewpoint.

3.18. Alternative Geometry

123. The design and route of transmission line is as short as it can be and avoids the local villages by erecting angle towers. The settlements have been avoided by passing the line through cultivated and semi forested land. Some further detailed surveys may be carried out for the detailed design to determine the exact construction methods and locations but no land acquisition is envisaged to be involved in this sub-project from private people.
124. The present assumption is that the transmission line will be completed as planned on the defined alignment and site. The detailed design and surveys are yet to be carried out.

3.19. Proposed Schedule for Implementation

125. The Project Proponent (NTDC) plans to have the tranche-II completed within 2 to 3 years, after completing the necessary arrangements, which shall be completed on fast track. There will not be any significant land acquisition or compensation process except for the crop compensation of the transmission line towers. Designs, power transmission arrangements, access, review of environmental management and construction processes will need to be completed in about three

months. When the detailed designs are completed, tendering and award of contract will take place over about three to six months. The construction period will follow and best estimates indicate about eighteen months to two years.

Figure 3.4: Inverted 'T' Type Tower Foundation

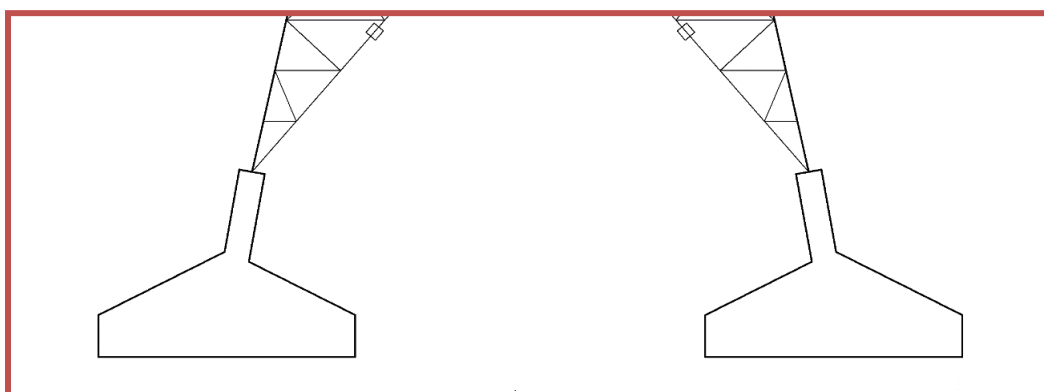


Figure 3.5: Proposed Elevation of Strain Tower

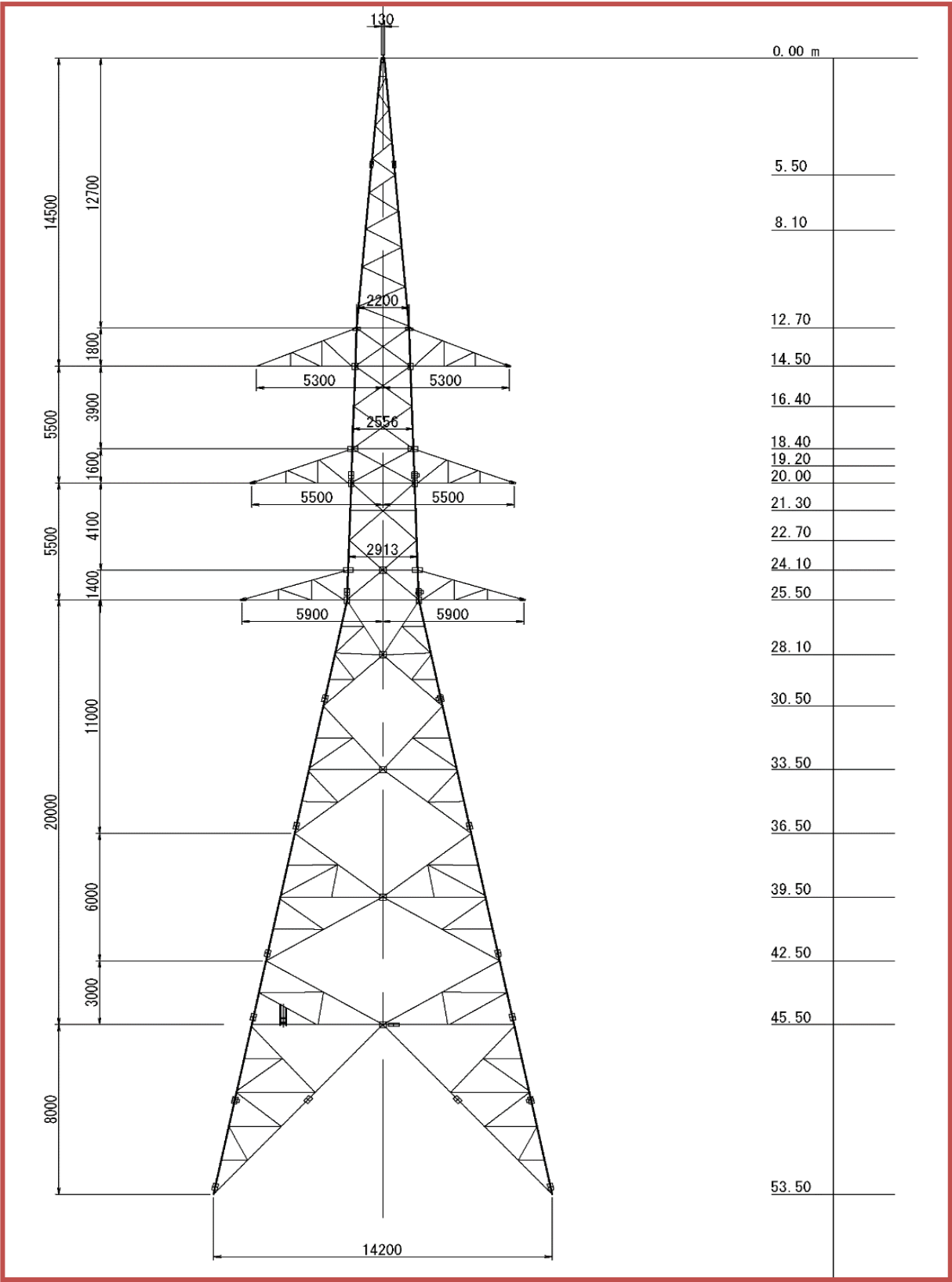
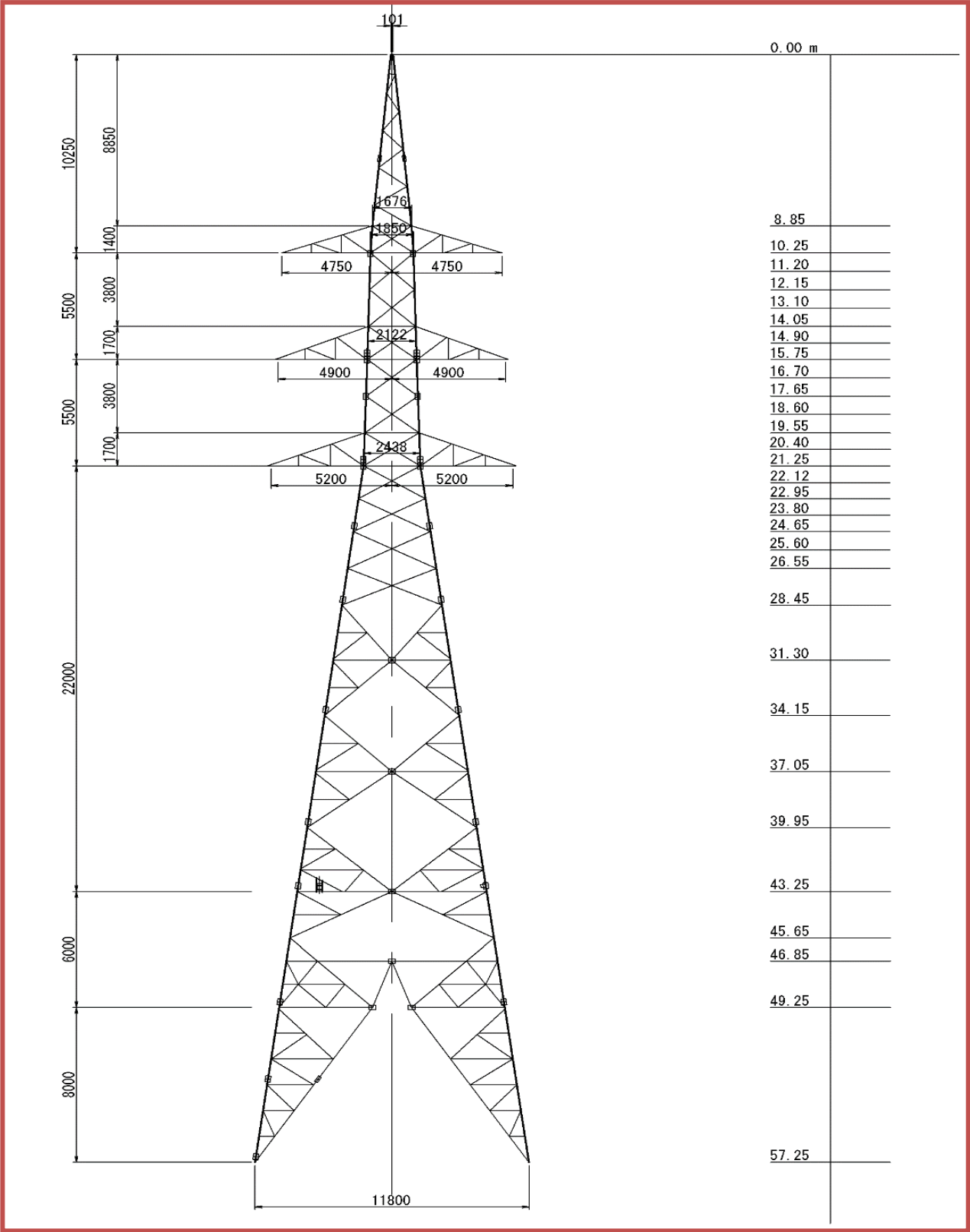


Figure 3.6: Proposed Elevation of Suspension Tower



4. Description of Environmental and Social Baseline Conditions

126. The 220 kV double circuit single conductor transmission line from Dera Ismail Khan to Zhob. (220 km) and the 220 kV Grid station to be constructed at Zhob is located in District D I Khan of Khyber Pakhtunkhwa (KPK) province, F R D.I Khan of Federal Tribal area and Zhob district of Baluchistan. The Grid station sites to be linked coordinates are:
- | | | |
|-----------------------|------------|-------------|
| Zhob Grid Station: | E 54 5 000 | N 34 67 236 |
| D I Khan Grid Station | E 67 2589 | N 35 45 700 |
127. The transmission line route passes mostly through agricultural land of D I Khan district and rocky/barren land of FR D.I Khan areas. The villages on the way are Pusha, Muddy (Kolachi Road), Hassani, kot Essakhel, Darraban Kalan, Derazanda and Mandi Zai Kelay. It has been learnt by surveys and Investigation (S&I) department of NTDC that the route of the transmission line is selected in a way that no structure requires relocation or demolishing. Only tree removal and crop damages are expected to occur during the construction phase of project. The transmission line will mostly cross rocky/barren areas except some limited part in the agricultural land. Moreover, by using angled towers and by locating the line, as per alignment provided by NTDC, on the agriculture cultivated fields, there are no locations where the line is immediately adjacent to any residential or school property (sensitive receptor).
128. Erection of each tower may require working room up to 500 m². However, there is plenty of room in the agriculture fields. Provisions have been made in the LARP to compensate damage to trees and crops. Access to the transmission line will be from the tracks and katcha roads adjacent to the fields. There should be no need to disturb any existing roads and water courses, based on the current alignment subject to reconfirmation after detailed designs are complete.
129. As already depicted in the report, the project corridor lies within the jurisdiction of three provinces i.e. KP, FATA and Baluchistan. For the purpose of baseline conditions and identification of potential social impacts of the project, the following definitions have been taken into consideration:
130. "ROW refers to a limit of 30 meters wide strip, i.e. 15 m from either side of the center line of transmission line along the project route and has been considered for identifying the potential social impacts of the proposed project"
131. This chapter gives an overview of the environmental and social baseline information of project area, with special reference to impacts on Project Corridor. The information has been compiled from secondary and primary resources. Major environmental components are:
- Physical Environment
 - Biological Environment
 - Socioeconomic Environment

4.1. Physical Environment

132. Baseline studies on the physical parameters including land resources, topography, climate, geology, seismicity, soils, water resources etc. are indicative of the following information.

4.1.1 Topography, Geography, Geology, and Soils

133. At the start of the project area lies in the fertile alluvial plains of Dera Ismail Khan, while rest of the area FR D.I Khan and Zhob are almost rugged rocky/barren areas. It is composed of the Sulaiman mountains, which are of considerable height. It also has comparatively lower hills on the entire eastern side. The line passes at eastern direction upon the lower hills. A number of peaks in this range are over 2,750 meters high. Takht-e-Sulaiman is the highest point of the Sulaiman Range, with a height of 3,441 meters. This uphill's western range is covered by coniferous forest. Average height of the hills along the eastern border is around 700 meters. Important streams in this part are; Tangi khwar and Rangharar Khwar. They are the main tributaries of the Khora River. These rock outcrops are medium to lower height and can be used as range land.

134. The greater part of the area consists of extensive series of calcareous sandstones and shale.

135. With the exception of these rocks, the area is mostly alluvial plain. The surface soils are grey to brown in color and medium textured i.e. silty clay/ clay loamy or sandy loam at the site, at all the locations and generally continues up to depth of 3-10 feet. This sub stratum contains fine sand or rocky material. Topographically the area is mixed nature i.e plain, undulating and hilly/rocky.

4.1.2 Seismology

136. Geological survey of Pakistan has divided Pakistan into five seismic zones. The project area, a part of Zhob district lies in seismic Zone 3 (slightly high hazard), while the rest of the falls in FR D.I Khan and DI Khan district are in seismic zone 2B (moderate hazard) corresponding to peak ground acceleration (PGA) values of 0.0.24 g to 0.32 g and 0.16g to 0.24g respectively. Figure 4.1 shows seismic map of the project location.

4.1.3 Climate, Temperature and Rainfall

137. The climate of the Zhob district is dry during summer and cold in winter. June is the hottest month with mean maximum and minimum temperatures of about 37°C and 23°C respectively. January is the coldest month with mean maximum and minimum temperatures are 13°C and -10 °C respectively. The average annual rainfall is about 285mm.

138. The climate of the FR D.I Khan and D I Khan district is dry and hot. In general, the areas are hottest with maximum temperature ranges between 46°C and 50°C. Temperatures in summer are quite oppressively hot, whilst in winter; however, this region is both warmer and generally drier than the rest of KP. Nights, however, can still be quite cold during the winter. The project area experiences little and very erratic monsoonal rains, averaging around 114.30 mm in July and August and almost nothing in June or September; whereas the average annual rainfall varies from 295 mm to 1048 mm.

4.1.4 **Groundwater Resources**

139. Irrigation is largely dependent on the canals only in the D.I Khan district, while rest of the project area is mostly barren or some dry farming. Tube wells have also been sunk in the areas where water is fit for irrigation. The chemical quality of ground water in the district varies area wise and depth wise. Irrigation supplies are perennial in irrigated areas and tube wells have been installed to make up the deficiencies. The strata near the transmission line route are mixed nature that contains water bearing and alluvial deposits, rocky and range lands.
140. The water table is near the surface at 30 to 45 feet in D.I Khan district but the remaining areas the water table is deep. The water table is not seasonal and dug wells do not generally run dry, because the ground water aquifer is recharged by rivers and canals. The local population is generally reliant on installed hand pumps, electric motors and supply from tube wells. Generally, the ground water quality parameters i.e. chemical and biological are within the permissible limits.

4.1.5 **Surface Water Resources**

141. River Indus and related Chashma Right Bank Canal are the major surface water sources of project area in D.I Khan district while the water bodies in rest of the project area are River Khora with its tributaries i.e. Spinkai Ghasha, Kharmeri Nala, Tangi Khwar, Mandi river, Khamistani river and Zhob river tributaries.. Most of these water bodies are perennial and flows throughout the year. It also causes floods in the monsoon season, when it receives excessive rainfall water from upstream.

4.1.6 **Ambient Air Quality**

142. Air quality in the project area is fairly clean. The other major source of air pollution is vehicular emissions on the road, dust arising from construction and other ground or soil disturbance, during dry weather, and from movement of vehicles on poorly surfaced or katcha access roads. There are no Industries and/or commercial areas in the project corridor. Domestic sources of air pollution, such as emissions from wood and kerosene burning stoves as well as small diesel standby generators in some households, are a minor source of air pollution.

4.1.7 **Noise**

143. Apart from the noise generated from vehicles moving on the main road, no major source of noise is present in the project vicinity. There are also the occasional calls to prayer from loud speakers in the local mosques but there are no significant disturbances to the quiet rural setting.

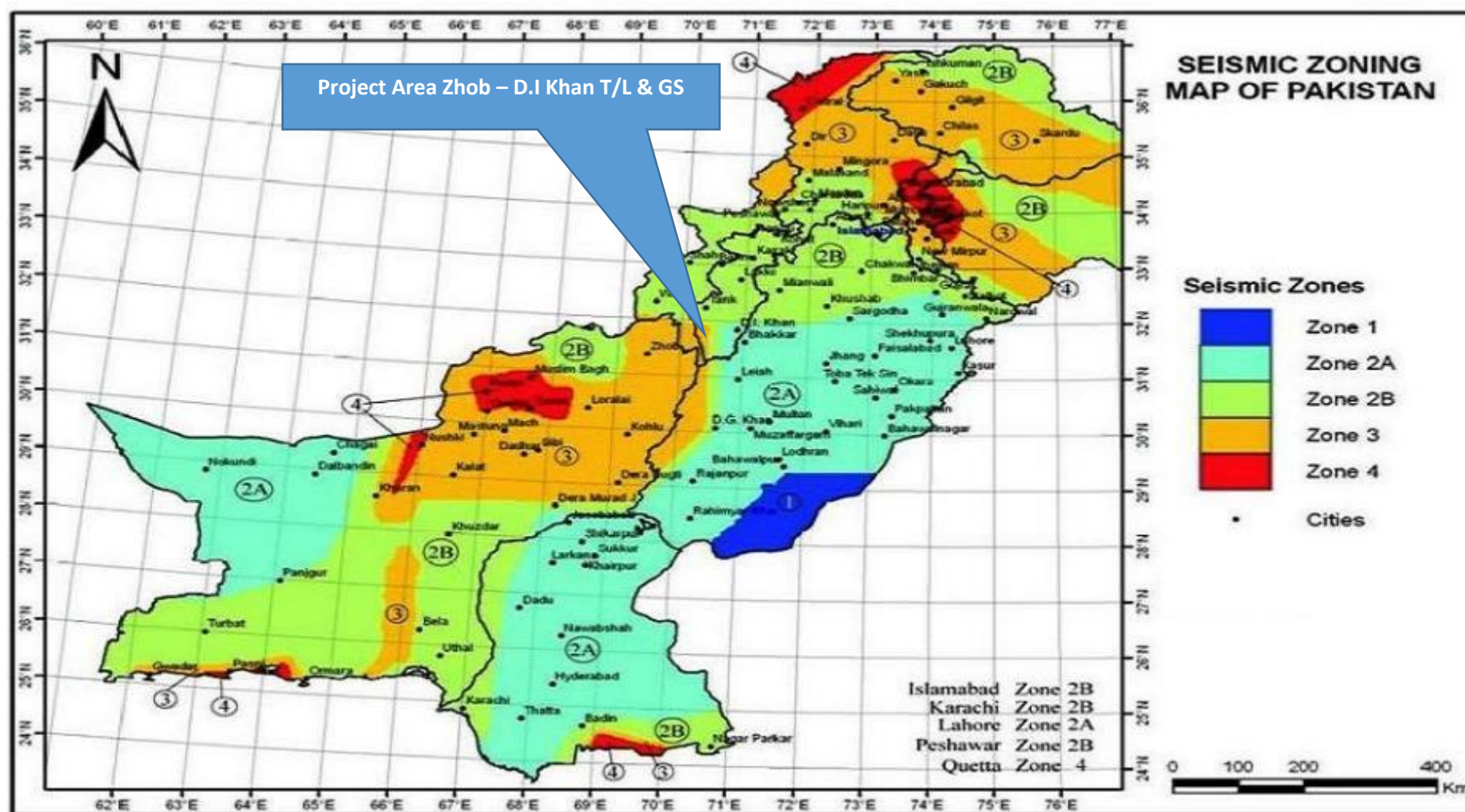


Figure 4.1: Seismic Zoning Map of Pakistan and Project Area

4.2. Biological Environment

4.2.1 Flora

144. Flora of the sub-project area has been greatly modified by human agency of the old open forests of small trees and shrubs. There remain only a few Rakhs or portions of forests which are kept as grazing grounds for cattle etc. Amongst trees, the most important are Kikar (*Acacia Arabica*) Shisham or Tahli (*Delbergiasissoo*), Beri (*Zizyphus jujube*), Toot (*Morus alba*), Sharin (*Albizzialebbek*), Dherek (*Meliaazeharach*), Phulai(*Acacia modesta*), Pipal (*Ficusreligiosa*) and Bohr (*Ficusbengalansis*) are planted for shade. The growth in Rakhs is composed mainly of three kind of trees, Jand (*Prosopisspicigera*), Karir (*Capparisaphylla*) and Wan (*Salvadoraoleoides*). Occasionally, Rero (*Acacia ieucophhloea*) and Farash (*Tamarixarticulata*) are also found. Pilchhi (*Tamarixdioica*) is found on moist sandy soil along the river and is used for wicker work, basket making etc. The habitat is mostly modified due to human interventions in the area for many decades.
145. There is wild growth of Mesquite bushes and some Eucalyptus trees in the areas along the canals, roads and barren land but there is no natural forest cover in the area. The fruit trees in the project area also rare and include citrus fruits, mango, guava and date palm.

4.2.2 Fauna

146. There is no wildlife except jackals, dogs and snakes etc. Common species of birds found in the project area are sparrows, crows, pigeon, dove, tiliar (starling), lalmena, parrot, quail, pintail, and humming bird etc. Chishma Right Bank Canal and perennial rivers are the sources of freshwater fishes. The most commonly seen animals in the project area are hog deer, ravine deer, black buck and blue bull. Fox, jackals, hares, wild boars, porcupines, mongoose, arks, owls and hawks are also found which are critical habitat triggers in the project area, as listed in the IBAT report.

4.2.3 Protected Areas/ National Sanctuaries

147. In Pakistan, there are several areas of land devoted to the preservation of biodiversity through the dedication of national parks and wildlife sanctuaries. There is no protected area or national sanctuary near the area of works and sub-project area.

4.2.4 Wetlands and Aquatic Biology

148. River Khora with its tributaries i.e Spinkai Ghasha , Kharmeri nala, Tangi Khwar, Mandi river, Khamistani river and Zhob river. Tributaries are wetlands in the project area, which will require special measures during construction of towers.

4.2.5 Game Reserves & Wildlife Sanctuaries

149. No game reserve or wildlife sanctuaries are found in the project corridor.

4.3. Socioeconomic Environment

150. This Section of the report provides the information on socio-economic environment existing in and around the Study area including methodology, administrative setup, demographic characteristics, educational and institutional facilities, transportation, water supply, income sources, common diseases, religious/archeological and historical sites (if any) existing in the area. The socio-economic survey was carried out at and nearby the location of sub project. The questionnaire used for socioeconomic and village profile survey has been attached in **Annex II**.

4.3.1 Political and Administrative Setup

151. The Project area falls in jurisdiction of D. I. Khan district of Khyber Pakhtunkhwa province, FR D.I Khan in FATA and Zhob district in Baluchistan province. As per provincial local Government Ordinances, 2001, Union Council is the lowest tier of the local government system. It is constituted of selected council normally representing five to ten villages depending upon population, while four to five union councils form the next higher tier of governance, viz., Tehsil Council.
152. Tehsils are sub-units of a district, which is the highest tier of local government system and deals with the administrative and revenue matters. District is normally constituted of three to five tehsils, and is governed by District Council. In the existing local government system of the project area, the union councils consist of members directly elected through open competition, who also form the Electoral College for the selection of members of the next higher tiers. In this way, it has also been ensured that the councils have a sizeable representation from the vulnerable groups particularly the labor and female members of communities.
153. District D.I.Khan is spread over an area of 7,326 square kilometers and comprises of five tehsils Dera Ismail Khan, Kulachi, Darabin, Paroa, Paharpur which are sub divided into 47 Union councils. The project area falls in D.I Khan and Kulachi tehsils. The Frontier Region Dera Ismail Khan (often abbreviated as F.R. D.I. Khan) is a small administrative unit in the Federally Administered Tribal Areas (FATA) of Pakistan. The region is named after Dera Ismail Khan District which lies to the east and also borders South Waziristan Agency to the north, Dera Ghazi Khan and Musa Khel to the south and Zhob to the west. It is administered by the Deputy Commissioner (DC) of Dera Ismail Khan District. The overall administration of the Frontier Regions is carried out by the FATA Secretariat based in Peshawar, the capital of the Khyber Pakhtunkhwa (KPK) province. The main village of the frontier region is Darazinda, which is also in the border of South Waziristan. Zhob is spread over 20,297 square kilometers and comprises three tehsils and five sub tehsils. The tehsils are Lower Zhob, Sherani and Kakar Kharasan.

4.3.2 Demographic Analysis

154. According to the 1998 District Census Report, total population of D.I Khan, FR D.I Khan and Zhob Districts are 853,000, 38,990, and 275,000 persons respectively. Population density of D.I Khan is 116.4 persons per sq. kilometer, FR D.I Khan 19.4 and Zhob 13.6 persons per sq. kilometer. The population of all the districts is predominantly Muslims i.e. > 99 percent. The next higher percentage is of Christians 0.5 percent. While other minorities like Christians, Ahmadis, Schedule Castes etc. are very small in number.

a) Gender Ratio

155. The number of males for every 100 females was 111.1 in D.I. Khan , 110.8 in FR D.I Khan and 119.5 Zhob District in 1998.

b) Ethnicity/Tribes and Languages

156. D.I. Khan has in addition to the Pathan tribes of Koh-e-Sukh, a large mixed population of Baloch and Jatt tribes. Other major castes are Ali zais, Sado zais, Khwajak zais, Khakwanis and Barak zais. The predominant language of D.I. Khan is Saraiki spoken by 72.47% of the population and 22.02% of the people speak Pusto. The remaining 4.28% of the people speak Balochi, Urdu and Sindhi. In FR D.I Khan the major Pashtun tribes are Wazir, Battani, Gandapur and Sherani. All the population speaks Pushto language in FR D.I Khan and Zhob districts, while the major castes of Zhob dDistrict are Mandokhel, Kakar, Sherani, Harpals, Babers, Lowoons, Khosty and Syeds.

c) Literacy Level

157. In district D.I. Khan male literacy ratio is 43.19%, which is significantly higher than female literacy ratio at 17.86% in 1998 census. Literacy ratio of FR D.I Khan was 17.42 % in 1998, where literacy ratio for males is 29.5% as against 3.0% for females. The literacy ratio in Zhob district was 16.78, where literacy ratio for male is 24.53 against 6.9 for females.

4.3.3 Employment

158. The major proportion of total population in both districts is self-employed; others are private employees and government employees. The difference in proportions of employed population is significant between the genders and urban and rural residences. The major occupation in project area is agricultural farming, livestock raring, small businesses and service in public and private sectors.
159. The main occupation of women in rural areas including project area is house-keeping which includes attending to the cattle, extracting butter and ghee from milk, weaving and sewing of family clothes. In addition, they generally help their men-folk on farms with the lighter duties like transplanting of seedlings, threshing and winnowing of grains and sometimes they also help in harvesting. In city, women are house-wives or work as professionals; such as doctors, nurses, teachers, private jobs etc.

4.3.4 Income Sources and Expenditure

a) Agriculture and Livestock

160. The agriculture is by far the main economic activity in the in the project area. The main crops during Rabi are wheat, gram, rape, mustard, barley and oil seeds. In Kharif, cotton, jawar, sugarcane, bajra, maize and rice are grown. In addition, there are subsidiary crops known as Zaid Rabi like Kharbooz, tobacco and potatoes and ZaidKharif like potatoes and chilies. The main fruits grown are mangoes, date, Malta, orange, water and musk melon, guava, citrus, falsa, jaman and pomegranate. In the beginning of the cultivation era, the inhabitants used to eat Pilu and Bair, the only wild fruits that grows intermittently. With the introduction of canal irrigation Date palm and

other fruits are being grown on commercial basis. The vegetables are grown in abundance as the water and soils are suitable for cultivation. Potato, carrot, lady finger, chilies, onion and cauliflowers are grown. Bitter gourd, turmeric and garlic are grown to meet the public demand. Other vegetables i.e. Radish, Tinda (apple gourd), Bringal is also grown.

161. Livestock breeding is one of the main pursuits and means of livelihood of rural and urban population of the whole project tract. The area is very famous for livestock production. The sheep, goats, cows and camels are common livestock animals and serve as an important source of income.

b) Industry

162. In the project area, except D I Khan, there is no any industry. In D I Khan, with one or two exceptions, industrial activity is restricted primarily to small, owner-financed units, operating without government oversight. These include stone processing, textile weaving, and furniture manufacture. In DI Khan, the total numbers of industrial units are 73 out of which 33 units are running while 40 are closed.

4.4. Economic Infrastructure

a) Roads and Railway Structure

163. The entire project area is well connected with various cities in Pakistan. The city D.I. Khan has its own airport, which connects the southern districts of Khyber-Pakhtunkhwa with other parts of the country. D.I. Khan Airport links the city with various Pakistani cities. The project site is accessible from both sides; one from Indus Highway (N-55) and other is with Quetta and other cities of Baluchistan.. There is a network of metalled and un-metalled roads in the area.
164. There are no airports or airfields located in a distance of over 50 kilometers from the transmission line corridor. Thus, there is no risk to any aircrafts from the proposed transmission lines.

b) Electricity

165. The electricity supply is available to almost all the villages and settlements along the line route. QESCO in Zhob region, TESCO in FR D.I Khan and PESCO in D.I. Khan region are responsible for electricity distribution in project area.

c) Telecommunication

166. All the villages along the project corridor are connected with the Pakistan telecommunication network. Mobile coverage exists in the project area which enables people to use mobile phones for communication.

d) Post Offices and Banks

167. Postal, money order and bank facilities exist throughout the vicinity of the project area.

4.5. Social Infrastructure

a) Water Supply

168. In project area, the public water supply is available and people are dependent on local water supply system to meet the drinking as well as household use requirements.

b) Health

169. The Government hospital of Dera Ismail Khan was established during the British regime. There are also many other hospitals and basic health units in the district which provide health facilities to the public. District headquarter Hospital Zhob and Hospital Drazanda in FATA area are major hospitals in the project area.

4.6. Religious, Archaeological and Historical Sites

170. There are no officially protected heritage sites or historic, religious or archaeologically important sites located in the sub-project work areas. There are no major historic or archaeological features of note but there are a few places of worship within about 500 meters of the works. It is envisaged that there will be no impact on such places.

4.7. Women Participation in Different Activities

171. Participation rate of women in various socio-economic activities in the project area is generally of moderate nature. Women are mostly employed in the fields and play a vital role in sowing and harvesting of the crops.

4.8. Village Profiles

172. Various villages located along the project corridor were visited to establish village profile. The village wise abstract is elaborated as below.

i) Pusha (G/S Site)

173. The population of this area constitutes of Wazir, Mehsud, Bango and Aka Khel tribes. Languages spoken here are Pushto, Saraiki and Urdu. There are no educational facilities. A Mosque is situated in the area. Public transport is available for local and inter-city travel. Civic facilities in this village include electricity, grocery shops and road-side restaurants.

ii) Muddy (Kolachi Road)

174. The population of this village is around 4000 people with 450 houses and main caste is Gandapur. Languages spoken here are Pushto, Saraiki and Urdu. Educational facilities include 01 Govt. Girls Middle School & 01 Govt. Boys High School and 03 Mosques as institutional facility. Public transport is available for local and inter-city travel. Civic facilities in this village include electricity and grocery shops. There is 01 graveyard in the village vicinity.

iii) Hassani (Kolachi Road)

175. The population of this village is around 2,500 people with 230 houses and main caste is Gandapur. Languages spoken here are Saraiki, Pushto and Urdu. Educational facilities include 01 Govt. Boys Primary School & 01 Govt. Girls Primary School and a mosque. Public transport is available for local travel. Civic facilities in this village include electricity, a few grocery shops and a public water supply. There is 01 graveyard in the village.

iv) Kot Essa Khel (D.I Khan)

176. The population of this village is around 2,000 people with 250 houses and main castes are Mian Khel Baludi and Kumbhar. Languages spoken here are Saraiki and Urdu. Educational facilities include 01 Govt. Girls Middle School & 01 Govt. Boys Primary School. Public transport is available for local and inter-city travel. Civic facilities in this village include a Basic Health Unit, electricity, a few grocery shops, 01 Medical Store and a public water supply. There is 01 graveyard in the village vicinity.

v) Draban Kalan (D.I Khan)

177. The population of this village is around 5,000 people with 550 houses and main castes are Mian Khel and Sherani. Languages spoken here are Pushto, Saraiki and Urdu. Educational facilities include 01 Govt. Girls Primary School, 01 Govt. Boys Primary School and 03 Mosques as institutional facility. Civic facilities in this village include a Basic Health Unit, electricity, telephone and a grocery shops and restaurants. There is 02 graveyard for the village.

vi) Darazinda (F.R D.I Khan)

178. The main caste of this village is Sherani. Languages spoken here are Pushto. Educational facilities include 01 Govt. Girls Primary School, 01 Govt. Boys Primary School, 01 Govt. Girls College and a Madrassah and a Mosque. Public transport is rarely available for local and inter-city travel. A Basic Health Unit and electricity are present. There is 01 graveyard in vicinity.

vii) Manday Zai Killi (Zhob)

179. The population of this village is around 1500 people with 250 houses and main caste is MAndo Khel. Languages spoken here are Pushto Approximate area of this village is 1 km². Educational facilities include 01 Govt. Boys High School and 01 Govt. Girls Primary School. There is 01 Mosque. Public transport is available for inter-city travel. Civic facilities in this village include electricity and a few grocery shops. There is also a Basic Health Unit for the village. There is 01 graveyard in the village vicinity.

5. Assessment of Environmental Impacts and Mitigation Measures

5.1. Subproject Location

5.1.1 Impact Assessment and Mitigation

180. This MFF Tranche - II sub-project will involve the construction of 220 KV Zhob Grid Station along with extension of 220 kV D.I Khan Grid Station and new Transmission Line (220 km).
181. The location and scale of the works are very important in predicting the environmental impacts. Therefore, it is essential that a proper analysis is carried out during the subproject planning period. This process of impact prediction is the core of the IEE process and it is critical that the recommendations and mitigation measures are carried out according to, and with reference to the conditions on the ground in the affected areas in the spirit of the environmental assessments process.
182. In this section the potential environmental impacts are reviewed. Where impacts are significant enough to exceed accepted environmental standards, mitigation is proposed in order to reduce residual impact to acceptable levels. In this regard, the impact prediction plays a vital role as these predictions are used for developing mitigation measures and any alternative options, if appropriate. When the detailed designs are completed, the impacts and mitigation measures will need to be further reviewed to take account of how the contracts are set up and in the light of any fine tuning of the subproject proposals.
183. The environmental management plan has been prepared based on the assessment and shall be reviewed in due course at subproject inception and through construction in order to provide a feedback on any significant unpredicted impacts. It is based on the analysis of impacts, primarily to document key environmental issues likely to arise from subproject implementation, to prescribe mitigation measures to be integrated in the subproject design, to design monitoring and evaluation schedules to be implemented during subproject construction and operation, and to estimate costs required for implementing subproject mitigation measures. The EMP must be reviewed in the subproject inception by the subproject management and approved before any construction activity is initiated, to take account of any subsequent changes and fine tuning of the proposals.

5.2. General Approach to Mitigation

184. Based on professional experience on heavy transmission line and grid station projects, contractors have put emphasis on the financial compensation for nuisances. This may be acceptable for some social impacts where evacuation is necessary or where structures have been accidentally damaged, however, it is not best international practice to accept payment for environmental impacts. An approach whereby the subproject contractor pays money for nuisances rather than control impacts at source will not be acceptable. This practice should not

be allowed and financial compensation shall not be allowed as mitigation for environmental impacts or environmental nuisance.

185. During the preparation for the subproject construction phase the future contractors must be notified and prepared to co-operate with the executing and implementing agencies, subproject management, construction supervising consultants and local population in the mitigation of impacts. Furthermore, the contractor must be primed through bidding stages and the contract documentation to implement the EMP in full and be ready to engage or train staff in the management of environmental issues and to audit the effectiveness and review the mitigation measures as the subproject proceeds. The effective implementation of the EMP will be audited as part of the loan conditions and the executing agency (NTDC) must be prepared for this. In this regard, the NTDC must fulfill the requirements of the law and guidance prepared by Pak-EPA on the environmental aspects of power subprojects and the recommendations already made for subproject in this IEE and under Pakistan's PEPA 1997 and KPK and Balochistan Environmental Acts.
186. The location of the residences, mosques, schools, hospitals and civic, cultural and other heritage sites has been reviewed. A few residences at the start of line in D I Khan district close enough to the subproject on which there could be some potential impacts in the construction stage from disturbance and significant noise and dust. The line route was selected in way that minimum disturbance to human settlements occur and the alignment is along cultivated and barren land and has no human settlements and structures in its ROW of 30 meters.
187. The grid station construction activities will be with the boundary wall. Work on the tower sites could cause some generation of air borne dust, but any nuisance from this is likely to be very localized and temporary. Other project activities, e.g. movement of heavy vehicles on unpaved tracks during the works, could generate considerable dust. Water is available in the study area, although surplus water may not always be available to suppress dust at vulnerable locations in the dry season.
188. Therefore, as a general approach it is recommended that where works are within 25 m of any residential sensitive receivers, the contractor should install segregation between the works and the edge of the sensitive receivers. The segregation should be easily erectable 2.5 m high tarpaulin sheet and designed to retain dust and provide a temporary visual barrier to the works. Where dust is the major consideration the barrier can take the form of tarpaulins strung between two poles mounted on a concrete base. These can be moved along from tower base to tower base as the work proceeds. In order to mitigate high noise levels, temporary acoustic barriers shall be used, wherever felt necessary.
189. Noise from the construction of the towers should not be a major consideration unless very close to schools or hospitals where construction should be avoided at sensitive times. In addition to the physical effect of mitigating dust and noise with barriers installation of such measures should be discussed with the local population and serve as a vehicle for further public consultation at the implementation stage to assist in public relations.

5.3. Cultural Heritage, Mosques, Religious Sites, and Social Infrastructure

Impact Analysis

190. The location of mosques and other cultural and other heritage SR sites has been reviewed. There is no mosque, graveyard, tomb or any other religious/archaeological site in the ROW of transmission line, therefore, no impact on such site is expected.
191. The clinic / hospitals are all more than 100m from the center of line and there will be sufficient buffer distance between the works and the SR such that no significant impact would be expected from the works.
192. The location of schools is more than 100m from the sub-project. There will be sufficient buffer distance between the works and all the SR such that no significant impacts can be expected. Public consultation should be undertaken at the implementation stage to ensure nuisances are not allowed to escalate.

Mitigation measures

No measures required.

5.4. Impacts During Pre-Construction Stage

5.4.1 Impact due to Land Acquisition

Impact Analysis

193. The proposed project will not involve the acquisition of land on permanent basis for construction of Transmission line as per NTDC practice. Only the crop & trees compensation will be made. But for 220 kV Zhob Grid Station, the land will be acquired permanently by applying Land Acquisition Act 1894.

Mitigation Measures

No measures required.

5.4.1.1 Encroachment, Landscape and Physical Disfiguration

Impact Analysis

194. The extent of the proposed power expansion is moderate and will not extend beyond the power corridor created by the subproject. No significant landscape impacts are expected from construction of the transmission line and Grid station. The grid station extension will not pose any encroachment as it will be constructed in a boundary wall.

Mitigation Measures

195. Disposal of surplus materials will be negotiated through local authority approvals prior to the commencement of construction, so that no toxic or hazardous material is included in the scrap.

5.4.1.2 Loss of Crops

Impact Analysis

196. The grid station area is free of any crops or agricultural resources. However, the transmission line will pass across cultivated lands and orchards. For construction of the Transmission line and tower stringing, approximately 2,500 acres of crops will be lost.

Mitigation Measures

197. Compensation of crops to be paid to the owners will be estimated in the LARP, which is presently is under preparation.

5.5. Impacts during Construction Stage

5.5.1 Physical Impacts

5.5.1.1 Ambient Air Quality

Impact Analysis

198. Air quality will be affected by the fugitive dust and emissions from the construction machinery, and vehicular traffic during the construction phase. Emissions may be carried over long distances, depending on wind speed and direction, the temperature of the surrounding air, and atmospheric stability. These air emissions may contain Particulate matter (PM), Smoke, Dust, CO, SOx, NOx. The critical sources of air pollution during the construction phase are listed below:
- i. Earth haulage trucks that generate dust, particularly during transportation, loading and unloading processes.
 - ii. Noxious gases emission by Construction equipment and vehicles.

Mitigation Measures

- i. Concrete batching plants will be equipped with dust control equipment such as fabric filters or wet scrubbers to reduce the level of dust emissions and will be located at a minimum distance of 500 meters from residences.
- ii. The NEQS applicable to gaseous emissions generated by the construction vehicles, equipment and machinery will be enforced during the construction works. Contractor shall make sure that all equipment and vehicles are tested for emissions. Regular maintenance of equipment and vehicles will also control the incomplete combustion.
- iii. Where dust emissions are high, katcha tracks will be overlain with shingle or surface treated. Where necessary, dust emissions will be reduced by a regular sprinkling of water for keeping the dust settled, at least twice a day.
- iv. Haul-trucks carrying sand, aggregate and other materials will be kept covered with tarpaulin to help contain construction materials being transported within the body of each carrier between the sites.
- v. NTDC will set up a system to monitor the air quality along the project corridor in accordance with the accepted international standards. The system will cover protocols for sampling and analysis, assessment of air quality at sensitive locations, reporting, and information sharing.

- vi. Ensure proper tuning of the construction vehicles.
- vii. Implementation of plantation plan for trees & plants
- viii. The construction material will be stored in the boundary wall and no disturbance to surrounding areas is expected. The contractor will be, however, required to provide a traffic management plan before commencement of work at site.
- ix. The need for large stockpiles should be minimized by careful planning of the supply of materials from controlled sources. Stockpiles (if required) should not be located within 50 meters of schools, hospitals or other public amenities such as wells and pumps and should be covered with tarpaulins when not in use and at the end of the working day to enclose dust.

5.5.1.2 Noise Level

Impact Analysis

199. It is anticipated that powered mechanical equipment and some local labour with hand tool methods will be used to construct the subproject works. No blasting is anticipated. Powered mechanical equipment can generate significant noise and vibration. The cumulative effects from several machines can be significant. Noise and vibration from the construction of the towers would not be a major consideration as there are no schools or hospitals present nearby the construction site.

Mitigation Measures

- i. To minimize such impacts, the contractor for subproject should be requested by the construction supervision consultants (engineer) to provide evidence and certification that all equipment to be used for construction is fitted with the necessary air pollution and noise dampening devices to meet EPA requirements.
- ii. Noise will be controlled by monitoring at a distance of at least 3 m from the boundary wall of any residential unit and while following the NEQS of 55dB (A) during day time and 45dB (A) during night time.
- iii. Noise from construction of substations is not covered under any regulations. However, in order to keep in line with best international practice, it is recommended that construction should not be allowed during nighttime (9 PM to 6 AM).
- iv. All noisy equipment should be located within DGS or far away from sensitive receptors as possible to prevent nuisances to dwellings and other structures from operation. However, if the noise still exceeds NEQS, then noise barriers will be installed around the equipment to reduce the effects of the noise. Mitigation measures such as barrier installation should be discussed with the local population.
- v. Vibration from construction of piles to support pads may be required for some tower construction and may pose a significant impact, but this shall be for a short duration. Where vibration could become a major consideration (within say 100m of schools, religious premises, hospitals or residences), a building condition survey shall take place prior to construction. The physical effect of piling shall be assessed prior to construction and measures should be discussed with the local population as well as timing of the works to serve as a vehicle for further public consultation at the implementation stage and to assist in public relations. At nearby schools, the contractor shall discuss with the school

principals the agreed time for operating these machines and completely avoid machine use near schools during examination times, if such a need arises.

- vi. Noise level from construction activity can be reduced by regular maintenance of machinery. Noise can be controlled through engineering control e.g. hammering actions can be substituted by hydraulic. Ensure that the workers are wearing PPE's (ear plugs, ear muffs etc.) where engineering control is not applicable to reduce the impact of noise.

5.5.1.3 Soil Erosion

Impact Analysis

- 200. Soil erosion may occur in the workshop areas as a result of improper runoff drawn from the equipment washing-yards and improper management of construction activities.

Mitigation Measures

- 201. Good engineering practices will help control soil erosion both at the construction sites and in peripheral areas, particularly at substation site, tower foundations and along the haul tracks. Controlled and well-managed vehicular movement, excavation, vegetation and regular water sprinkling will reduce the chances of soil erosion.

5.5.1.4 Drainage

Impact Analysis

- 202. No impact is anticipated on the natural drainage by the implementation of the project. However, temporary drainage system for toilets and workshop effluents needs to be developed.

Mitigation Measures

- 203. Design engineer will ensure appropriately sized drainage to avoid negative impacts due to sewage effluent. During construction phase, temporary drains and embankments would be necessarily made to channel the runoff appropriately which will be located a minimum of 100 meters from groundwater well or any surface water source.

5.5.1.5 Soil Contamination

Impact Analysis

- 204. Lands may get contaminated from the spillage of chemicals like fuels, solvents, oils, paints and other construction chemicals and concrete. This normally happens when these materials are transported in open or loosely capped containers. Unmanaged sewage can also contribute to contamination of soil.
- 205. The possible contamination of soil by oils and chemicals at camp sites, workshop areas, and equipment washing-yards may limit the future use of land for vegetation purposes.

Mitigation Measures

- i. Control measures will be needed for oily residues such as transformer oil and lubricants in the case of accidental or unexpected release. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. There are facilities in some subproject DGS

maintenance yards for recycling (dehydrating) oil from breakers. However the areas upon which these recycling facilities are located have no dedicated drainage which can capture run-off. Oily residues and fuel and any contaminated soil residues should be captured at source and refueling and maintenance should take place in dedicated areas with impervious surface away from surface water resources. Contaminated residues and waste oily residues should be disposed at a site agreed with the local authority. It shall be ensured that no PCB containing transformer oil is used.

- ii. Transformer oil has a long life (typically over 15 years, which depends upon the level of load the transformer serves). Oil spills are very rare and are preempted by routine maintenance. Good housekeeping techniques should be used to control oil spillage. Responsible authority should ensure that the maintenance schedule of each piece of hardware is adhered to by ensuring transformers are placed on an impermeable surface bunded to 110% of capacity in case of oil spill or leak.
- iii. Solid waste generated at the campsites will be properly segregated, treated and safely disposed of only in the demarcated waste disposal sites.
- iv. Proper drainage and wastewater treatment system as suggested in section 7.5.4 will ensure proper disposal of sewage which will offset any impact on soil. Sewage will be connected to sewage network for offsite treatment or will be connected to septic tank.

5.5.1.6 Cut and Fill and Waste Disposal

Impact Analysis

- 206. Disposal of surplus materials must also be negotiated through local authority approvals prior to the commencement of construction. The subproject work does not involve any significant cutting and filling but the excavations (down to 4m) and piling may be required to create the foundations for some towers (if required). It is envisaged (depending on the mode of contract) that the surface under the towers will need to be scabbled to remove unstable materials, or to stockpile topsoil.

Mitigation Measures

- i. If surplus materials arise from the removal of the existing surfaces from specific areas, these should be used elsewhere on the subproject before additional soil, rock, gravel or sand is brought in. The use of immediately available material will generally minimize the need for additional rock based materials extraction from outside. Moreover, it will also save the cost of bringing the material from some other locations.
- ii. The subproject detailed designers have so far estimated that no substantial additional materials will be required subject to confirmation at the detailed design stage.
- iii. Contractual clauses should be included to require each contractor to produce a materials management plan (one month before construction commences) to identify all sources of cement and aggregates and to balance cut and fill. The plan should clearly state the methods to be employed prior to and during the extraction of materials and all the mitigation measures to be employed to mitigate nuisances to the local residents. Financial compensation shall not be allowed as mitigation for environmental impacts or environmental nuisance. Mitigation measures shall seek to control the impacts at source in the first place. The engineer shall be responsible to update the subproject cut and fill estimates and create Materials Master Plan to facilitate materials exchange between the different contract areas along the power line and sub-contractors on the power line and to provide an overall balance for materials and minimize impacts on local resources.

- iv. Any oil contaminated gravel/sand left after the construction activity will be handed over to a pre-approved third party that shall be responsible for incineration and/or disposal of this material in accordance with NEQS and international best practices.

v.

5.5.1.7 Use of Local Water Supplies/Spring Water

Impact Analysis

- 207. Project lies in an agriculturally rich area, where there is no scarcity of water. Still use of local water supplies for construction purpose can create a big issue. As acknowledged during the public consultation, locals may not want to share their water supplies as they were concerned that sharing will disturb their agricultural activities and water will get contaminated.

Mitigation Measures

- 208. The following measures will be carried out to mitigate the impacts of tapping local community water resources, where required:
 - i. Approval from the local administration and representatives of the concerned departments will be obtained before using local water resources.
 - ii. Camps will be located within the project boundary to prevent the contamination of community-owned water resources.
 - iii. The contractors will be required to maintain close liaison with local communities to ensure that any potential conflicts relating to the common resource utilization for the project purposes are resolved quickly.
 - iv. Guidelines will be established to minimize the wastage of water during the construction activities and at campsites.

5.5.1.8 Contamination of Surface and Ground Water

Impact Analysis

- 209. River Khora with its tributaries i.e Spinkai Ghasha , Kharmeri nala, Tangi Khwar, Mandi River, Khamistani River and Zhob River Tributaries Chishma Right Bank Canal to be crossed or pass nearby the Transmission Line. Other than that small drains are present in AOI. It is anticipated that the project activities will not cause any impact on these surface water bodies as these are not near campsite, which lies within the GS boundary, and no construction activity will be done near them.
- 210. Subsurface water resources may be contaminated by fuel and chemical spills, or by unmanaged solid waste and effluents generated by the kitchens and toilets at construction campsites.

Mitigation Measures

- 211. Good management practices will be adopted to ensure that fuels and chemicals, raw sewage and wastewater effluent are disposed of in a controlled manner to reduce the risk of contamination. These measures are as described below:

- i. Best engineered drainage channels will be established in the construction camps in order to facilitate the flow of the treated effluents.
- ii. Soakage pits and septic tanks will be established for the treatment of sewage effluents.
- iii. Wastewater effluent from the contractors' workshops and equipment washing-yards will be passed through gravel/sand beds to remove oil/grease contaminants before discharging into the natural streams. According to the local laws, the BOD5 concentration in sewage must be brought down to less than 80 mg/l before being discharged into a natural stream with a capacity to dilute the effluent further by 10 times. Furthermore, since the national regulation of 80 mg/l is quite lenient, thus in spirit all efforts shall be made to minimize the pollution load to meet the standard of 30 mg/l.

5.5.2 Biological Environment

212. This section describes impacts on flora and fauna and corresponding mitigation measures.

5.5.2.1 Flora, Trees, Ecology and Protected Areas

Impact Analysis

213. There is no protected area, as per identification of National Conservation Strategy, inside or anywhere near the project. Around 5500 forest trees and 500 fruit trees and some shrubs will have to be removed from the project land and along Transmission line. Wood trees include Jungli Kikar (Wild Acacia nilotica), Sufaida (Eucalyptus), Aak (Calotropis), Sheesam (Dilbergia Sisso) and Jandh (Prosopis cineraria). Fruit trees include Citrus, Gauva and Date palms. Dust during the construction phase will also cause an adverse impact on surrounding orchards and crops. The trees to be removed are not part of a fragmented forest.

Mitigation Measures

214. Trees will be enumerated species wise and compensatory plantation will be arranged along roads and paths within the campus or outside the campus through forestry. To replace the removed trees sufficient areas will be identified to allow plantation of trees at a rate of 3:1. Moreover, owners of the affected trees will be paid compensation for their loss. An approximate sum of PKR 5.00 million is estimated for compensation of trees.
215. In addition to this, the contractor will be requested to spray water twice or thrice a day (as per needed) to avoid dispersal of dust on the adjacent flora.

5.5.2.2 Wildlife and Fauna

Impact Analysis

216. Mammals, amphibians, birds and reptiles will be disturbed with the clearance of flora and leveling of land. Birds can easily fly away to trees outside the campus or to the trees which are retained from original flora. Moreover grazing activity of animals will also be disturbed.

217. During construction stage noise and movement of heavy machinery for road construction, shall disturb the fauna of the area as the reptiles like lizard and snakes may get killed or move to the adjoining areas. Similarly, avifauna shall be disturbed and scared away due to disturbance of habitat. Trees provide resting and nesting places to the birds. Their removal shall have a negative effect on the fauna. Movement of vehicles near corridors of grazing cattle/slow moving animals may cause danger to their lives and require special attention by provision of sign boards and educating the drivers of construction vehicles. As there are no endangered species present near the project area so there is no potential impact on the endangered species by the execution of the project.

Mitigation Measures

- i. While constructing boundary wall around the project campus, outlets near the ground surface will be provided at suitable intervals in order to facilitate the mammals and reptiles to migrate out of the disturbed campus. As far as possible, some parts of original habitat should be retained.
- ii. Moreover vehicle speed will be controlled to avoid incidental mortality of small mammals and reptiles.
- iii. Staff working on the project will be given clear orders, not to shoot or trap any bird.
- iv. Lights used in the camps, during construction of towers will be kept to the minimum requirement. Upward scattering lights will preferably be used.
- v. There will be adjacent areas available for grazing; hence the grazing activity of animals will not be affected.

5.5.3 Socioeconomic and Cultural Environment

218. This section describes the impact of the proposed project on local communities, construction workers, and other people as well as on structures or sites of cultural and religious significance.

5.5.3.1 Impacts on Local Communities/Workforce

Impact Analysis

219. The area's surrounding communities will be affected during the construction phase as follows:
- i. During the construction phase the general mobility of the local residents and their livestock in and around the project area is likely to be hindered.
 - ii. Unmonitored construction activities, e.g. excavation, equipment movement etc. may create accident risks.
 - iii. Usage of community's common resources like potable water, fuel wood etc. by contractor's workforce may create conflicts between the community and the contractor.
 - iv. Induction of outside workers in the contractor labor may cause cultural issues with the local community.
 - v. Theft problems to the community by the contractor workers and vice versa.

Mitigation Measures

220. The presence of migrant construction workers inevitably causes some degree of social unease and even active disputes with the local community as a result of cultural differences. Potential social conflict will be contained by implementing the measures listed below:

- i. Temporarily and for short duration, the contractor has to select specific timings for stringing so as to cause least botheration to the local population considering their peak movement hours.
- ii. Approval from the local administration will be obtained before using the local resources such as wood and water.
- iii. The contractors will be required to maintain close liaison with the local communities to ensure that any potential conflicts related to common resource utilization for the project purposes are resolved quickly.
- iv. Contractor will take care of the local community and sensitivity towards the local customs and traditions will be encouraged.
- v. Effective construction controls by the contractor to avoid inconvenience to the locals due to noise, smoke and fugitive dust.
- vi. Haul-trucks carrying concrete, aggregate and sand fill materials will be kept covered with tarpaulin to help contain construction materials being transported between the sites.
- vii. Good relations with the local communities will be promoted by encouraging contractors to provide opportunities for skilled and unskilled employment to the locals, as well as on-the-job training in construction for young people. Contractor will restrict his permanent staff to mix with the locals to avoid any social problems.
- viii. Local vendors will be provided with regular business by purchasing campsite goods and services from them.
- ix. The Contractor will warn the workers not to get involved in any theft activities and if anyone found guilty of such activities, he will have to pay heavy penalty and would be handed over to police. Similarly, at the time of employing, Contractor has to take care that the workers should be of good repute. The Contractor camp will be properly fenced and main gate will be locked at night with a security guard to check the theft issues from community side.

5.5.3.2 Indigenous, Vulnerable and Women Headed Households

Impact Analysis

221. During the social field survey of the project, no indigenous group of people was identified, which comes under the definition of "Indigenous People". So, no impact on the indigenous people is envisaged due to the implementation of the project. No woman headed household was identified during the social survey of the Project.

Mitigation Measures

222. As referred earlier, no indigenous people and women headed households have been identified in or along the Project corridor, so no mitigation is required.

5.5.3.3 Public Health and Safety Hazards

Impact Analysis

223. During the construction and operation stage Of the project, the public health and safety issues are:

- i. Construction of Transmission line and Grid Station extension will require large number of workers who will obviously be accommodated in congested temporary camps. This scenario may lead to spreading of diseases like Malaria, Cholera, Typhoid, Hepatitis A, B and C etc.
- ii. Occurrence of accidents/incidents during the construction stage is a common phenomenon as evident from previous experience of NTDC.
- iii. During the operation stage, people believe that they will be prone to danger due to the current flows from towers, breaking of conductors, etc.
- iv. Safety of general public at construction sites.
- v. During the operational stage electric current (induction) may travel into the substation and will become a hazard to the public/animals.

Mitigation Measures

- i. In construction camps, amenities of life including clean food, water and sanitation facilities must be provided. Contractor will arrange first aid boxes in the temporary camps. Routine medical check-ups of all the field staff including unskilled labor needs to be conducted by an MBBS doctor.
- ii. The other source of pollution from the camps will be from garbage and waste. Apparently, there are no solid waste disposals facilities in the villages located in the vicinity of the road and solid waste will have to be disposed of at safe site.
- iii. Complying with the safety precautions for construction workers as per International Labor Organization (ILO) Convention No. 62, as far as applicable to the project contract.
- iv. Workers should be trained in construction safety procedures and environmental awareness. Proper handling of combustibles, and flammable material and good housekeeping practices will be required to avoid fire hazard. Prohibit smoking at or around work areas where fire hazards are present. Put up signs, saying NO SMOKING or OPEN FLAMES.
- v. Equipping all construction workers with PPEs such as safety boots, helmets, gloves, and protective masks, and monitoring their proper and sustained usage.
- vi. Contractor will ensure the provision of medicines, first aid kits, vehicle, etc. at the camp site.
- vii. Safety lookouts will be built to prevent people and vehicles from passing at the time of excavation and other activities of such sort.
- viii. Cordon off the work areas where necessary.
- ix. It is recommended that NTDC at the planning stage of the project shall plan necessary arrangements in the form of earthing system to avoid accidents.
- x. Adequate facilities shall be provided in terms of drinking water that meets standards, number of toilets per worker with running water, stocked first aid kit and trained first aider at each tower location etc.
- xi. Solid and hazardous waste generated shall be disposed to a suitably licensed landfill, potentially transporting it outside the project area, if felt necessary.

5.5.3.4 Religious, Cultural and Historical Sites

Impact Analysis

224. The location of mosques and other cultural and other heritage SR sites has been reviewed. There is no mosque, graveyard, tomb or any other religious/archaeological site within 100m boundary from the edge of the Subproject; therefore, no impact on the site is expected. There will be sufficient buffer distance between the works and all the SR such that no significant impacts can be expected.
225. In case any archaeological discovery is made, Chance find procedures are provided as Annexure VI.

Mitigation Measures

No measures required.

5.5.3.5 Sanitation, Solid Waste Disposal, Communicable Diseases

Impact Analysis

226. The main issues of concern are uncontrolled or unmanaged disposal of solid and liquid wastes into watercourses and natural drains, improper disposal of storm water and black water and open defecation by construction workers.

Mitigation Measures

- i. In order to maintain proper sanitation around construction sites, access to the nearby lavatories will be allowed or provision of temporary toilets will be made. Construction worker camps will be necessary, based on the scale of the works needed. The construction camp will be provided with toilets with soakage pits or portable lavatories or at least pit latrines.
- ii. Toilets will be self contained or shall be disposed off to a septic tank and no toilets will be located within 100 meters of any surface water body or any groundwater well.
- iii. Disposal of surplus materials must also be negotiated through local authority approvals prior to the commencement of construction. The Subproject work will not involve any significant cutting and filling but minor excavations (down to 4m) and piling may be required to create the foundations for the new transformers and for some towers (if required). It is envisaged (depending on the mode of contract) that the surface under the towers will need to be scrapped to remove unstable materials, or to stockpile topsoil.
- iv. If surplus materials arise from the removal of the existing surfaces from specific areas, it will be used elsewhere on the subproject before additional soil, rock, gravel or sand is brought in. The use of immediately available material will generally minimize the need for additional rock based materials extraction from outside.
- v. Contractual clauses will require the contractor to produce a materials management plan (one month before construction commences) to identify all sources of cement and aggregates and to balance cut and fill. The plan should clearly state the methods to be employed prior to and during the extraction of materials and all the mitigation measures to be employed to mitigate nuisances to local residents. Financial compensation shall not be allowed as mitigation for environmental impacts or environmental nuisance.
- vi. Contractual clauses will require the contractor to produce a solid waste management plan so that proper disposal of waste can be ensured.

5.5.3.6 Disease Vectors

Impact Analysis

227. Wherever water is allowed to accumulate, in temporary drainage facilities, due to improper storm water management, or improper disposal of wastewater generated from the site, it can offer a breeding site for mosquitoes and other insects. Vectors such as mosquitoes may be encountered if open water is allowed to accumulate at the construction camp site.

Mitigation Measures

228. Temporary and permanent drainage facilities should therefore be designed to facilitate the rapid removal of surface water from all areas and prevent the accumulation of surface water ponds.

5.6. Impacts During Operational Stages

5.6.1 Air Pollution and Noise from the Enhanced Operations

Impact Analysis

229. The subproject works will extend the power distribution lines. No houses, mosques or schools are close to the new GS in the operational phase. The operation of the facility is not likely to cause any appreciable increase in the noise level already generated by the existing equipment. However, it is recommended that an acoustical check be made on the detailed design to determine if any noise barriers are required. There is no source of atmospheric pollution from the subproject. In the operational phase any nearby industrial facilities with fuel powered mechanical equipment will be the main polluters.

Mitigation Measures

- i. All the emissions will be very well dissipated in the open terrain and there will be no cumulative effect from the subproject.
- ii. Noise impacts from the operation of the DGS equipment will be reviewed at the detailed design stage. The NEQS for noise close to residential areas will be complied with 45 dB(A) Leq (at exterior, boundary of DGS).
- iii. The specifications of the new equipment that shall be installed shall follow international standards and best practices to avoid use of chemicals causing Green House Gas (GHG) emissions. All equipment procured shall be free from Polychlorinated Biphenyls (PCBs). If SF6 (Sulfur Hexafluoride), a highly non-toxic greenhouse gas (GHG) based equipment is installed, a proper maintenance management program will have to be implemented to avoid leakage beyond international norms for GHG to the atmosphere.

5.6.2 Pollution from Oily Run-Off, Fuel Spills and Dangerous Goods

Impact analysis

230. Impacts from spillage of oily residues such as transformer oil and lubricants are expected to arise in this subproject. However control measures will be needed in the case of accidental or unexpected release.

Mitigation Measures

231. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. There are facilities in some subproject DGS maintenance yards for recycling (dehydrating) oil from breakers. However the areas upon which these recycling facilities are located have no dedicated drainage which can capture run-off. Oily residues and fuel and any contaminated soil residues should be captured at source and refueling and maintenance should take place in dedicated areas with impermeable surfaces away from water resources. Contaminated residues and waste oily residues should be disposed at a site agreed with the local authority.
232. Transformer oil has a long life (typically over 15 years, which depends upon the level of load the transformer serves). Oil spills are very rare and are preempted by routine maintenance. Good housekeeping techniques should be used to control oil spillage. Responsible authority should ensure that the maintenance schedule of each piece of hardware is adhered to.

5.6.3 Impacts on Ecological Resources

233. No more tree cutting is to take place, during the operation stage .On the other hand, tree plantation, on the ratio of 5:1 will improve the ecological habitat and environmental conditions of the project area and thus enable the scared away avifauna to return to this area. New plantations will not only compensate for the loss of trees, but will also add to the aesthetics of the area. There will be healthy and positive impacts on flora and fauna during the operation stage. Substation operation will enhance the risks for reptiles, amphibians and mammals and they will prefer not to return to the area, thus causing a minor negative impact. Sufficient funds will be allocated to maintain the trees at operation stage and the local communities would be also involved for the maintenance of these plants. This will ultimately have a positive impact.

ENHANCEMENTS

234. Environmental enhancements are not a major consideration within the subproject site. However it is noted that it is common practice to create some local hard and soft landscaping and successful planting of fruit trees at such sites. This practice should be encouraged as far as practicable. Other opportunities for enhancements can be assessed prior to construction and proposed enhancements will be discussed with the local population to serve as a vehicle for further public consultation at the implementation stage and to assist in public relations.

5.6.4 Environmental and Social Risk Assessment

Impact Analysis

235. The common environmental risks as assessed on the basis of consultations with the stakeholders are as under:
 - i. The local people believe that their movement will be restricted in the project area due to Electro Magnetic Field (EMF), and it may have adverse impacts on their health. EMF due to EHV can cause the risk of leukemia, which is a disease in which white blood cells mutate and become cancerous before maturity. These cells are important in fighting against infection in

the body. Leukemia also slows down the production of red blood cells that are needed to carry oxygen in the second leading cause of death for children ages 2-15 years.

- ii. People have to bear an excessive noise due to the current flow in the conductors especially in rainy season.
- iii. The electronic devices/equipment may fail to work when passing under the EHV transmission lines.
- iv. The allied transmission line may become a danger to the movement of birds.

Mitigation

236. The proposed mitigation measures for the above environmental risks are as under:

5.8.1 Effect of Electro Magnetic Field (EMF)

- i. Different studies are carried out in Britain to find out the effects of EHV on children particularly with reference to leukemia. British study suggested that children who live close to high voltage overhead power lines may be at an increased risk of leukemia. Although the researchers have made efforts to identify the effects of EHV related to leukemia but there is no panic because the researchers cannot prove that the power lines are the cause of leukemia. They have admitted that their findings may be due to some chance.
- ii. Since the project has been planned in the least populated area, even if some effects due to EMF are envisaged, these will be minimal due to safe distance since no residences are located within a distance of 100 meters along the transmission line alignment. Similarly, a vertical clearance required as per international standards will also be maintained especially near the populated areas. During operation stage check will be kept by the NTDC that no construction will be allowed within 100 m of the substation and transmission line.

5.8.2 Excessive Noise Problem

237. Due to the EMF around the substation, noise is generated during the ionization of the ambient air. Such a situation occurs with more severity in the rainy season when moisture in the air is relatively high. It may generate discomfort due to the noise generated during the ionization process. To overcome this problem, the route has been selected passing through the least populated area. Construction of houses within the project corridor will be prohibited and NTDC will make sure to check such type of construction during the operation stage. NTDC is providing vertical and horizontal clearances in accordance with national and international standards. This will also reduce the noise intensity.

5.8.3 Failure to Work of Electronic Devices/Equipment

238. The failure of electronic devices/equipment to work under the EHV transmission line is a common apprehension of the stakeholders. To avoid this risk, NTDC has planned to keep excessive clearance as compared to international standards. If proper required clearance is provided, the severity of the risk is minimized, for which observations were made in the field under the existing EHV transmission lines deliberately. Secondly, as the selected route will not pass close to the settlements, the risk is also minimized.

5.8.4 **Danger to Bird Movements**

Impact Analysis

239. There is a possibility of birds either being electrocuted by sitting on transmission lines or by colliding with the towers. The necessary mitigation measures for minimizing the possibility of either of these two scenarios are presented below.

Mitigation Measures

(i) Mitigating for Electrocution:

240. Electrocution mitigation can be more easily achieved than collision mitigation. The problem is at a smaller physical scale, whereby a bird bridges energized wires or wires and grounded hardware on a pole structure. The solution is relatively straightforward and involves ensuring that a bird cannot touch the relevant components using appropriate design. It is cost effective to carry out electrocution mitigation in the building phase of new medium voltage power lines as retrospective fitting (i.e. mitigate for electrocution on an already operational network) of dangerous poles is very expensive.
241. Also the impact upon migratory soaring birds (MSBs) in the interim period could be highly significant, especially in terms of cumulative impact if occurring at multiple locations across the flyway. Furthermore, retrofitting normally requires an outage (line switched off) with subsequent customer issues, and is principally changing a previously approved engineering design, with additional materials and complications.

▪ Pole and line design or configuration

242. This is relatively easily achieved through the technical design of the pole top. The design can take one or a combination of two approaches:
- Ensuring that the likely preferred perching space for a bird on the pole top is well clear of dangerous components;
 - Ensuring that the dangerous components are sufficiently separated by space to ensure that the bird cannot touch them.
 - The second option, whilst more foolproof, can result in significantly larger pole tops with consequent significantly increased costs, which is why a combination of the two approaches is often employed.
 - Line design modifications for mitigating bird casualties should include sufficient spacing between different conductors and between conductors and grounded wires or hardware. Short distances between conductors often occur at switch towers, at junctions and dead ends of distribution systems.
 - Insulation
 - Where poles or pylons or substation hardware pose a risk of electrocution to birds by virtue of the insufficient clearances between critical hardware, it is possible to adjust the situation

with add-on mitigation. This usually takes the form of insulating materials that are fitted onto critical components of the structure, in order to render those components neutral.

In some cases this insulation takes the form of custom designed products for insulating certain components, and in other cases more universal, generic material is used, which can be adapted on site to insulate varying components. A feature of most of these products is that they often do not provide full insulation, and should not be considered safe for humans. In fact, these materials often only cover the dangerous components, reducing the likelihood of electrocution but not fully eliminating it.

(ii) Mitigating for Collisions:

243. Employing mitigation measures already during the development of new lines is more cost-effective and may ensure a substantially reduced number of casualties from the onset of the operation of the power line. Once infrastructure exists, line modification in various forms is the most widely used approach. Modification of existing lines can be broadly divided into measures that:

- Make power lines less of an 'obstacle' for birds to collide with;
- Keep birds away from the power line
- ☐ Make the power lines more visible.

▪ Line design or configuration

244. Although different bird species fly at different heights above the ground, there is general consensus that:

- Power line cables lower to the ground are better for preventing bird collision;
- ☐ Less vertical separation of cables is preferred, as it poses less of an 'obstacle' for birds to collide with. Horizontal separation of conductors is therefore preferred;
- Construction of self-supporting towers, which do not require stay wires, is preferred, as bird collisions have been recorded with the guy or stay wires of towers;
- Removing or designing power lines without earth or shield wire (the thinnest wire at the top of the power line structure) can take away the obstacle birds most often collide with.

▪ Line marking

- Since the assumption is that birds collide with overhead cables because they cannot see them, fitting the cables with devices in order to make them more visible to birds in flight is the preferred mitigation option.
- Besides thickening, coating or coloring the often least visible thin ground wires, a wide range of potential 'line marking' devices has evolved over the years, including: spheres, swinging plates, spiral vibration dampers, strips, swan flight diverters, Firefly Bird Flight Diverters, bird flappers, aerial marker spheres, ribbons, tapes, flags, fishing floats, aviation balls and crossed bands
- Devices should be installed on the earth wire (also-called ground or shield wire), wherever possible. On lines without an earth wire, devices should be installed on the conductors. Although installation of these devices on higher voltage conductors is problematic, lines of higher voltage would typically have an earth wire anyway. Guidance is available on spacing between line markers.

5.8. Cumulative impacts

245. Cumulative impacts would mainly be from other projects, particularly other transmission line projects being constructed concurrently with the construction stage of this sub-project.
246. There is no other transmission line project or any other infrastructure projects being planned in the project area along the transmission line alignment. Thus, no cumulative impacts are expected.

5.7. Environmental and Social Benefits of the Project

247. Although there will be some insignificant and temporary negative effects of the Project during implementation and operation stage, but a large number of positive effects on environment and social settings of the area are also expected. Load Shedding is a serious issue these days due to huge difference in production and demand of electricity. The major positive impacts of the proposed Project on environment and social settings of the Project area include:
- i. Availability of the electricity will be ensured as per demand of the area.
 - ii. Expansion of industries expected due to availability of electricity.
 - iii. Better quality of life will be available to the citizens.
 - iv. Grid station will open new employment opportunities for locals.

6. Information Disclosure, Public Consultation and Participation

6.1. Approach to Public Consultation

248. The public consultation process with various stakeholders has been approached so as to involve public and other stakeholders from the earliest stages. Public consultation has taken place during the planning and design stage and viewpoints of the stakeholders have been taken into account and their concerns and suggestions for possible improvements have been included where appropriate. Much of the public consultation process to date has revolved around concerns for the mitigation of construction impacts and the possible side effects from the proximity of the proposed subprojects.

6.2. Public Consultation Process

249. The public consultation process has commenced in the initial feasibility stages (prior to construction) in order to disclose the project information to the stakeholders and record feedback regarding the proposed sub-project and preferences. The stakeholders involved in the process were the interested folks; the local people, village leaders and school teachers.
250. Prior to the implementation of the consultation, feedback has been carried out to support this IEE and recorded. The focus of attention has been the population near the proposed route of the T/L and existing grid station. The level of engagement varied from the stakeholder to stakeholder with some registering no major comment but it is noted that none registered any outright opposition to sub-projects.
251. The disclosure of subproject works in advance and subsequent consultation with stakeholders has advantages in the environmental assessment and mitigation of impacts. Public consultation can also provide a conduit for the improvement of the project implementation to serve the stakeholders in better way.
252. The environmental assessment process under the PEPA 1997, requires the disclosure to the public after the statutory IEE/EIA has been accepted by the relevant EPA, to be in strict adherence to the rules. In this IEE, the consultation process was performed to satisfy the ADB requirements Social Safeguard Policy (SPS), 2009 and PEPA guidelines.

6.3. Results of Public Consultation

253. The consultations identified some potential environmental and social impacts and perceptions of stakeholders. The public consultation carried out in March, 2016 & July, 2016 (Summary of the Public Consultation is provided in Annex-III). The Community members along the project corridor were generally supportive of the proposed project. The local poor people predominantly requested for employment of unskilled and semi-skilled jobs on priority basis with the contractors during implementation of the project. No private land acquisition and resettlement is involved in this project. On the basis of the consultations so far, it appears that the project will have no

environmental and social impacts but the proponent will have to make sure that skilled and unskilled employment should be preferably made from local people, where possible.

6.4. Social Framework Agreement

254. The project proponent has committed that they will work hand-in-hand with the community for the successful completion of the project.

255. SFA shall be considered as a “follow up” of the public consultation process and indicates that NTDC and the communities are mutually facilitating the construction process of the sub-project.

6.4.1 Parties to Agreement

256. The local villagers/representatives and the project proponent will sign the SFA through mutual consent. At least two leaders/elders will be chosen from each of the villages situated adjacent to the area where construction activity will be based. These leaders/elders will constitute a villagers’ committee, which will choose a Chairman amongst themselves.

257. SFA shall be signed by NTDC Resident Engineer (RE) representing the project proponent and by the Chairman of villagers’ committee representing the local community prior to two months from commencement of the construction work.

6.4.2 Agreement Contents

258. SFA shall be prepared in the form of a legal agreement in Urdu language on a stamp paper to be provided by RE at the project cost. Three copies of the agreement shall be signed by both parties. All the mitigation measures described in EMP which are relevant to SFA shall be included in the agreement. The obligations of the NTDC and those of the community shall be listed clearly. Signed copies of SFA shall be kept by both parties and the Executive Engineer in charge of this TL project.

7. Environmental Management and Monitoring Plan

7.1. General

259. This chapter provides an overall approach for managing and monitoring the environment related issues and describes the institutional framework and resource allocations proposed by NTDC to implement the EMMP for 220 kV Transmission line from Zhob to D.I Khan and Zhob Grid Station. The main objectives of the EMP are to:

- Provide the details of the project impacts along with the proposed mitigation measures, and a corresponding implementation schedule.
- Define the responsibilities of the project proponent, contractor, supervisory consultants and other role players, and effectively communicate environmental issues among them.
- Define a monitoring mechanism, reporting frequency, auditing and identifying monitoring parameters to ensure that all the mitigation measures are completely and effectively implemented.
- Identify the resources required to implement the EMP and outline the corresponding financing arrangements.

7.2. Environmental Management Plan (EMP)

260. The environmental protection and enhancement are achieved in various ways. These approaches should begin right at the embryonic stage, i.e. i) project location, ii) design, specifications and tender/contract documents, iii) construction activities and iv) post completion activities i.e. operation and maintenance stage. Appropriate environmental management measures are required to be exercised in a cascade order by NTDC at each stage of the project.

261. In this way, it is envisaged that the Project will achieve maximum ongoing cost-effectiveness, environmental sustainability and social soundness, far beyond the end of implementation of the Project. All the stages of the Project have to be managed by adopting the proposed environmental mitigation measures, where, besides engineering aspects, due importance is to be accorded to mitigation measures which make a perfect blending with the surrounding ecosystem. The key environmental and social issues, which have already been discussed in previous as under:

- i. Impacts on Crops and Trees
- ii. Contamination of air, water and soil during the construction activities
- iii. Borrowing of aggregate materials
- iv. Soil erosion and soil contamination
- v. Impact of noise generated by vehicles, machinery and equipment during the construction activities
- vi. Impact on community and work force safety as a result of accident hazards during the construction and operation of the project
- vii. Vegetation clearing for tower foundations and establishment of camp facilities

262. An Environmental Management Plan is provided in **Table 7.1** below, which establishes the linkages between the environmental and social impacts, mitigation strategy and the agencies responsible for execution.

Table 7.1: Environmental Management Plan

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
DESIGN STAGE						
1. Social Impacts	To ensure that the adverse impacts on crops and trees are mitigated according to the LARP provisions.	<ol style="list-style-type: none"> 1. NTDC to select the route in a way that minimum impact on trees and crops occur. 2. Assessment of losses of tree and crops damages (if any) due to construction of transmission line towers. 3. Preparation of LARP for the proposed project before commencement of construction activities. 4. All the payments / entitlements are paid according to the Entitlement Matrix, prepared according to the LARP. 5. All the impacts identified by the IEE are incorporated in to the project as well as the LARP and relevant entitlements included into the Entitlement Matrix. 	Before the construction of the transmission line and all other structures, the APs should be given sufficient time and compensation to satisfy them.	Affected Persons will be compensated by NTDC through its land acquisition officers.	NTDC / LAOs	MC and External Monitors
2. Hydrological Impacts	To minimize hydrological and	<ol style="list-style-type: none"> 1. Hydrological flow in areas where it is sensitive, such as 	Before the commencement of construction	Considered locations are as	NTDC with the Design Consultant	NTDC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
	drainage impacts during constructions.	water courses or bridges and culverts. 2. Adequate culverts should be provided where any water channel is needed to be crossed for transmission line construction activities.	activities/during designing stage.	in the design report.		
3. Noise Barriers	Ensure cumulative noise impacts are acceptable in operational phase.	1. Conduct detailed acoustic assessment for all residential buildings, schools, (other sensitive structures) within 50m of RoW. 2. If noise at sensitive receiver exceeds the permissible limit, the construction activities should be monitored and controlled.	During detailed design stage, and in include in the contract.	Noise sensitive locations to be identified after detailed design.	NTDC with the design consultant	NTDS and Construction Supervision Consultant (CSC if any)
4. Waste Disposal	Ensure adequate disposal options for all waste including unsuitable soils, scrap metal.	1. Identify sufficient locations for disposal of transformer oils, unsuitable soils, scrap metal "cradle to grave". 2. Include in contracts for unit rates for re-measurement for disposal. 3. Designate disposal sites in the contract and cost unit disposal rates accordingly. 4. Prepare a PCB spill handling procedure and equip such	1. During designing stage no later than pre-qualification or tender negotiations. 2. Include in the contract.	Locations approved by ADB and NTDC and waste disposal local authorities.	ADB and NTDC with the design consultant	NTDC and CSC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		teams with special clothing, steel containers and solvents.				
5. Temporary Drainage and Erosion Control	Include mitigation in Preliminary and detailed designs for erosion control and temporary drainage.	<ol style="list-style-type: none"> 1. Identify locations where drainage or irrigation crossing RoW may be affected by works. 2. Include in protection works contract as a payment milestone(s). 	During designing stage no later than pre-qualification or tender negotiations.	Locations based on drainage or irrigation crossing RoW.	NTDC and Design Consultant	NTDC and CSC
6. Avoidance of Sensitive and High Value Areas	The siting of transmission facilities must seek to avoid to the maximum extent possible areas of high ecological, cultural, economic, and aesthetic value and sensitivity.	When siting in such areas cannot be avoided altogether, the area of disruption should be minimized and the impacts mitigated.	During designing stage no later than pre-qualification or tender negotiations	Locations based on crossing RoW	NTDC and Design Consultant	NTDC and CSC
7. EMF Reduction	Although the health effects of chronic exposure to EMFs from AC transmission lines remain scientifically uncertain, many utilities and regulatory authorities employ EMF reduction practices	<ul style="list-style-type: none"> • Raising conductor height above the ground, typically by increasing tower height. • Reducing conductor spacing. • Arranging phases so that fields tend to cancel. • Increasing transmission voltage (since magnetic field intensities are a function of current, and 	Design Stage	Project Area	NTDC	NTDC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
	as a precautionary measure, usually within the limit of a few percent of overall project cost. Utilities seek to keep annual average magnetic field intensities at the edge of the right-of-way below about 10 mG (milli-Gauss).	<p>increased voltage, all things being equal, will result in reduced current).</p> <ul style="list-style-type: none"> Reducing loads (and therefore, currents). Increasing right-of-way widths or buffer zone widths, to move people further from transmission lines. 				
8. Health & Safety	To ensure all health and safety aspects are considered during the project design phase.	<ul style="list-style-type: none"> Ensure seismic design requirements are incorporated in the project design. 	Design Stage	Project Area	NTDC	NTDC
CONSTRUCTION STAGE						
1. Hydrology and Drainage Aspects	To ensure the proper implementation of any requirements mentioned in EPA conditions of approval letter in relation to Hydrology of the project.	<ol style="list-style-type: none"> Consideration of weather conditions when particular construction activities are undertaken. Limitations on excavation depths in use of recharge areas for material exploitation or spoil disposal. Use of landscaping as an integrated component of 	<ol style="list-style-type: none"> Prepare a thorough plan to be approved by SC one month prior to a commencement of construction. Proper timetable prepared in consideration 	<ol style="list-style-type: none"> Locations of each construction activity to be listed by the engineer. Special locations are identified along the RoW by the 	CSC or NTDC to actively supervise and enforce	NTDC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		<p>construction activity as an erosion control measure.</p> <p>4. Minimizing the removal of vegetative cover as much as possible and providing for its restoration where construction sites have been cleared of such areas.</p>	<p>with the climatic conditions of each area, the different construction activities mentioned here to be guided.</p>	<p>contractor to minimize disturbance.</p> <p>3. A list of locations of irrigation channels/ drains to be compiled by the contractor.</p>		
<p>2. Orientation for Contractors, and Workers</p>	<p>To ensure that the CSC, contractor and workers understand and have the capacity to ensure the environmental requirements and implementation of mitigation measures.</p>	<p>1. NTDC to engage environmental specialist in the PMC to monitor and progress all environmental statutory and recommended obligations.</p> <p>2. Conduct special briefing for managers and / or on-site training for the contractors and workers on the environmental requirement of the project. Record attendance and achievement test.</p> <p>3. Agreement on critical areas to be considered and necessary mitigation measures, among all parties</p>	<p>Induction of all relevant staff required for implementation of EMP.</p> <p>At early stages of construction for all construction employees as far as reasonably practicable.</p>	<p>All staff members in all categories. Monthly induction and six month refresher course as necessary until contractor complies.</p>	<p>Contractor and the CSC and record details</p>	<p>NTDC & CSC to observe and record success</p>

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		<p>who are involved in project activities.</p> <p>4. Continuous progress review and refresher sessions to be followed.</p>				
3. Water Quality	To prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively. Ensure adverse impacts on water quality caused by construction activities are minimized.	<p>1. Compile temporary drainage management plan one month before commencement of works.</p> <p>2. Proper installation of Temporary Drainage (TD) and Erosion Control (EC) before works within 50 m of water bodies.</p> <p>3. Proper construction of TD and EC measures, maintenance and management including training of operators and other workers to avoid pollution of water bodies by the considerate operation of construction machinery and equipment.</p> <p>4. Storage of lubricants, fuels and other hydrocarbons in self-contained dedicated enclosures >50m away from water bodies.</p>	Prior to construction, 50 m from water bodies. Timing will depend on the construction timetable.	Relevant locations to be determined in the detailed project design	<p>1. Contractor CSC to enforce</p> <p>2. Contractor has to check water quality and report to NTDC.</p> <p>3. CSC supervises monitoring activities.</p>	NTDC review results

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		<ol style="list-style-type: none"> 5. Proper disposal of solid waste from construction activities and labor camps. 6. Cover the construction material and spoil stockpiles with a suitable material to reduce material loss and sedimentation and avoid stockpiling near to water bodies. 7. Topsoil stripped material shall not be stored where natural drainage will be disrupted. 8. Borrow sites (if required) should not be close to sources of drinking water. 				
4. Air Quality	To minimize effectively and avoid complaints due to the airborne particulate matter released to the atmosphere.	<ol style="list-style-type: none"> 1. Control all dusty materials at source. 2. All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations. (Relevant regulations are in the Motor vehicles fitness rules and Highway Act). 3. Stockpiled soil and sand shall be slightly wetted 	All construction sites within 100 m of sensitive receivers.	A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works.	Contractor should maintain acceptable standard CSC to supervise activities.	NTDC/CSC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		before loading, particularly in windy conditions. 4. Fuel-efficient and well-maintained haulage trucks shall be employed to minimize exhaust emissions. 5. Vehicles transporting soil, sand and other construction materials shall be covered. 6. Limitations to speeds of such vehicles necessary. Transport through densely populated area should be avoided. 7. To plan to minimize the dust within the vicinity of orchards and fruit farms. 8. Spraying of bare areas with water. 9. Concrete plants to be controlled in line with statutory requirements should not be close to sensitive receptors.				
5. Noise / Ground Vibration	To minimize noise level increases and ground vibrations during construction operations.	1. All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations and with	Maximum allowable noise levels should be below 75 dB (A) L_{EQ} at the boundary of the construction site.	During construction stage, the most sensitive locations need special attention.	Contractor should maintain the acceptable standards	NTDC / CSC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		<p>effective silencing apparatus to minimize noise.</p> <ol style="list-style-type: none"> As a rule, the operation of heavy equipment shall be conducted in daylight hours. Hammer- type percussive pile driving operations shall be not be allowed at night time. Construction equipment, which generates excessive noise, shall be enclosed or fitted with effective silencing apparatus to minimize noise. Well-maintained haulage trucks will be used with speed controls. Contractor shall take adequate measures to minimize noise nuisance in the vicinity of construction sites by way of adopting available acoustic methods. 			CSC to supervise relevant activities.	
6. Soil Erosion/ Surface Run-off	Prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively.	<ol style="list-style-type: none"> Schedule works in sensitive areas (e.g. rivers) for dry season Temporary erosion control plan one month before commencement of works. 	Because the area can be subject to un seasonal heavy rain plan before and during construction (cut and fill, land reclamation etc.)	<ol style="list-style-type: none"> Locations based on history of flooding problems. A list of sensitive 	Contractor and CSC	NTDC/ CSC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
	To minimize soil erosion due to the construction activities of towers, stringing of conductors and creation of access tracks for project vehicles.	<ol style="list-style-type: none"> 3. Proper installation of TD and EC before works within 50m of water bodies. 4. Meaningful water quality monitoring up and downstream at any tower site within a river or stream during construction. Rapid reporting and feedback to CSC. 5. Back-fill should be compacted properly in accordance with design standards and graded to original contours where possible. 6. Cut areas should be treated against flow acceleration while filled areas should be carefully designed to avoid improper drainage. 7. Stockpiles should not be formed within such distances behind excavated or natural slopes that would reduce the stability of the slopes. 8. In the short-term, either temporary or permanent drainage works shall protect 	while considering the climatic conditions.	<p>areas during construction to be prepared by the detail design consultant in consideration with the cut and fill, land reclamation, borrow areas etc.</p> <ol style="list-style-type: none"> 3. Locations of all culverts, irrigation channels, road and highway. 		

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		<p>all areas susceptible to erosion.</p> <p>9. Measures shall be taken to prevent pounding of surface water and scouring of slopes. Newly eroded channels shall be backfilled and restored to natural contours.</p> <p>10. Contractor should arrange to adopt suitable measures to minimize soil erosion during the construction period. Contractor should consult concerned authorities in the area before deciding mitigation measures.</p> <p>11. Clearing of green surface cover to be minimized during site preparation.</p> <p>12. Replanting trees to be done before the site is vacated and handed back to NTDC with appropriate trees (other vegetation cover as appropriate) to ensure interception of rainwater and the deceleration of surface run-off.</p>				

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
7. Exploitation Handling, Transportation and Storage of Construction Materials	<p>To minimize contamination of the surroundings</p> <p>(Due to Implementation of works, concrete and crushing plants).</p>	<ol style="list-style-type: none"> 1. In order to minimize and or avoid adverse environmental impacts arising out of construction material exploitation, handling, transportation and storage measures to be taken in line with any EPA conditions/recommendations in approval. 2. Conditions that apply for selecting sites for material exploitation. 3. Conditions that apply to timing and use of roads for material transport. 4. Conditions that apply for maintenance of vehicles used in material transport or construction. 5. Conditions that apply for selection of sites for material storage. 6. Conditions that apply for aggregate production. 7. Conditions that apply for handling hazardous or dangerous materials such as oil, lubricants and toxic chemicals. 	Update monthly	<ol style="list-style-type: none"> 1. List of borrow areas to be prepared one month prior to construction. 2. List of routes of transport of construction material is to be prepared for the contract and agreed one month prior to construction. 3. Report of vehicle conditions is available. 4. Map of locations of storage is prepared by the contractor. 5. Environmental accident checklist and a list of banned substances are included in the 	Contractor and CSC to agree format of reporting	NTDC/CSC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
				contractor's manual.		
8. Construction Waste Disposal	Minimize the impacts from the disposal of construction waste.	<ol style="list-style-type: none"> 1. Waste management plan to be submitted to the CSC and approved by MC one month prior to starting works. 2. Estimating the amounts and types of construction waste to be generated by the project. 3. Investigating whether the waste can be reused in the project or by other interested parties. 4. Identifying potential safe disposal sites close to the project or those designated sites in the contract. 5. Investigating the environmental conditions of the disposal sites and recommendation of most suitable and safest sites. 6. Piling up of loose material should be done in segregated areas to arrest washing out of soil. Debris shall not be left where it may be carried by water to 	Update monthly	A list of temporary stockpiling areas and more permanent dumping areas to be prepared at the contract stage for agreement	Contractor and CSC should supervise and take action to complete contractor's relevant activities according to EIA/IEE/ EMP requirement & environmental standards.	NTDC/ CSC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		<p>downstream flood plains, dams, lagoons etc.</p> <p>7. Used oil and lubricants shall be recovered and reused or removed from the site in full compliance with the national and local regulations.</p> <p>8. Oily wastes must not be burned. Disposal location to be agreed with local authorities/EPA.</p> <p>9. Machinery should be properly maintained to minimize oil spill during the construction.</p> <p>10. Solid waste should be disposed at an approved solid waste facility, open burning is illegal and contrary to good environmental practice</p>				
9. Work Camp Operation and Location	To ensure that the operation of work camps does not adversely affect the surrounding environment and residents in the area.	1. Identify location of work camps in consultation with local authorities. The location shall be subject to approval by the NTDC. If possible, camps shall not be located near settlements or near drinking water supply intakes.	Update once a month	Location Map is prepared by the Contractor.	Contractor	NTDC/ MC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		<ol style="list-style-type: none"> 2. Cutting of trees shall be avoided and removal of vegetation shall be minimized. 3. Water and sanitary facilities (at least pit latrines) shall be provided for employees. Worker camp and latrine sites to be backfilled and marked upon vacation of the sites. 4. Solid waste and sewage shall be managed according to the national and local regulations. As a rule, solid waste must not be dumped, buried or burned at or near the project site, but shall be disposed off to the nearest sanitary landfill or site having complied with the necessary permission of local authority permission 5. The Contractor shall organize and maintain a waste separation, collection and transport system. 6. The Contractor shall document that all liquid and solid hazardous and non- 				

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		<p>hazardous waste are separated, collected and disposed of according to the given requirements and regulations.</p> <p>7. At the conclusion of the project, all debris and waste shall be removed. All temporary structures, including office buildings, shelters and toilets shall be removed.</p> <p>8. Exposed areas shall be planted with suitable vegetation.</p> <p>9. NTDC and Supervising Engineer shall inspect and report that the camp has been vacated and restored to pre-project conditions.</p>				
<p>10. Loss of Trees and Vegetation Cover of the Areas for Towers and Temporary Work-space</p>	<p>To avoid several negative impacts due to removing of landmark, sentinel and specimen trees as well as green vegetation and surface cover.</p>	<p>1. Land holders will be paid compensation for their standing trees in accordance with prevailing market rates (LARP). The land holders will be allowed to salvage the wood of the affected trees. They will also be encouraged to plant suitable new trees outside</p>	<p>Rerouting and site identification during design stage and other matters during construction of relevant activities</p>	<p>A list of Locations with a Map to be compiled by the design consultant during detailed design and CSC to update as necessary.</p>	<p>Design consultant, Contractor and CSC</p>	<p>NTDC/CSC</p>

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		<p>the 30 meter corridor of the transmission line in lieu of tree removed.</p> <p>2. The contractor's staff and labor will be strictly directed not to damage any vegetation such as trees or bushes.</p> <p>3. In order to save the affected orchards (if any), Transmission Line route will need to be changed. However, if unavoidable, use of towers with maximum height will be resorted to.</p> <p>4. Clearing of green surface cover for construction, for borrow of for development, cutting trees and other important vegetation during construction should be minimized.</p> <p>5. Landscaping and road verges to be re-installed on completion.</p> <p>6. Compensatory planting of trees/shrubs/ornamental plants (at a rate of 3:1) to contribute to the aesthetic</p>				

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		<p>value of the area and compensate for the lost capability of the area to absorb carbon dioxide in line with best international practice.</p> <p>7. At completion all debris and waste shall be removed.</p> <p>8. All temporary structures, including office buildings, shelters and toilets shall be removed.</p>				
11. Safety Precautions for the Workers	To ensure safety of workers	<p>1. Providing adequate warning signs.</p> <p>2. Providing workers with skull guard or hard hat.</p> <p>3. Contractor shall instruct his workers in health and safety matters, and require the workers to use the provided safety equipment.</p> <p>4. Establish all relevant safety measures as required by law and good engineering practices.</p>	Prior to commencement and during construction	Location to be identified by the CSC with contractor.	Contractor and CSC	NTDC/ CSC
12. Traffic Condition	Minimize disturbance of vehicular traffic and pedestrians during haulage of construction	<p>1. Submit temporary haul and access routes plan one month prior to start of works.</p> <p>2. Formulate and implementation of a plan of</p>	Prior to and throughout the construction.	The most important locations to be identified and listed. Relevant	Contractor and Engineer	NTDC/CSC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
	materials, spoil and equipment and machinery, blocking access roads during works damage/maintenance problems for roads and bridges used by the haulage trucks, dust nuisance to school and hospitals.	<ul style="list-style-type: none"> alternate routes for heavy vehicles. 3. Vicinity of schools and hospitals to be considered. 4. Installation of traffic warning signs, and enforcing traffic regulations during transportation of materials and equipment and machinery. Conditions of roads and bridges to be considered. 5. Provision of culverts on water channels and drains. 6. Widening/upgrading of access paths/roads 		plans of the Contractor on traffic arrangements are available.		
13. Social Impacts	<p>To ensure minimum impacts from construction labor force.</p> <p>To ensure minimum impacts on public health.</p> <p>To ensure minimum effects of indirect impacts of constructions to the people who are living close to the boundaries of ROW;</p>	<ul style="list-style-type: none"> 1. Potential for spread of vector borne and communicable diseases from labor camps shall be avoided (worker awareness orientation and appropriate sanitation should be maintained). 2. Claims/complaints of the people on construction nuisance/damages close to ROW to be considered and responded to promptly by the Contractor. 	<p>Complaints of APs to be solved as soon as possible.</p> <p>Necessary evacuations to be done as when necessary if construction impacts are of significant duration and close to APs.</p>	The whole alignment route of transmission line.	Contractor and the CSC	NTDC/ CSC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
	Dust, Noise, Vibration and Rock blasting effects etc. To minimize access problems for local population during construction.	3. Contractor should organize temporary means of access and make alternative arrangements to avoid local community impacts and to avoid such short-term negative impacts.				
14. Institutional Strengthening and Capacity Building	To ensure that NTDC officials are trained to understand and to appreciate EMP.	Capacity building activities were taken by Environmental Officer in Tranche 1 and 2. Environmental and Social Impact Cell (ESIC) was setup within NTDC under GM (Projects) in Tranche 1. These capacity building exercise will be continue for Tranche subprojects. Trainings and provisions of proper monitoring facilities to ESIC are recommended.	Initiate preconstruction and continue beyond project completion	Awareness training for all management and senior staff in NTDC at senior engineer and above in PMU and related units.	NTDC	NTDC & ADB
OPERATIONAL STAGE						
1. Compensatory Tree Planting	Maintain survival of trees planted	Employ landscaping contractor to monitor, water, feed and replace dead specimens as necessary.		All Project sites	NTDC	NTDC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
2. Crops and Vegetation	Monitor impacts from maintaining tree clearance under transmission lines	<ul style="list-style-type: none"> Track growth of large trees under the conductors. Tree planting shall be conducted at suitable locations in project area, as near as possible from locations where any trees might be uprooted, if necessary. Required measures for vegetation management shall be taken such as minimizing use of chemicals, avoiding invasive plant species, risk of forest fires etc. 		All Project sites	NTDC	NTDC
3. Social safety Impacts	Ensure no encroachments/ construction under the transmission line. No violation of clearances spaces.	Necessary signboards with limits of height clearances to be placed properly. Identify and prevent any illegal encroachments under the transmission line.		All Project site	NTDC	NTDC
4. Danger to bird movement	To minimize potential risk to birds of getting electrocuted or colliding in the transmission lines.	<ul style="list-style-type: none"> Align transmission corridors to avoid critical habitats (e.g. nesting grounds, heronries, rookeries, bat foraging corridors and migration corridors). Maintain 1.5 meter (60 inch) spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware 		All Project site	NTDC	NTDC

Environmental Concern	Objectives	Mitigation Measures (MM) Recommended	Timing to Implement MM	Location to Implement MM	Implementation Responsibility	Monitoring Responsibility
		<ul style="list-style-type: none"> ▪ Retrofitting existing transmission or distribution systems by installing elevated perches, insulating jumper loops, placing obstructive perch deterrents (e.g. insulated 'V's'), changing the location of conductors, and/or using raptor hoods. ▪ Installing visibility enhancement objects such as marker balls, bird deterrents or diverters. 				

FLAGGING

Some other social impacts during construction phase, particularly from local socio-cultural perspective, if required, will be reviewed at the implementation stage according to the existing Land Acquisition criteria.

1. During the construction phase, the general mobility of the local residents and their livestock in and around the project area is likely to be hindered.
2. Usage of Community's common resources like potable water, fuel wood etc. by Contractor workforce may create conflicts between the community and the Contractor.
3. Community will have to face the noise and dust problems during the construction activities.
4. Induction of outside workers in the Contractor labor may cause cultural issues with the local community.
5. Theft problems to the community by the Contractor workers and vice versa.
6. During the construction activities of tower foundations, erection, and conductor stringing people will lose their annual income due to the loss of crops, trees, etc.

7. The land under the towers during the operation stage may restrict its current use for agriculture purpose.
8. The restriction of plantation of trees above 2.5 m height during the operation stage may also cause the reduction of income of the farmers.
9. Due to the erection of towers and passing of the transmission line, the value of land may depreciate in the long term.
10. As the project route is passing through the rural areas and rural community, women activities in the field may become affected due to the construction activities.
11. The rural women normally use the open field latrines and their privacy may suffer due to the project activities.
12. The induction of outside labor may create social and gender issues due to the unawareness by them of local customs and norms. It will also cause hindrance to the mobility of local women.
13. Disturbance to the privacy of the local women when workers will work on the erection of towers

7.3. Environmental and Social Monitoring Plan

263. This section provides a monitoring plan that identifies the roles and responsibilities of the project staff involved in environmental and social monitoring under the proposed Project, and list the parameters that will be used in the monitoring process.

7.3.1 Objectives

264. The main objectives of the pre-construction and construction phase monitoring plans will be:

- i. The compensation for loss of assets will be monitored during the pre-construction activities as per latest rates announced by the government as every year rates have to be revised by the government. This aspect will be strictly monitored.
- ii. Monitor the actual impact of the construction activities on the project corridor's physical, biological and socio-economic receptors. This will indicate the adequacy of the IEE.
- iii. Recommend mitigation measures for any unexpected impact or where the impact level exceeds that anticipated in the IEE.
- iv. Ensure compliance with legal and community obligations including safety at construction sites.
- v. Monitor the impacts on land, water resources, air quality, noise level and cutting of trees in the project area as described in the EMP.

265. The main objectives of environmental monitoring during the operation phase will be to:

- i. Appraise the adequacy of the IEE with respect to the project's predicted long-term impact on the corridor's physical, biological and socio-economic environment.
- ii. Evaluate the effectiveness of the mitigation measures proposed in the EMP, and recommend improvements, if necessary.
- iii. Compile periodic accident data to support analysis that will help to minimize the future risks.

7.3.2 Role and Responsibilities of Project Management Consultants (PMC)

266. A Supervisory Consultant appointed by NTDC will be designated as the "Engineer/Project Manager". The Consultant will be responsible for:

- Supervising the Project's Contractors and ensuring that all the contractual obligations related to the design and construction, as well as environmental and social compliance are met;
- Ensuring that the day-to-day construction activities are carried out in an environmentally and socially sound and sustainable manner; Developing 'good practices' construction guidelines to assist the Contractors and NTDC staff in implementing the EMMP; and
- Assisting the Chief Engineer (EHV-II) in coordinating with the EPAs, provincial agriculture, forest and Wildlife departments, NGOs/CBOs and other public/private sector organizations.

7.3.3 Role and Responsibilities of Contractor

267. For the proposed Project, NTDC will appoint Contractor(s) for construction and other project activities. The Contractor(s) will be responsible for the physical execution / implementation of EMMP, or adherence to all the

provisions of the EIA and EMMP and any environmental or other code of conduct required by Balochistan and KPK EPAs. Overall responsibility for the Contractor's environmental performance will rest with the NTDC.

268. The project contractor will also responsible for following items:

- Implementation of, or adherence to, all provisions of the IEE/EIA and EMP;
- Contractor should prepare and submit the SSEMPs required according to the EMP, which should be approved at least ten days before for the start construction activity.
- Contractor's environmental performance will rest with the person holding the highest management position within the contractor's organization. Reporting to their management, the contractor's site managers will be responsible for the effective implementation of the EMP.

7.4. Institutional Structure for Implementation and Operation of the Project

269. The proposed project will be administered by NTDC during the implementation stage as described in detail below, and the existing institutional setup of NTDC for implementation of the project is illustrated in **Figure 7.1** below. The existing organizational setup of NTDC for all the stages of the project (design, construction and operation) is fully integrated with handling of environment and social issues.

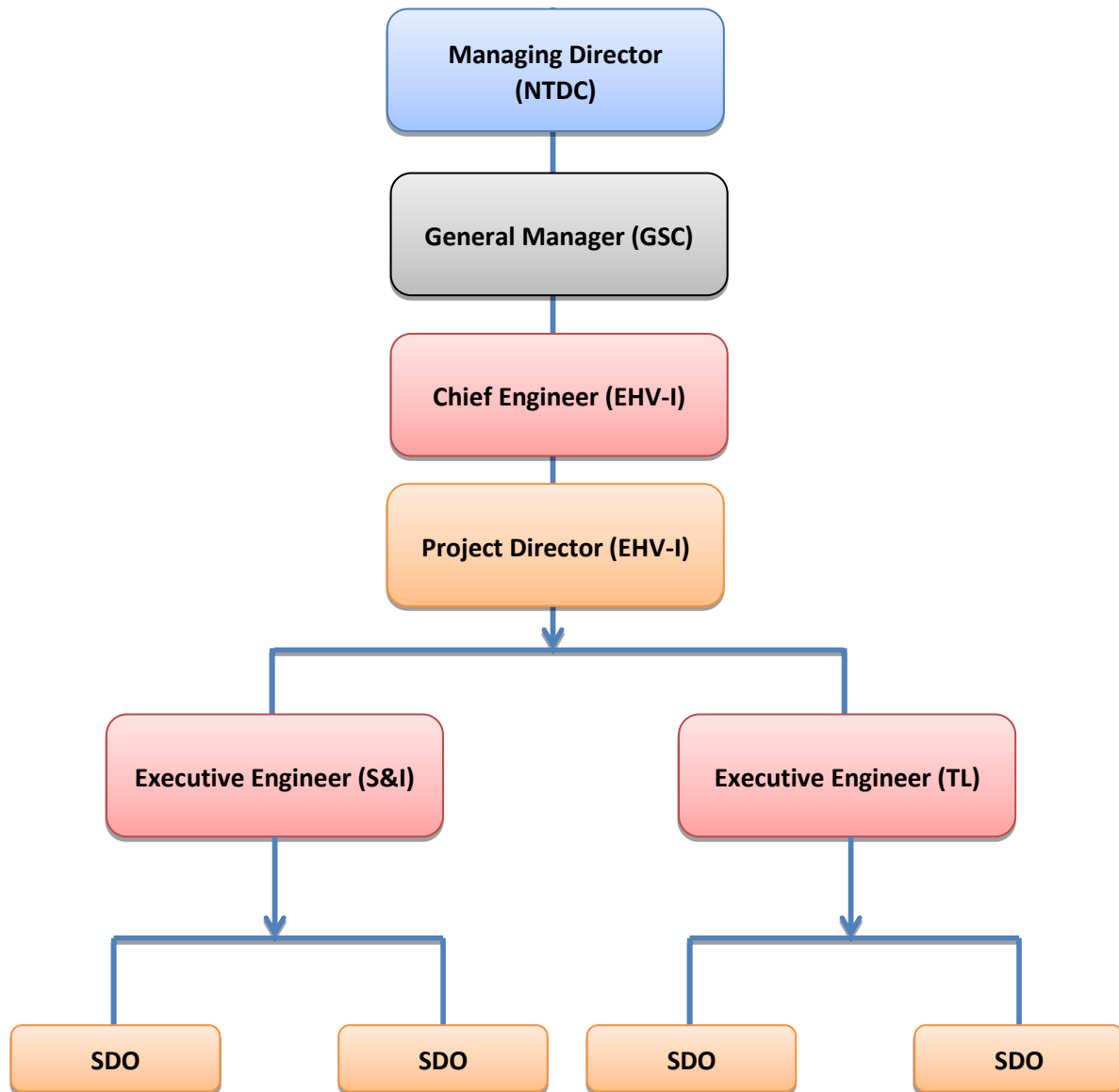


Figure 7.1: NTDC's Institutional Setup for Project Implementation

270. The NTDC federal headquarter is based in Lahore, and is responsible for managing the project at the policy level. At the highest level, the Chief Engineer (EHV-I) will be responsible for day-to-day project management at project implementation stage. He will report directly to the General Manager (GSC), who will have ultimate responsibility for planning and managing implementation of the projects.
271. The Chief Engineer (EHV-I) will be assisted by Project Director, who will have overall responsibility for ensuring the project compliance with the EMP. The Project Director (PD) will be supported by two Executive Engineers i.e. Survey and Soil Investigations (SI) and Transmission Line Construction (TLC) who, will further be assisted by the concerned Sub-Divisional Officers and their teams.
272. After completion of the Project, the Project will be handed over to the GSO Division of NTDC, which is working under the Chief Engineer (GSO). He reports to the General Manager (GSO) for operation and maintenance of grid stations and transmission lines. The Chief Engineer GSO will be supported by the Superintending

Engineer for the proposed project, who will also be assisted by Executive Engineer, Sub-Divisional Officer and his field team.

273. To ensure the community participation and to provide the environmentally and socially viable conditions, the Environment and Social Impact Cell of NTDC will extend its services and support the field teams. The Organogram of ESIC for the implementation of EMP is depicted in following **Figure 7.2**.

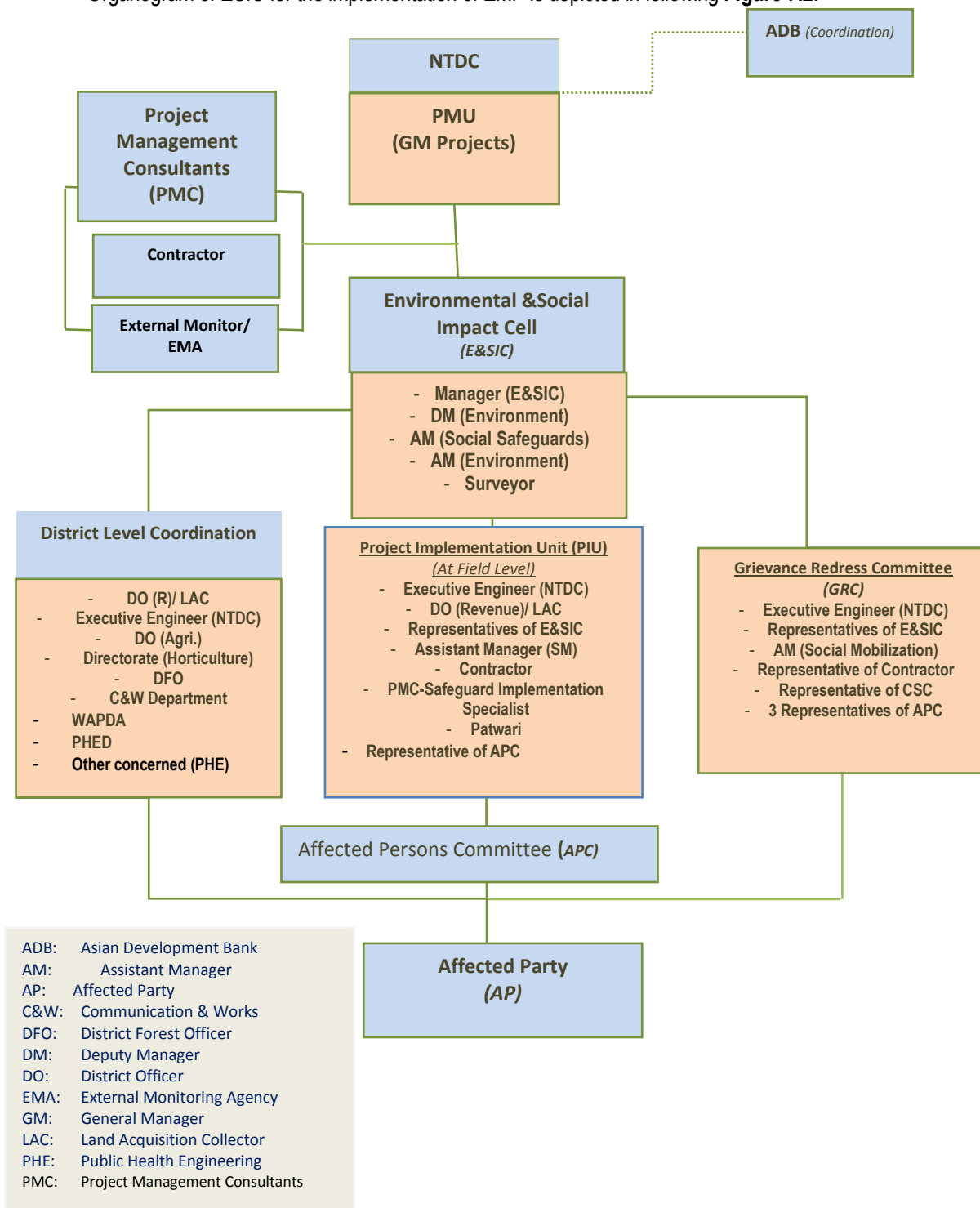


Figure 7.2: Organogram of NTDC Environment and Social Impact Cell

274. The EMP was prepared taking into account the capacity of the NTDC to conduct environmental assessments of the subprojects. But it is envisaged that the NTDC's Environmental and Social Impact Cell (ESIC) will conduct monitoring of subproject to check the compliance of EMP provisions and will obtain environmental approval from Balochistan and KPK EPAs. The ESIC is composed of one Manager, one Deputy Manager, and two Assistant Managers (refer to **Figure 7.2**). Most of the environmental work is delegated to consultants. Specific areas for immediate attention are in EMP auditing, environmentally responsible procurement, air, water and noise pollution management, Social and ecological impact mitigation. It is recommended that an environmental specialist should be made part of team of supervisory consultants for effective monitoring of EMP provisions.
275. The duties of the ESIC include but not limited to followings:
- i. Provide review and technical support to PMU, including review of papers, feasibility studies, appraisal reports and other relevant documents from the perspective of environment and land acquisition and resettlement management, on assignment basis.
 - ii. Supervise and scrutinize the consultants hiring process for environmental and social documents preparation.
 - iii. Oversight of construction contractors for monitoring and implementing mitigation measures.
 - iv. Preparing and implementing environment policy guidelines and environmental good practices.
 - v. Liaising with the PIUs and seeking their help to solve the environment related issues of project implementation.
 - vi. Providing awareness training workshop on environmental and social issues related to power transmission to PIU staff.
 - vii. Preparation of monthly/quarterly progress report on environmental and social safeguards for submission to financing agencies.
 - viii. Conduct seminars / local training workshops on environment safeguards matters with the help of NGOs / PIU / IFIs, etc.
 - ix. Prepare EIAs/IEEs of new projects.
 - x. Seek environmental approvals (NOCs) from respective EPA

7.5. Environmental and Social Monitoring by ESIC

276. The general monitoring responsibilities of the NTDC Environment and Social Impact Cell will consist of:
- Assist in valuation of the trees, crops etc., and negotiation with the owners.
 - Assist in checking genuine ownerships of the claimants, in consultation with the Revenue staff for prompt payment to the affectees.
 - Assist the Contractor for the timely payments of negotiated price.
 - Check that the Contractor backfills, compacts, and leaves the ground in the original condition after excavation of pits for subsurface investigations, and for the tower footings.
 - Keep checks and controls so that the pollution of land and water resources due to the spills of lubricants, fuel, chemicals, and other wastes does not take place.
 - Monitor, that pollution of wetlands is not excessive during the excavation for the tower footings.

- To see that the Contractor keeps the damages to the minimum during the substation construction especially while making tracks for accessibility and that the damage is rectified properly.
 - All the existing tracks, roads, water courses are left in the original shape after completion of the construction activities.
 - Monitor that the Contractor uses such working methodology so as not to cause disturbance to the communities by fugitive dust, noise, fumes, etc.
 - Monitor that the Contractor adjusts his working hours during the stringing activities in such a manner that it causes least inconvenience to the local population.
 - To ensure that the Contractor keeps first aid kits, medicines, safety gadgets at site for taking care of possible mishaps to the workers or other persons.
 - To keep the working site/camps tidy so as to avoid unhealthy impacts on the work force.
277. The pre-construction Environmental Monitoring Plan is provided as Table 7.2 and the Environmental Monitoring Plan is provided as Table 7.3 below.

7.6. Environmental Training

6.1.1. Capacity Building and Training

278. Capacity building and training programs are necessary for the project staff in order to control the negative impacts resulting from the project construction and during its operation phase. They will also require trainings on monitoring and inspecting of such a project for environmental impacts and for implementation of mitigation measures.
279. The details of this capacity building and training program are presented in the Table 7.4 below.

Table 7.2: Pre-Construction Environmental Monitoring Plan for Baseline Development

<i>Parameter to be measured</i>	<i>Objective of Monitoring</i>	<i>Parameters to be Monitored</i>	<i>Measurements</i>	<i>Location</i>	<i>Frequency</i>	<i>Responsibility</i>
Ambient Air Quality	To establish baseline air quality levels	CO,NO _x & PM ₁₀ (particulate matter smaller than 10 microns) concentration at receptor level	1-hr concentration levels	At any three random project sites	Once	ESIC
Ambient Noise	To establish baseline noise levels	Ambient noise level near receptors at project site	1-hr concentration levels	At any three random project sites	Once	ESIC
Safety of Workers and Community members	To minimize risk of hazards and accidents by ensuring only trained and certified personnel with experience of high voltage and working at height are employed to undertake this work.	Review and verify profiles of workers to be engaged for project and ensure they possess relevant credentials and experience	Verification of relevant skills and experience	At time of hiring of staff	Once	ESIC & Contractor

Table 7.3: Environmental Monitoring Plan

FOR TRANSMISSION LINE

Environmental concern	Performance indicator	Frequency to monitor	Timing to check	Locations to implement	Implementation Responsibility	Supervision Responsibility
Construction Phase for TL						
1. Encroachment and Physical Disfiguration	Landscape Conditions, Baseline Environment	Once (update monthly as necessary)	One Month after Construction Work	All NTDC'S alignment	Contractor	NTDC, ESIC cell
2. Soil Erosion	Soil Compression, Land Clearing, Vegetation Removal	Once (update monthly as necessary)	Prior to construction. Update monthly	All NTDC'S alignment	Contractor	NTDC, ESIC cell
3. Soil Contamination	Fuels Spillage, Chemicals Containers	Weekly	During Construction	All NTDC'S alignment	Contractor	NTDC, ESIC cell
4. Ecological Resources	Land Clearing, Habitat destruction	Monthly	Update monthly	All NTDC'S alignment	Contractor	NTDC, ESIC cell
5. Loss of Barani Crops	Number of People affected due to unavailability of Opportunistic Agriculture	Once (update monthly as necessary)	During Construction	All NTDC'S alignment	Contractor	NTDC, ESIC cell
6. Local Community Work Force	Disturbance due to Stringing, Good engineering practices adopted	Once (update monthly as necessary)	Update monthly	All NTDC'S alignment	Contractor	NTDC, ESIC cell
7. Safety Hazards	Zero near miss, minor, major and fatal accidents	Monthly	Update monthly	All NTDC'S alignment	Contractor	NTDC, ESIC cell

Environmental concern	Performance indicator	Frequency to monitor	Timing to check	Locations to implement	Implementation Responsibility	Supervision Responsibility
8. Noise	Most stringent noise standards at nearest receptor to works.	Once every three months on a typical working day	1-hr concentration levels	At any three random project sites	Contractor's Environmental officer	NTDC, ESIC
Operational Phase for TL						
1. Electric Current	Earthing of the Towers, Safety Plan by the contractor to be followed	Monthly	During Operation	All NTDC'S alignment	Contractor	NTDC, ESIC Cell
2. Breaking of Conductors	Frequency of Conductors Tripping, Complaints reported	Quarterly	Throughout the Project	All NTDC'S alignment	Contractor	NTDC, ESIC Cell
3. Towers Collapse	Soil Geology, Climatic Conditions, Records on displacement (if any)	Six Monthly	During Implementation Phase	All NTDC'S alignment	Contractor	NTDC, ESIC Cell
4. Avifauna Movement	Reported death of Birds, Audit Report by the ESIC cell	Quarterly	After Transmission Line is erected	All NTDC'S alignment	Contractor	NTDC, ESIC Cell
5. Safety	Security Plan, Good Engineering Practices, Complaints on the Register	Quarterly	During Operational Phase	All NTDC'S alignment	Contractor	NTDC, ESIC Cell

Environmental concern	Performance indicator	Frequency to monitor	Timing to check	Locations to implement	Implementation Responsibility	Supervision Responsibility
6. Monitoring of EMF levels post optic fiber installation	No over exposure to EMF by community members or workers	Once every three months on a typical working day	During Operational Phase	All NTDC'S alignment	Contractor	NTDC, ESIC Cell

Note: LAFC = Land Acquisition Compensation Fixation Committee. RAP, SIA and other engineering considerations may change, EIA=environmental impact Assessment. EPA= Environmental Protection Agency. ADB * = ADB checks that processes have been completed and signed off by NTDC's before moving to construction stage. MoFSC = Ministry of Forest and Soil Conservation.

ESIC = Environmental and Social Impact Cell (NTDC)

Table 7.4: Capacity Development and Training Programme for Project Contractor(s)

Provided by	Organized by	Contents	Target Audience	Venue	Duration
Pre-construction Phase NTDC offering specialized services in environmental management and monitoring	Project Director	Short seminars and courses on: Environmental Management Plan and Environmental Monitoring Plan	Contractor staff	NTDC ESIC Office	One day long training seminar
Construction Phase NTDC offering specialized services in social management and monitoring	Project Director	Short seminar on Environmental risks associated with construction phase. Development of Environmental Performance Indicators Occupational Health and Safety (OHS) issues	Contractor staff	NTDC ESIC Office	One day long training seminar

7.7. Estimated Environmental and Social Management Costs

280. The following Table provides the estimated costs for the compensation of crops and trees damages and implementation of EMP. The compensation costs include the costs for cutting of trees due to construction of subproject. It should be noted that as referred earlier that the project is at a preliminary stage and detailed surveys including tower spotting is to be carried out for the project showing the actual position of the towers, so at this stage only tentative and lump sum amount has been allocated for the expected losses and is based on the environmental and social field surveys. The actual cost will be earmarked in the Land Acquisition and Resettlement Plan (LARP)
281. The cost for implementation of mitigation measures prescribed in Environmental Management Plan (EMP) has also been given. The mitigation measures include; water sprinkling, provision of PPEs to workers, arrangement of first aid kits at site, waste management etc.
282. The total estimated cost for the environmental and social management comes to about PKR 4.13 million. This includes the cost of environmental implementation of mitigation measure. Cost estimates of mitigation and other environmental management measures are summarized in following Table.

Table 7.5: Estimated Environmental and Social Management Costs

Particulars	Details	Total Cost (PKR)
Contractor environment Staffing, audit and monitoring	1 person for 2 years ¹	1,440,000
Monitoring activities	As detailed under EMP ²	1,000,000
Mitigation measures	As prescribed under EMP and IEE ³	15,00,000
	(i) Water sprinkling	800,000
	(ii) Tree replanting	700,000
Contingency	5% contingency	197,000
Total		4,137,000

Note:

¹ @
rate of PKR 60,000/month

² Laboratory charges for: testing of construction materials; water quality tests; ambient air tests; emissions measurements; and noise measurements.

³ Includes; Compensatory tree plantation under supervision of forest department and training on counterpart staff.

7.8. Grievance Redress Mechanism

283. This section describes mechanism to receive and facilitates the resolution of affected party including women' concerns and grievances. A grievance mechanism will be available to allow an AP appealing any disagreeable decision, practice or activity arising from land or other assets compensation. APs will be fully informed of their rights and of the procedures for addressing complaints whether verbally or in writing during consultation, survey, and time of compensation.
284. APs/ local community will enter their complaints/ concerns and issues formally including the information of date, name and address of complainant, description of complain. The Assistant Manager (social mobilization) at PIU will maintain a register named as "community complaint register (CCR)". The register will include the information as date, name and address of complainant, description of complaints, and will enter the complaints in a date covering the minimum information of name and address of complaint, description of complaints, action taken, status of redress of complaints and reasons in case issue not resolved.
285. GRC will work at field level, while unsettled issues will be referred to the PMU at sub-project level. The field level PIU (AM Environment) will inform the affected persons about GRC and its mechanism by passing the information at known places.
286. Efforts will be made to avoid the APs/ community concerns by implementing the sub-project in accordance with the EMP, i.e. proper information disclosure, community consultations, payments as per entitlements and coordination with APs/ APC, PIU and PMU. However, a Grievance Redress Committees (GRC) will also be established to redress the unresolved issues.
287. The composition of GRC will as below:

GRC at PIU Level

- i). Executive Engineer (NTDC)
 - ii). Representative of E&SIC(Assistant Manager (Social Mobilization)
 - iii). Representative of CSC
 - iv). Representative of Contractor
 - v). 3 Representatives of Affected Person Committee (APC) including Nazim/Village Notable person
- a) A comprehensive grievance redress process regarding land compensation and other compensation is described below:

Table 7.1: Grievance Redress Process

Land / Crop Compensation Issues	Other Environmental and Social Issues
<ul style="list-style-type: none"> First, complaints will be redressed at field level through the involvement of PIU and APC as well as other local committees. 	<ul style="list-style-type: none"> First, complaints will be redressed at field level through the involvement of PIU and APC as well as other local committees.
<ul style="list-style-type: none"> If issue is unresolved, then it will be lodged to the DO (Revenue)/ LAC who will have 14 day to make decision on it. 	<ul style="list-style-type: none"> If no solution is accomplished, then grievance will be lodged to GRC. The GRC will provide the decision within 3 weeks. The GRC decision must be in compliance with this EMP and provisions given in the EMP.
<ul style="list-style-type: none"> If issue still unsettled, then grievance will 	<ul style="list-style-type: none"> If the grievance redress system does not satisfy the APs,

<ul style="list-style-type: none"> be forwarded to GRC. GRC will provide decision within 3 weeks, which should be in compliance with the EMP and provisions given in the EMP. 	<p>then, the grievance can be submitted to the GM Projects (PMU), where decision will be made in a period of 2 weeks.</p>
<ul style="list-style-type: none"> In case, the grievance redress system does not satisfy the APs, then they can pursue by submitting their case to the appropriate court of law. 	<ul style="list-style-type: none"> If still APs are not satisfied, they can pursue their case to appropriate Court of law.

288. The grievance redress procedure will comply with the requirements of ADB SPS (2009) in addressing people's concerns and complaints promptly and in a transparent manner as shown in Figures 7.3 and 7.4.

7.7.1 GRM – Preconstruction Phase

289. During the pre-construction phase of the project, the most likely grievances that may be encountered involve land acquisition and compensation.

290. The mechanism shall comply with land acquisition, land use right implementation, compensation, allowances, resettlement sequences and procedures provided in the LARP of this project in accordance with national and provincial laws and regulations. In general, the grievance redress mechanism of the project during the pre-construction phase shall observe the following steps and outlined in **Figure 7.3**:

Step 1: The project affected person informs the village head and NTDC about his/her concerns on the project. A meeting at the commune level will be conducted to discuss the concerns of the complainant.

Step 2: If the project affected person is not satisfied with the resolution of the complaint at the commune level, he/she can submit a complaint to the district officer Revenue/LAC at the district level.

Step 3: If the affected person does not agree with the administrative action or decision of the district level, the affected person can elevate the complaint to the GRC.

Step 4: If the affected person is still not satisfied with the decision of the GRC, the complaint is sent to the Court. The decision of the Court becomes the final legal basis for the implementation of the compensation.

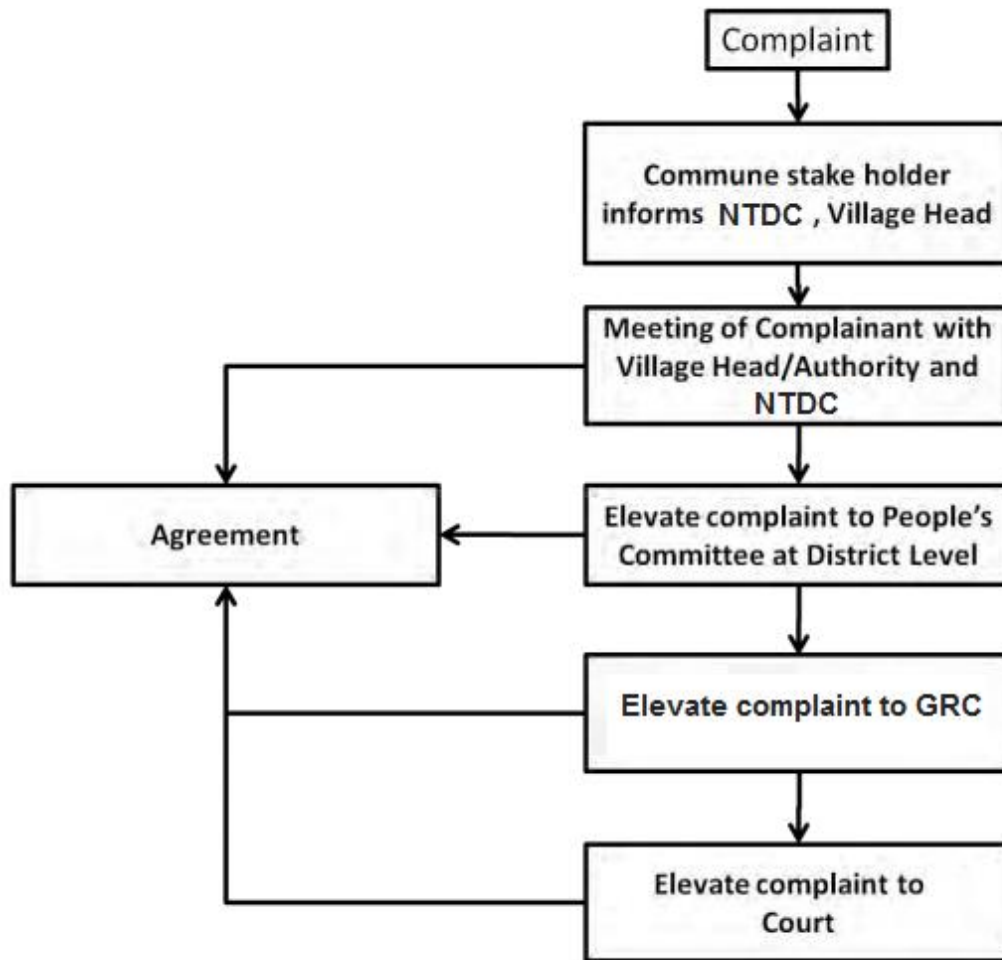


Figure 7.3: Grievance Redress Procedure during the Pre-Construction Phase

7.7.2 GRM - Construction and Operational Phases

291. Grievances during construction may also include impacts related to physical construction works on the towers and substation and the site clearing activities. During the operational phase of the project, the complaints that may be anticipated are related to maintenance activities of the connection lines and facilities.

Step 1: A complainant may send his/her concerns about the construction or operation of the project to NTDS or the construction contractor and the head of the commune. Immediate action on the complaint is expected from the contractor or the NTDC on the concern raised by the complainant. The resolution of the complaint should be done within two weeks.

Step 2: When the complainant is not satisfied with the action or decision of the NTDS or the contractor, the complainant can inform the head of the commune about the matter. The commune head/authority through the Commune People's Committee will then call a meeting of the complainant, NTDS, and contractor to resolve the complainant.

Step 3: When the complainant is not satisfied with the action or decision on the complaint, it is then elevated to the district level for resolution.

Step 4: Complaints not resolved at the district level are elevated to the People's Committee at the GRC level for resolution.

Step 5: When the complaint is not resolved at the People's Committee at the GRC, the complaint is then elevated to the Court. The decision of the Court becomes the final legal basis for the decision on the complaint

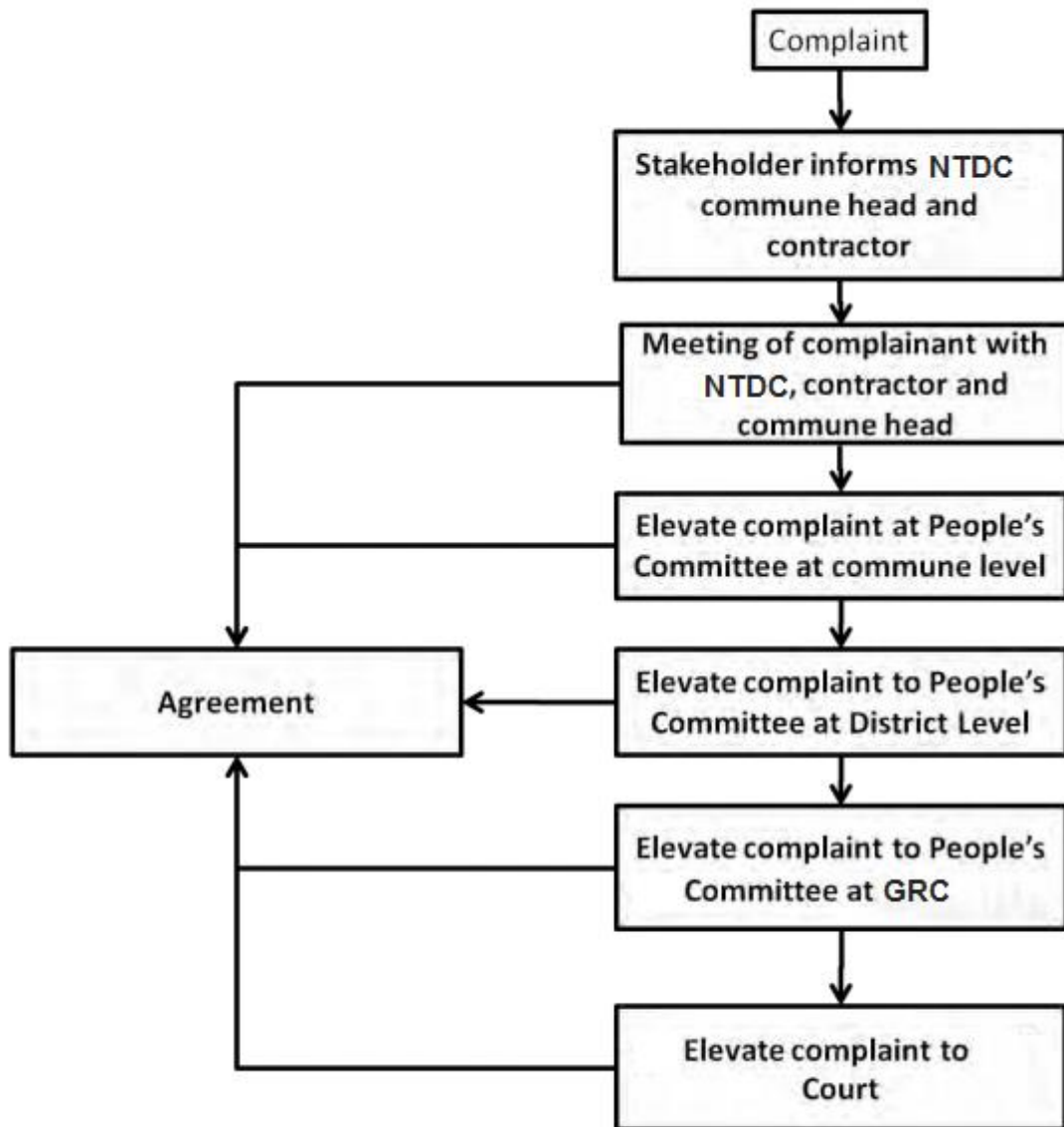


Figure 7.4: Grievance Redress Procedure during the Construction and Operational Phases

8. Conclusions and Recommendations

8.1. Conclusions

292. Based on the preliminary plans, environmental and social field surveys and impact assessment of the proposed 220 kV Zhob Grid station and associated 220 km Transmission Line Zhob – D.I Khan, there are insignificant, short term and reversible impacts of the project. The major impacts of the project are summarized as follows:
- i. No acquisition of permanent land will be involved for erection of towers for transmission line as per Telegraphy Act, 1910. However, the payments for the loss of trees and crops will be made as per market rates.
 - ii. All the other impacts like soil erosion, soil contamination, water contamination, air pollution, high noise level, etc. are of temporary nature and can be controlled and mitigated.
 - iii. It is estimated that the implementation of project activities will cause cutting of about 6,000 trees.
 - iv. No protected forest area or wildlife sanctuary or any other environmentally sensitive site exists along the Project corridor, which may be affected by the Project.
 - v. No indigenous people and women headed households have been identified in the Project.
 - vi. The other social issues like safety of general public and workers, security problems, risk of communicable diseases, vector borne diseases etc. are of temporary nature.
 - vii. Most of the above impacts are of temporary nature and manageable through good engineering practices and none of these are irreversible.
 - viii. A comprehensive EMP has been developed identifying the impacts, mitigation measures, agencies responsible for implementation and monitoring of the proposed measures. EMP also describes the environmental and social monitoring responsibilities of ESIC.
 - ix. The total estimated cost for the environmental and social management comes to about PKR 4.13 million.
293. In the light of the above discussions, it may be concluded that the proposed preliminary Project route is environment friendly and will cause the least effects on the area's existing social and environmental settings.

8.2. Recommendations

294. Although comprehensive mitigation measures have been proposed in the report to minimize the negative impacts and to enhance the positive impacts of the Project, however, major recommended mitigation measures are summarized as follows:
- i. Temporary labour camps shall be developed inside the grid station boundary and should be facilitated with proper drainage facilities.

- ii. Soil erosion and contamination, water contamination, air pollution and high noise levels shall be controlled with the use of good engineering practices.
- iii. Contractor shall develop different plans such as traffic management, Solid waste management and material management etc. before starting the construction activities.
- iv. Fair and negotiated compensation in accordance with the prevailing market prices shall be made for loss of crops and trees during the construction activities of the Project.
- v. Erection of towers in the water bodies shall be avoided as far as possible. However, at places where realignment of the transmission line is unavoidable, towers with the maximum span shall be used to minimize the number of towers in the water body.
- vi. Contractor shall warn the workers not to hunt the water birds, fish resources, etc.
- vii. The Contractor will have to adopt some suitable timing for the construction activities so as to cause the least disturbance to the local community particularly women considering their peak movement hours.
- viii. Contractor shall take due care of the local community and its sensitivity towards local customs and traditions.
- ix. EMP proposed in the report should be implemented in the true letter and spirit.

ANNEXURES

Annexure I - REA CHECKLIST

Instructions:

- (i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.
- (ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
- (iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:**220 KV Zhob Grid Station and Associated Transmission Line****Sector Division:**

Power Transmission

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting			
Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No cultural heritage site near the project corridor.
▪ Protected Area	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No protected site near the project corridor.
▪ Wetland	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
▪ Mangrove	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
▪ Estuarine	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
▪ Buffer zone of protected area	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
▪ Special area for protecting biodiversity	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
B. Potential Environmental Impacts			
Will the Project cause...			
▪ encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No impact on historical site, but landscape will be disrupted and waste will be generated. That will be managed by implementation of EMMP
▪ encroachment on precious ecosystem (e.g. sensitive or protected areas)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
▪ alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The impact will be minimum and limited to the tower foundation sites. The appropriate mitigation measures will be built into the EMP to address this impact.
▪ damage to sensitive coastal/marine habitats by construction of submarine cables?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Such activities are not involved in proposed project.

SCREENING QUESTIONS	Yes	No	REMARKS
▪ deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	As per EMP provisions, respective mitigation measure will be followed.
▪ increased local air pollution due to rock crushing, cutting and filling?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Appropriate mitigation measure will be adopted to minimize the impact.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The impacts will be short term and will be observed only in construction phase. Respective mitigation measures will be adopted to minimize the impact.
▪ chemical pollution resulting from chemical clearing of vegetation for construction site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NTDC does not use any chemical for vegetation removal.
▪ noise and vibration due to blasting and other civil works?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Blasting will not be involved, but the noise and vibration will be generated during construction phase by heavy machinery. These impacts will be occur, even though it will be mitigated by implementing the Environment Management Plan.
▪ dislocation or involuntary resettlement of people?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
▪ social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Contractors will be strictly advised not to interfere the local community resources.
▪ hazardous driving conditions where construction interferes with pre-existing roads?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The drivers will be advised to keep the speed below 30km/hr. and traffic planning to avoid hazardous circumstances.
▪ creation of temporary breeding habitats for vectors of disease such as mosquitoes and rodents?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	This impact can be minimized by proper waste management and other remedial measures.
▪ dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
▪ environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Properly control the vegetative growth during operation phase with due consideration of environmental protocols.
▪ facilitation of access to protected areas in case corridors traverse protected areas?	<input type="checkbox"/>	<input type="checkbox"/>	There is no protected area in the vicinity of the project corridor.
▪ disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NTDC does not use any herbicide for vegetation control or removal.
▪ large population influx during project construction and operation that cause increased burden on social infrastructure and services (such as water supply and sanitation systems)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	It may not likely be happened, as the line passes mostly away from population, more over the contractor will advised for proper care to avoid social conflict.
▪ social conflicts if workers from other regions or countries are hired?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	It will not likely be happened, as mostly the local labor is hired.
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	These impacts will be mitigated by proper implementation of EMP provisions regarding health, safety, waste management and sanitation protocols.
▪ risks to community safety associated with maintenance of lines and related facilities?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Community associated safety safeguards are considered during operation phase.

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization? 	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Al ready considered in the feasibility/design stage.
<ul style="list-style-type: none"> risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Explosive material will not be used, but other materials like fuel, oil etc. will be kept in the construction camps only. Transport and disposal of such materials will be according to protective measures given in EMP. Therefore, risk to community health and safety is manageable by maintaining H&S protocols.
<ul style="list-style-type: none"> community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., high voltage wires, and transmission towers and lines) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning? 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	These impacts will be mitigated by implementing EMP provisions during all the stages of project implementation.

Annexure II - SURVEY QUESTIONNAIRE

Serial No. _____

Interviewer's Name _____

Date _____

Name of the Respondent _____

Father's Name _____

Age (years) _____

Education _____

Q.1 Name of Tehsil: آپ کے علاقے کی تحصیل کا نام کیا ہے؟

Q.2 Name of Union Council: آپ کی رہائش گاہ کی یونین کونسل کا نام کیا ہے؟

Q.3 Name of Valley: آپ کی رہائش گاہ کی وادی کا نام کیا ہے؟

Q.4 Name of the Village: آپ کے رہائش گاہ کے گاؤں کا نام کیا ہے؟

Q.5 Names of Tribes in the Village: آپ کے رہائش گاہ کے گاؤں میں کون سے قبیلے ہیں؟

1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.

Q.6 Languages Spoken in the Village: آپ کے گاؤں میں بولی جانے والی زبانیں کونسی ہیں؟

1		4	
2		5	
3		6	

Q.7 Accessibility from main road to Village:

Track	Un metalled Road	Metalled Road	Other (Specify)
-------	------------------	---------------	-----------------

Q.8 Distance from tarred road to Village: _____ Km گاؤں سے سڑک تک فاصلہ؟

Q.9 Approximate area of the Village: _____ (km²) آپ کے گاؤں کا کل رقبہ تقریباً کتنے مربع کلومیٹر ہے؟

Q.10 Approximate population of the Village _____ آپ کے گاؤں کی کل آبادی تقریباً کتنی ہے؟

Q.11 Total Houses in the Village _____ آپ کے گاؤں میں تقریباً کتنے گھر ہیں؟

Q.12 Educational Facilities Available in the Village. آپ کے گاؤں میں کون سے تعلیمی ادارے ہیں؟

Sr. No	Facilities	Yes	No	Govt.	Private	Boys (M)	Girls (F)	Co-Education
(a)	Primary School							
(b)	Middle School							
(c)	High School							
(d)	College							
(e)	Vocational Training Centers							
(f)	Deeni Madrassa							
(g)	Others (Specify)							

Q.13 Institutional Facilities Available in the Village. آپ کے گاؤں میں درج ذیل میں سے کونسی سہولیات موجود ہیں؟

Sr. No	Facilities	Yes	No	Govt.	Private	Name
a.	Hospital					
b.	Dispensary					
c.	Basic Health Unit					
d.	Post Office					
e.	Mosque					
f.	Banks					

g.	Others					
----	--------	--	--	--	--	--

Q.14 Means of Transport Available in the Village.

آپ کے گاؤں میں کون سے ذرائع موجود ہیں؟

LOCAL	INTERCITY
1. Public Transport	1. Public Transport
2. Private Transport	2. Private Transport
3. Pedestrian	3. Pedestrian
4. Others	4. Others

Q.15 Civic Facilities Available in the Village

آپ کے گاؤں میں درج ذیل سہولتیں کتنی درجہ تک دستیاب ہیں؟

Sr. No	Facilities	Yes	No	Remarks if Any
A	Lined Drainage System	1	2	
B	Street Lights	1	2	
C	Grocery Shops	1	2	
D	Recreational / Games Facilities	1	2	
E	Medical Stores	1	2	
F	Graveyards	1	2	
G	Electricity	1	2	
H	Telephone	1	2	
I	Public Water Supply	1	2	
J	Others	1	2	

Q. 16 Source of Water in the Village

آپ کے گاؤں میں کون سے ذرائع دستیاب ہیں؟

Storage Pit	Channel	Spring	Nullah	Other _____
A	B	C	D	E

Q.17 If Channel,

1 Katcha

2 Partly Lined

3 Completely Lined

Q.18 Nature of water supply

آپ کے گاؤں کو پانی کس طرح پہنچایا جاتا ہے؟

1. Public	Mode of supply of water:	(a) Self Carried (b) Tapped
-----------	--------------------------	--------------------------------

2. Private		(c) By Channel (d) By Tanker
------------	--	---------------------------------

Q. 19 Common Diseases in the Village

آپ کے گاؤں میں عموماً کونسی بیماریاں پائی جاتی ہیں؟

a. Common cold	b. Diarrhea	c. Typhoid
d. Stomach Worms	e. TB	f. Malaria
g. Goiter	h. Dysentery	i. Hepatitis
j. Other (specify)		

Q.20 Does a Child Birth Attendant Available in the Village?

1. Yes

☐

2. No

☐

کیا آپ کے گاؤں میں بچے کی پیدائش کے لیے دینی سہولت ہے؟

Q.21 If Yes: اگر ہاں تو کیا دوا تریت یا لوتہ ہے یا غیر تریت یا لوتہ؟

1 Trained

☐

2 Untrained

☐**Q. 22 Does any NGO exist in the Village?**

کیا آپ کے گاؤں میں کوئی غیر سرکاری تنظیمیں کام کر رہی ہیں؟

1. Yes

☐

2. No

☐**Q.23 If Yes:**

Sr.No	Name	Status
A		1. Local 2. National 3. International
B		1. Local 2. National 3. International
C		1. Local 2. National 3. International

Q.24 Major Development projects run by different organizations in the village?

کیا آپ کے گاؤں میں کوئی بڑے پیمانے پر چلائی ہو کر رہا ہے؟ جی ہاں؟ براہ مہربانی ان کے نام بتائیے؟

- _____
- _____
- _____

Q.25 Who has the ownership rights of the mountains, pastures, jungles and natural resources of the area? آپ کے علاقے میں پہاڑوں، چرائیگاؤں، جنگلات اور قدرتی وسائل کے ملکیتی حقوق کس کو حاصل ہیں؟

- a. Owner Tribes ☐ b. Non Owner Tribes ☐ c. Individual ☐
d. Others (Specify) _____

Q.26 Who has the right to allow the people to get benefits from natural resources? (Forest trees, Mountains, Pastures, Herbs etc)? ان قدرتی وسائل سے فائدہ حاصل کرنے کے لیے کون سے گروہ کو اجازت دینے کا حق کس کو حاصل ہے؟

- a. Owner Tribes ☐ b. Non Owner Tribes ☐ c. Owner ☐
d. None ☐ e. Others (Specify) _____

Q.27 Who has the rights of selling and purchasing the agriculture land, residential and commercial property? آپ کے گاؤں میں زرعی زمین، رہائشی اور کمرشل ملکیت کی خرید و فروخت کا حق کس کو حاصل ہے؟

- a. Owner Tribes ☐ Non Owner Tribes ☐ c. Individual ☐
d. Anyone ☐ e. Others (Specify) _____

Q.28 What are the preferences to sell the personal immovable property like houses, agriculture land, shops etc. to:

ذاتی جائیداد مثلاً گھر، زرعی زمین اور دکانیں وغیرہ بیچنے کے لئے درجن ذیل میں سے کون کون سی چیزیں چاہتی ہیں؟

- a. Owner Tribes ☐ b. Non Owner Tribes ☐
c. Immediate Neighbor ☐ d. Anyone ☐
e. Others (Specify) _____

Q.29 What are the prevalent units of measurement of agricultural land in your village? آپ کے گاؤں میں زرعی زمین کی پیمائش کے لئے درجن ذیل میں سے کون سے پیمانے استعمال کئے جاتے ہیں؟

- a. Marlas ☐ b. Kanals ☐ c. Acres ☐
d. Jarib ☐ e. Sq Feet ☐ f. Sq. Haath ☐
g. Others (Specify) _____

Q.30 What are the prevalent units of measurement of agricultural produce in your village? آپ کے گاؤں میں زرعی اجناس کی پیمائش کے لئے درجن ذیل میں سے کون سے پیمانے استعمال کئے جاتے ہیں؟

- a. Kilogram ☐ b. Maunds ☐ c. Haa ☐
d. Sinn ☐ e. Others (Specify) _____

Q.31 Who are the influential in your village?

آپ کے گاؤں میں درجن ایل میں سے کون سے لوگ سب سے زیادہ صاحب دماغ ہیں؟

- | | | | |
|---------------------------|----------------------|----------------------|----------------------|
| a. Head of the Tribe | <input type="text"/> | b. Councilors | <input type="text"/> |
| c. Religious Scholars | <input type="text"/> | d. Heads of Families | <input type="text"/> |
| e. Government Servants | <input type="text"/> | f. Numberdar | <input type="text"/> |
| g. Others (Specify) _____ | | | |

Q.32 How the matters related to property, dispute about the control and Consumption of the natural resources of the area are settled?

آپ کے گاؤں میں جائیداد اور قدرتی وسائل کے استعمال سے متعلق مسائل سے اچھڑنے والے درجن ایل میں سے کون کون سے طریقے استعمال کئے جاتے ہیں؟

1. Jirgah جرگہ	2. Head of the Tribes قبیلے کا سردار
3. Council of Ulamaہ علماء کونسل	4. Heads of Families سربراہ خاندان
5. Government Officials سرکاری افسر	6. Others (Specify)

Q.33 What types of migration exists in your village?

آپ کے گاؤں میں لوگ درجن ایل میں سے کس نوعیت کی نقل مکانی کرتے ہیں؟

Patterns of local migration		
Nature of Migration	Duration	Radius of Migration
(a) Permanent	(a) Seasonal	(a) Within the same valley
(b) Temporary	(b) Yearly	(b) Within the local neighboring valleys
(c) Voluntary	(c) Monthly	(c) Within the neighboring districts
(d) Involuntary	(d) Others (Specify)	(d) In Province
(e) Individual		(e) Other parts of the country
(f) With family / sub-tribe		
(g) Other		

Q.34 What are the reasons of local migration in your village?

مقامی نقل مکانی کی کوئی بڑی وجوہات ہیں؟

- a. _____
- b. _____
- c. _____

Q.35 What are the major problems of your area?

آپ کے گاؤں میں آبادی نوعیت کے کون سے بڑے مسائل ہیں؟

Sr.No	Types of Problems	Proposed Solutions
-------	-------------------	--------------------

A		
B		
C		
D		
E		
F		

Q.36 Do rock carvings / historical places exist in the village?

1. Yes ☐ 2. No ☐

کیا آپ کے گاؤں میں آثار قدیمہ سے متعلق یا دیگر تاریخی مقامات / اشیاء موجود ہیں؟

Q.37 If yes: اگر ہاں تو مندرجہ ذیل کی تفصیل دیجئے؟

Sr.No	Name	Number	Location
A	Rock Carvings		
B	Historical Ruins		
C	Old Graveyard		
D	Others (Specify)		

Q.38 Are there markets for grains and livestock in the village?

کیا آپ کے گاؤں میں اناج اور جانوروں کی خرید و فروخت کے لئے منڈیاں ہیں؟

Q.39 If No, where do people sell their agricultural produce and livestock?

اگر نہیں تو کون سی جگہ پر جانور یا اناج فروخت کرتے ہیں؟

Grains	
Livestock	

Q.40 What types of trees are in your area?

آپ کے گاؤں میں درختوں کی کون سی قسمیں عام طور پر کون سے درخت پائے جاتے ہیں؟

Fruit Trees	
Forest/wood Trees	

Q.41 What kinds of wild animals are found in your village area?

آپ کے گاؤں کے گرد و اطراف میں کون کون سے جنگلی جانور پائے جاتے ہیں ان کے نام بتائیے؟

Q.42 What type of cottage industry exists in your village?

آپ کے گاؤں میں کون کون سی گھریلو صنعتیں ہیں ان کے نام بتائیے؟

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Comments of the Interviewer

ملاحظات کرنے والے کی معلوماتیں

-- END --

Annexure III - PUBLIC CONSULTATION

<i>Sr. No</i>	<i>Participant Name</i>	<i>Village</i>	<i>Remarks/Concerns</i>
1	<ul style="list-style-type: none"> Abdul S/O Zingi Khan Mumtaz S/O Jalil Mukarram Shah Hazrat Khan S/O Ghulam Khan Mehsud 	Pusha (G/S Site)	<p>Residents did not raise many issues. Exceptions were the importance of providing information early and well before the start of work, targeting minimum wastage of crops, compensation according to the appropriate shares in crops, employment as labourer during installation of T/L, avoiding extensive tree cutting, advance payment should be made before harvesting the crops, T/L should be diverted to avoid houses, interested to become guard / watchman during implementation of the TL, prompt compensation and less wastage, payment should be made to the affected person, not to the landowner only, compensation should be through crossed check, early & fairly compensation required.</p> <p>Due to cultural and traditional restrictions, many women folks could not be consulted. The issues raised by a few women included:</p> <p>i. Minimum wastage of crops & trees,</p> <p>ii. Company workers should take care of our culture during installation of T/L,</p> <p>iii. Employment should be given to local men,</p>
2	<ul style="list-style-type: none"> Majid S/O Khan Doran Ayub S/O Murad Shah Baran S/O Umar Daraz Hassan S/O Badshah Salahuddin S/O Jahangir Ibrahim S/O Qasim Shahzad Khan S/O Badshah 	Muddy	
3	<ul style="list-style-type: none"> Aziz ur Rehman (Hawaldar) M. Akram Anayatullah S/O Sohrab Khan Inamullah Nasir S/O Muhammad Amir 	Hassani	
4	<ul style="list-style-type: none"> Naimatullah S/O Jan Muhammad Abdus Salam S/O Jumma Khan Rehmat S/O Pir Ghulam Mushtaq S/O Abdur Razzaq 	Kot Essa Khel	

5	<ul style="list-style-type: none"> • Amanullah S/O M Hayat • Ubaidullah S/O Abdul Sattar • Asmatullah S/O Abdul Sattar • Asmatullah S/O Abdul Sattar • Abdul Sattar S/O Sarfaraz • Najib Ullah S/O Ghulam Shah • Umer Khitab S/O Abdur Razzaq (Number Dar) 	Draban Kalan	<p>iv. Company works should not disturb us during field work,</p> <p>v. Project should offer jobs to the affected persons and compensation should be according to shares in crops.</p>
6	<ul style="list-style-type: none"> • Abdul Wajid Shah S/O Syed Gulbad Shah • Mohabat Shah S/O Ajab Shah • Mashal Din S/O Mehr Din 	Darazinda (F.R D.I Khan)	
7	<ul style="list-style-type: none"> • Nasir Ullah Jan S/O Abdulah Jan • Akhtar Muhammad S/O Abdul Rehman • Sana Ullah S/O Badr ud Din • Khurshid Khan S/O Aziz Ullah 	Manday Zai Killi	

Annexure IV - PHOTOLOG



Meeting with XEN Public Health (Distt. Zhob)



Meeting at Forest Office (Distt. Zhob)



Meeting at Deputy Commissioner's Office (Distt. Sherani)



Meeting Deputy Director Agriculture (Distt. Zhob)



Meeting at Revenue Office (Distt. Sherani)

Public Consultation at Pusha



Meeting at DFO's Office (Distt. Sherani)



Public Consultation at Pusha



Public Consultation at Muddy



Public Consultation at Muddy



Public Consultation at Kot Essa Khel



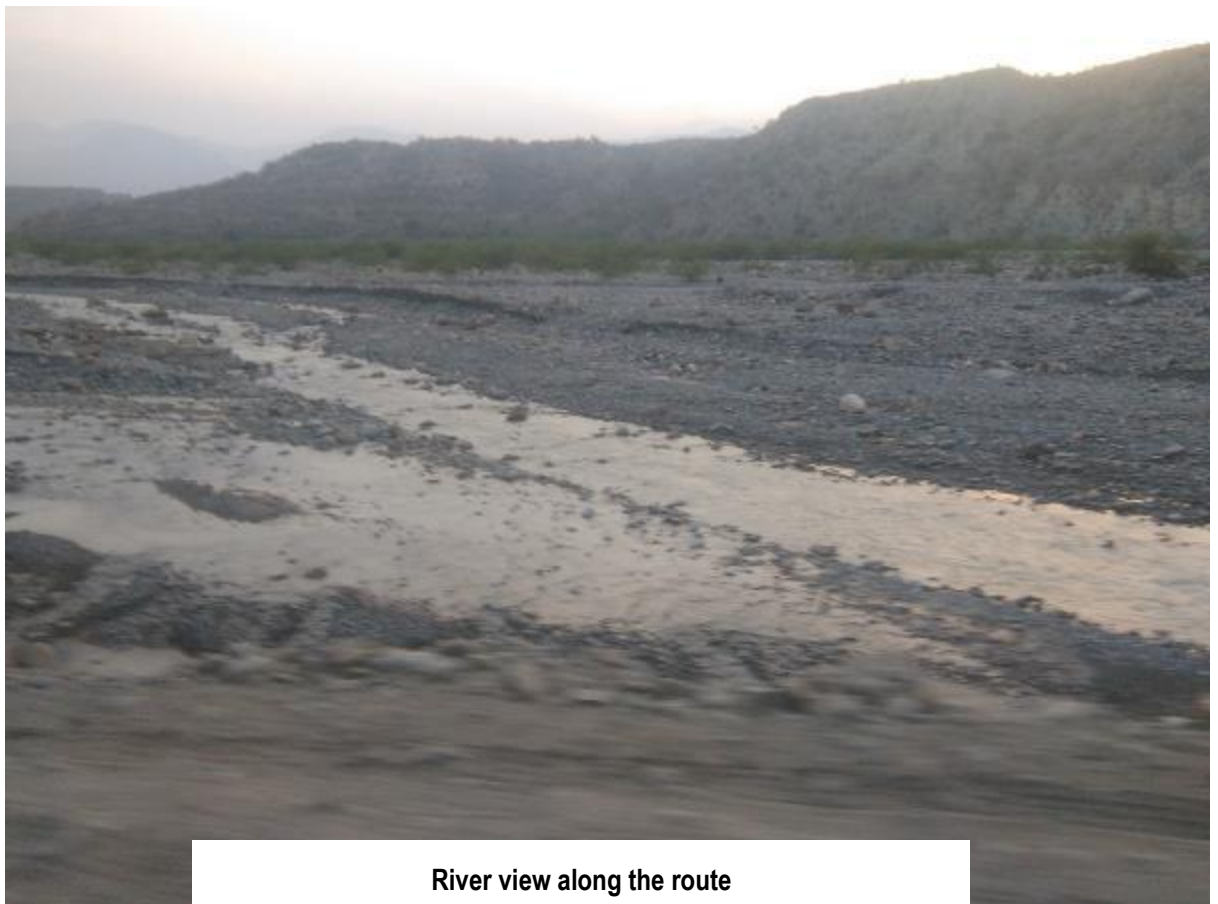
Public Consultation at Darazinda



Public Consultation at Draban Kallan



Public Consultation at Manday Zai Killi



River view along the route



Proposed Grid Station Site near D.I Khan (Pusha)





Crops at Muddy



Police Check Post near Muddy



Draban Kalan View



Abandoned Building near Draban Kallan



Livestock at Draban Kallan



Govt. Girls College at Darazinda



Govt. Boys High School at Darazinda



A view of Darazinda (along the proposed route)





Govt. Boys Degree College Zhob



Proposed Grid Station Site at Zhob



A view at Manday Zai Killi



Govt. High School Manday Zai



A view of Zhob City from DC Office Zhob

Annexure V - BROCHURE

ماحولیاتی انتظامی منصوبہ برائے بجلی گھر / ترسیلاتی قایم (گرڈ سٹیشن / ترانسمیشن لائن)

نمبر شمار	متوقع ماحولیاتی اثرات	طریقہ ہائے عداوت	ذرائع عداوت	لاگو کنندہ محکمہ / ادارہ	نگرانی
دوران تعمیر					
1.	پراجیکٹ کے بارے میں لوگوں کو آگاہی	مقامی آبادی کو پراجیکٹ شروع کرنے سے پہلے آگاہ کرنا کہ: * پراجیکٹ کی تعمیر سے کیا فائدہ ہوگا * دوران تعمیر کوئی عارضی نقصانات ہوگا	محکمہ نگرانی کا	کنسلٹنٹ کا ماحولیاتی ماہر	این۔ٹی۔ڈی۔سی
2.	پراجیکٹ سے مقامی آبادی اور متاثرہ لوگوں کی شکایات کا ازالہ	شکایات کے ازالہ کے لیے مقامی / متاثرہ اور پراجیکٹ پر مشتمل کمیٹی کا قیام	محکمہ نگرانی	کنسلٹنٹ / این۔ٹی۔ڈی۔سی	این۔ٹی۔ڈی۔سی
3.	شکایات ازالہ کمیٹی کے کام کرنے کا طریقہ کار	* سب سے پہلے شکایت مقامی طور پر متاثرہ فرد / افراد اور انتظامیہ حل کرے گی * شکایت مقامی طور پر حل نہ ہونے کی صورت میں متاثرہ فرد / افراد شکایت ازالہ کمیٹی کے پاس جانے کا * شکایت ازالہ کمیٹی 3 ہفتے کے اندر حل کرے گی جو کہ ماحولیاتی انتظامی منصوبے کے عین مطابق ہوگا * متاثرہ فرد / افراد کی تسلی نہ ہونے کی صورت میں پراجیکٹ منسوخ کو شکایت کی جانے کی جگہ دو (2) ہفتے میں فیصلہ کرے گا۔ * اگر پھر بھی متاثرہ شخص کی تسلی نہ ہو تو وہ دائری کے لیے مقامی عدالت میں جاسکتا ہے	محکمہ نگرانی متاثرہ آبادی، پراجیکٹ انتظامیہ، ضحیکدار اور کنسلٹنٹ کے نمائندوں پر مشتمل کمیٹی کا قیام	کنسلٹنٹ / پراجیکٹ انتظامیہ	پراجیکٹ انتظامیہ
4.	آلودگی کی گزرگاہ کی بہتری، ڈھلوان کی وجہ سے زمین کٹاؤ اور منصوبہ کے مختلف مراحل کا جائزہ	زمین کٹاؤ کو کم کرنے کے لیے پانی کے بہاؤ کے گچے راستے بنانا	محکمہ نگرانی	ضحیکدار اور ماحولیاتی انجینیر	این۔ٹی۔ڈی۔سی
5.	بست مٹی بحر و غیرہ کی وجہ سے سطح زمین کا غیر ہموار یا خراب ہونا	* مٹی، بست اور بحر و غیرہ صرف بحر، قاتو زمین یا دریا سے لینے جائیں * پیداواری زمین کی ہر حال میں حفاظت * مٹی، بست اور بحر کے حصول کے بعد متاثرہ جگہوں کی ہمواری	محکمہ نگرانی / ضحیکہ میں ماحولیاتی نگرانی کی شرائط کا اندراج	ضحیکدار اور ماحولیاتی انجینیر	این۔ٹی۔ڈی۔سی
6.	تعمیراتی سامان کے حصول کی جگہ کا جائزہ	* تعمیراتی سامان کے حصول کی جگہ لائسنس یافتہ ہو * نئی جگہ سے تعمیراتی سامان لینے سے پہلے محکمہ کی باقاعدہ اجازت درکار ہوگی	محکمہ نگرانی	ضحیکدار اور ماحولیاتی انجینیر	این۔ٹی۔ڈی۔سی
7.	تعمیراتی سامان کا جائزہ، دوران تعمیر پانی کی ترسیل اور آلودگی کا جائزہ	* پمپوں اور موہل آئل وغیرہ کو پانی کے ذریعے سے دور رکھنا اور سامان کی مکمل حفاظت * پانی کے ذرائع کی مکمل حفاظت * قاتو اور ضائع سامان کو مناسب طریقے سے محفوظ جگہ پر ٹھکانے لگایا جائے	محکمہ نگرانی / معاہدے کی شرائط کے مطابق	کنسلٹنٹ	این۔ٹی۔ڈی۔سی
8.	دوران تعمیر نکاسی آب کے مسائل	بارش کے پانی کی درست نکاسی اور اور نقصان کی صورت میں دوبارہ تعمیر	محکمہ نگرانی	کنسلٹنٹ / ضحیکدار	این۔ٹی۔ڈی۔سی
9.	رہائشی کالونی اور کیپ کے سماجی اثرات اور کوڑا کنائی کے ماحولیاتی اثرات کا جائزہ	* مزدوروں اور پروجیکٹ سے وابستہ دیگر افراد کی رہائش مقام آبادی سے دور ہونی چاہیئے * رہائشی مقامات پر نکاسی آب اور کوڑا کنائی کا مناسب انتظام موجود ہو	محکمہ نگرانی	کنسلٹنٹ / ضحیکدار	این۔ٹی۔ڈی۔سی

ماحولیاتی انتظامی منصوبہ برائے بجلی گھر / ترسیلاتی تاریں (گرڈ سٹیشن / ٹرانسمیشن لائنز)

نمبر شمار	متوقع ماحولیاتی اثرات	طریقہ ہائے سمارک	ذرائع سمارک	ڈاگو کنندہ محکمہ / ادارہ	نگرانی
دوران تعمیر					
10.	دوران تعمیر استعمال ہونے والی گاڑیوں سے فضائی آلودگی کے اثرات	<ul style="list-style-type: none"> • مذکورہ گاڑیوں اور سدان سے آلودگی پاکستان کے ادارہ ماحولیات کے متعین کردہ معیار کے مطابق ہو • آلودگی کی مکمل نگرانی کی جائے 	محکمہ نگرانی	کنسلٹنٹ / انجینیر	محکمہ ماحولیات
11.	گرو خراب کی وجہ سے عمومی صحت پر اثرات	<ul style="list-style-type: none"> • کرش اور کنکریٹ پلاٹ آبادی سے دور ہو • گرو خراب سے بچنے کے لیے سوٹر پانی کا پھرنکا اور سدان کی گاڑیوں کو ڈھکنا وغیرہ 	محکمہ نگرانی	کنسلٹنٹ / انجینیر	محکمہ ماحولیات
12.	گاڑیوں، تعمیراتی کام سے ہونے والے شور کا جانہ	<ul style="list-style-type: none"> • تمام تعمیراتی مشینری کا شور آلودگی پاکستان کے ادارہ ماحولیات کے متعین کردہ معیار کے مطابق ہو جبکہ تمام گاڑیوں میں شور کم کرنے کا آلہ نصب ہو • تمام مزدوروں کو شور سے بچانے کے آلات دیے جائیں 	محکمہ نگرانی	کنسلٹنٹ / انجینیر	محکمہ ماحولیات
13.	منصوبہ کے مختلف مراحل میں ہارور کے اثرات کا جانہ	<ul style="list-style-type: none"> • ہاروری کام پاکستانی قانون کے مطابق ہو • نزدیکی باسیں کو پہلے سے مطلع کیا جائے • متعلقہ مزدوروں کو ذاتی حفاظت اور بچانے کے آلات کی فراہمی کو یقینی بنایا جائے 	محکمہ منصوبہ بندی	کنسلٹنٹ / انجینیر	محکمہ ماحولیات
14.	تعمیراتی کاموں کے درخت اور دیگر نباتات پر ممکنہ منفی اثرات	<ul style="list-style-type: none"> • کوئی بھی پورا محکمہ جنگلات کی منظوری کے بغیر ناکارہ جائے • کاٹنے جانے والے درخت کا معاوضہ ادا کیا جائے اور نئے پودے لگائے جائیں 	محکمہ منصوبہ بندی	کنسلٹنٹ / انجینیر	محکمہ ماحولیات
15.	تعمیراتی کاموں کے جنگلی حیات پر ممکنہ منفی اثرات	مزدوروں کو جنگلی حیات کی حفاظت کی تربیت دینا، نیز شکار پر مکمل پابندی	محکمہ منصوبہ بندی اور نگرانی	کنسلٹنٹ / انجینیر	محکمہ ماحولیات
16.	تعمیراتی کاموں کے ممکنہ مداخلت	<ul style="list-style-type: none"> • کام کی جگہوں پر حفاظتی تختیاں نصب کرنا • مزدوروں کو بھرت، ماسک اور حفاظتی عینکیں، دستاں اور جوتے مہیا کرنا • ابتدائی طبی امداد کا انتظام اور مزدوروں کی تربیت • ٹریفک کا ذبح انتظام کرنا نیز ذرائعوں کی حفاظتی تربیت • تمام احتیاطی تدابیر کی عام لوگوں اور مقامی آبادی میں تعمیر، جگہوں کی نشاندہی اور ممکنہ خطرات سے آگاہی 	محکمہ نگرانی	کنسلٹنٹ / انجینیر	محکمہ ماحولیات
17.	تعمیراتی کاموں کا عوام کے استعمال کے ذرائع کو ممکنہ نقصان	<ul style="list-style-type: none"> • عام عوام کے استعمال کے ذرائع، ترسیل آب و نکاسی آب کی نالیوں، ٹیلیفون لائن، بجلی کے پل بچانا لازم ہے۔ • اگر سہیل کرنا ضروری ہو تو مقامی / رہائشی آبادی سے مشورہ کیا جائے 	محکمہ نگرانی	کنسلٹنٹ / انجینیر	محکمہ ماحولیات
بعد تعمیر (منصوبہ کے چلنے کی حالت میں)					
18.	زیادہ ڈھلوانی علاقے میں زمین کا کٹاؤ اور نباتات کی کمی	درختوں اور دیگر نباتات کی مکمل حفاظت، نئے پودے لگانا	صوبہ کے محکمہ جنگلات کے تعاون سے	این-ٹی-ڈی-سی	این-ٹی-ڈی-سی

Annexure VI – Archaeological Chance Find Procedures

Background

The purpose of this document is to address the possibility of archaeological deposits becoming exposed during ground altering activities within the project area and to provide protocols to follow in the case of a chance archaeological find to ensure that archaeological sites are documented and protected as required.

The Antiquities Act, 1975, protects archaeological sites, whether on Government owned or private land. They are non-renewable, very susceptible to disturbance and are finite in number. Archaeological sites are an important resource that is protected for their historical, cultural, scientific and educational value to the general public and local communities. Impacts to archaeological sites must be avoided or managed by development proponents. The objectives of this 'Archaeological Chance Find Procedure' are to promote preservation of archaeological data while minimizing disruption of construction scheduling. It is recommended that due to the moderate to high archaeological potential of some areas within the project area, all on site personnel and contractors be informed of the Archaeological Chance Find Procedure and have access to a copy while on site.

Potential Impacts to Archaeological Sites

Developments that involve excavation, movement, or disturbance of soils have the potential to impact archaeological materials, if present. Activities such as road construction, land clearing, and excavation are all examples of activities that may adversely affect archaeological deposits.

Relevant Legislation

It ensures the protection, preservation, development and maintenance of antiquities in the entire country, including the province of KP and Balochistan. The Act defines "antiquities" as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the KP and Balochistan provincial governments to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the subproject proponents are obligated to ensure that no activity is undertaken in the proximity of a protected antiquity, report to the Department of Archaeology, GoKPK and GoB, any archaeological discovery made during the course of the project.

Remedies and Penalties

The Antiquities Act, 1975 provides for heritage inspection or investigation orders, temporary protection orders, civil remedies and penalties to limit contraventions. These powers provide:

"A contravention of any provision of this Act or the rules shall, where no punishment has been

specifically provided be punishable with rigorous imprisonment for a term which may extend to two years, or with fine up to rupees ten hundred thousand, or with both. ”

Archaeological ‘Chance Find’ Procedure

If you believe that you may have encountered any archaeological materials, stop work in the area and follow the procedure below.

The following ‘chance-find’ principles will be implemented by the contractor throughout the construction works to account for any undiscovered items identified during construction works:

- (i) Workers will be trained in the location of heritage zones within the construction area and in the identification of potential items of heritage significance.
- (ii) Should any potential items be located, the site supervisor will be immediately contacted and work will be temporarily stopped in that area.
- (iii) If the site supervisor determines that the item is of potential significance, an officer from the department of Archaeology (DoA), GoKPK & GoB will be invited to inspect the site and work will be stopped until DoA has responded to this invitation.
- (iv) Work will not re-commence in this location until agreement has been reached between DoA and NTDC as to any required mitigation measures, which may include excavation and recovery of the item.
- (v) A precautionary approach will be adopted in the application of these procedures.

Detailed Procedural Steps

- If the Director, department of Archaeology receives any information or otherwise has the knowledge of the discovery or existence of an antiquity of which there is no owner, he shall, after satisfying himself as to the correctness of the information or knowledge, take such steps with the approval of the Government, as he may consider necessary for the custody, preservation and protection of the antiquity.
- Whoever discovers, or finds accidentally, any movable antiquity shall inform forth with the Directorate within seven days of its being discovered or found.
- If, within seven days of his being informed, the Director decides to take over the antiquity for purposes of custody, preservation and protection, the person discovering or finding it shall hand it over to the Director or a person authorized by him in writing.
- Where the Director decides to take over an antiquity, he may pay to the person by whom it is handed over to him such cash reward as may be decided in consultation with the Advisory Committee.
- If any person, who discovers or finds any movable antiquity contravenes the provisions of the Act, he shall be punishable with imprisonment for a term which may extend to five (05) years, or with fine not less than fifteen hundred thousand rupees or with both and the Court

convicting such person shall direct that the antiquity in respect of which such contravention has taken place shall stand forfeited to Government.

- The Director or any officer authorized by him with police assistance may, after giving reasonable notice, enter into, inspect and examine any premises, place or area which or the sub-soil of which he may have reason to believe to be, or to contain an antiquity and may cause any site, building, object or any antiquity or the remains of any antiquity in such premises, place or area to be photographed, copied or reproduced by any process suitable for the purpose.
- The owner or occupier of the premises, place or area shall afford all reasonable opportunity and assistance to the Director.
- No photograph, copy of reproduction taken or made shall be sold or offered for sale except by or with the consent of the owner of the object of which the photograph, copy or the reproduction has been taken or made.
- Where substantial damage is caused to any property as a result of the inspection, the Director shall pay to the owner thereof reasonable compensation for the damage in consultation with the Advisory Committee.
- If the Director after conducting an inquiry, has reasonable grounds to believe that any land contains any antiquity, he may approach the Government to direct the Revenue Department to acquire such land or any part thereof and the Revenue Department shall thereupon acquire such land or part under the Land Acquisition Act, 1894 (I of 1894), as for a public purpose.