

Initial Environmental Examination

Conversion from 66kV to 132kV Dera Murad Jamali, Rojhan, Usta Muhammad and Jhal Magsi Grid Stations along with Allied Transmission Lines

October 2016

PAK: MFF – Power Distribution Enhancement Investment Program (Tranche 3)

Prepared by Quetta Electric Supply Company, Balochistan for the Asian Development Bank.

NOTES

- (i) The fiscal year (FY) of the Government of the Islamic Republic of Pakistan and its agencies ends on 30 June.
- (ii) In this report "\$" refer to US dollars.

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Re: Fw: IEE (Reviewed by FMC) of QESCO for Tranche-3 Savings Subproject

Zehra Abbas
(632-1761)
Safia Shafiq, Liaqat Ali
Ehtesham Z. Khattak, Zhang Lei

28/10/2016 08:52 AM

Thank you, Liaqat sb., you can disclose it now.

Zehra Abbas (Ms.)
Senior Environment Specialist
Office of the Director General
Central & West Asia Department
Asian Development Bank
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Safia Shafiq

Dear Zehra, The revised IEE of QESCO convers...

21/10/2016 06:43:25 PM

From: Safia Shafiq/Consultants/ADB
To: Zehra Abbas/CWRD/ADB@ADB
Cc: Zhang Lei/CWRD/ADB@ADB, Ehtesham Z. Khattak/PRM/ADB@ADB, Liaqat Ali/PRM/ADB@ADB
Date: 21/10/2016 06:43 PM
Subject: Fw: IEE (Reviewed by FMC) of QESCO for Tranche-3 Savings Subproject

Dear Zehra,

The revised IEE of QESCO conversion subprojects under PDEIP Tranche 3 is attached for your review. I have checked it for incorporation of your comments.

Regards,

Safia Shafiq
Environment Specialist (Consultant)
Pakistan Resident Mission
Asian Development Bank

Level 8, North Wing, Serena Office Complex,
Khayaban-e-Suhrawardy G-5, Islamabad, Pakistan.
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-----Forwarded by Safia Shafiq/Consultants/ADB on 10/21/2016 03:41PM -----

To: Safia Shafiq/Consultants/ADB@ADB
From: Liaqat Ali/PRM/ADB
Date: 10/21/2016 02:48PM
Cc: Zhang Lei/CWRD/ADB@ADB, Ehtesham Z. Khattak/PRM/ADB@ADB
Subject: Fw: IEE (Reviewed by FMC) of QESCO for Tranche-3 Savings Subproject

Dear Safia:

The revised/updated IEE after incorporating your comments is below for your review please

Regards,

Liaqat Ali, Project Analyst, Pakistan Resident Mission
Level 8, North, Serena Office Complex, G-5, Islamabad/Pakistan
Tele: (92-51) 2600351-69/2087210 Fax: (92-51) 2600365-66/2087397-98
email: lali@adb.org.

----- Forwarded by Liaqat Ali/PRM/ADB on 21/10/2016 02:47 PM -----

From: Chief Engineer Development <qescocedev@yahoo.com>
To: "lali@adb.org" <lali@adb.org>, "sshafiq.consultant@adb.org" <sshafiq.consultant@adb.org>
Cc: CE PD PMU PEPCO <edtpepco@hotmail.com>, Umul Baneen <umul.zafar@smec.com>, "zlei@adb.org" <zlei@adb.org>
Date: 21/10/2016 01:28 PM
Subject: Re: Fw: IEE (Reviewed by FMC) of QESCO for Tranche-3 Savings Subproject

Dear sir/madam

Please find attached reviewed IEE of QESCO tranche 3 saving projects after addressing all your comments as desired.

- Please refer to para 34 . and yes these parameters are for 132kv TL as prescribed in last column table 3.1
- needful is done in para 29 and in EMP
- Please refer to para 139 and and needful is done in EMP
- Amended at para 46 and now there is no contradiction .
- This information is part of Tender doc and contractor is bound to implement EMP provided in general conditions of contract Document .

This is for your Information and further approval please.

Thanking you With B.Regards

Syed qutub udin
AM (Env) PMU
QESCO

From: "lali@adb.org" <lali@adb.org>
To: Chief Engineer Development <qescocedev@yahoo.com>
Cc: CE PD PMU PEPCO <edtpepco@hotmail.com>; "sshafiq.consultant@adb.org" <sshafiq.consultant@adb.org>; Umul Baneen <umul.zafar@smec.com>; zlei@adb.org; ekhattak@adb.org
Sent: Thursday, October 20, 2016 9:42 AM
Subject: Re: Fw: IEE (Reviewed by FMC) of QESCO for Tranche-3 Savings Subproject

Dear Chief Engineer:

Thank you for your submission of the revised IEE. We note that our following comments sent to you earlier have still not been addressed in the revised IEE:

- For Table 3.1, the source of the permissible conductor clearances is not stated.

Are these for 132kV transmission lines?

- In para 29, it states that the project will address both investment and institutional aspects, but the environmental training is poorly described (also in the EMP).
- In paras 37 and 61, it is mentioned that lack of clean water could create problems for construction workers, but this is not mentioned in the mitigation section or in the EMP.
- In para 46, it's mentioned that transformers containing PCBs were stopped in 1969, and yet para 133 leaves open the possibility that this may be an issue.
- Para 153 states that environmental measures should be costed separately in the tender doc and also that payment milestones should be linked to implementation of the EMP. But these do not clearly appear in the EMP.

Please incorporate these and resubmit the revised IEE at the earliest.

Regards,

Liaqat Ali, Project Analyst, Pakistan Resident Mission

Level 8, North, Serena Office Complex, G-5, Islamabad/Pakistan

Tele: (92-51) 2600351-69/2087210 Fax: (92-51) 2600365-66/2087397-98

email: lali@adb.org.

From: Chief Engineer Development <qescocedev@yahoo.com>

To: "sshafiq.consultant@adb.org" <sshafiq.consultant@adb.org>, Liaqat ADB <lali@adb.org>

Cc: CE PD PMU PEPCO <edlpepco@hotmail.com>, Umul Baneen <umul.zafer@smec.com>

Date: 14/10/2016 12:42 PM

Subject: Fw: IEE (Reviewed by FMC) of QESCO for Tranche-3 Savings Subproject

Dear

A.o.A

Please find the attached reviewed IEE of QESCO Tranche 3 Savings Conversion sub projects for your information and approval please.

Best Regards

Assistant Manager (Env)
PMU QESCO Quetta

----- Forwarded Message -----

From: "Zafar, Umul" <Umul.Zafar@smec.com>
To: Chief Engineer Development <qescocedev@yahoo.com>
Cc: "Khalid, Altaf" <Altaf.Khalid@smec.com>; "sshafiq.consultant@adb.org" <sshafiq.consultant@adb.org>
Sent: Thursday, October 6, 2016 3:41 PM
Subject: RE: IEE (Reviewed by FMC) of QESCO for Tranche-3 Savings Subproject

Dear Sir,

With reference to your email below, please find the attached reviewed IEE for QESCO Tranche-3 savings Conversion Subprojects.

All the comments made by ADB have been entertained in this report. QESCO is requested to go through the reviewed attached report and provide some required data, e.g. Public Consultation Details and Baseline Environmental Data (Water and Air quality Analysis Reports on the basis of which this IEE has been prepared).

The Environmental Management Plan (EMP) is kept generic at this stage and a Site Specific EMP is to be prepared by the Contractor after the award of contract.

Please send this report to ADB for approval **after** making the required changes.

Please acknowledge receipt of this email.

Regards,

Ms. Umul Baneen Zafar
Environmental Engineer
Engineering General Consultants/ SMEC International

From: Chief Engineer Development [<mailto:qescocedev@yahoo.com>]
Sent: 20 09, 2016 10:46 AM
To: Zafar, Umul
Subject: Fw: IEE (Reviewed by FMC) of QESCO for Tranche-3 Savings Subproject

----- Forwarded Message -----

From: "lali@adb.org" <lali@adb.org>
To: "qescocedev@yahoo.com" <qescocedev@yahoo.com>
Cc: zlei@adb.org; ekhattak@adb.org
Sent: Tuesday, September 20, 2016 8:43 AM
Subject: Fw: IEE (Reviewed by FMC) of QESCO for Tranche-3 Savings Subproject

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(See attached file: IEE for QESCO T3 Saving Projects 21 10 20116.docx)[attachment "IEE for QESCO T3 Saving Projects 21 10 20116.docx" deleted by Zehra Abbas/CWRD/ADB]



Initial Environmental Examination (IEE) (Draft)

Project Number: 2972 Pak- Tranche-3 (Savings Project) {June -2016}

**Islamic Republic of Pakistan: ADB's Power Distribution
Enhancement Investment Program (PDEIP) Multi-Tranche Financing
Facility**

**"The Conversion of Four (4) 66kV Grid Stations i.e, (Dera Murad
Jamali, Rojhan Jamali, Usta Muhammad and Jhal Magsi) to 132kV
along with 170km 132kV associated Transmission Line"**

**Submitted by:
Quetta Electric Supply Company (QESCO)
Government of Pakistan**

The Initial Environmental Examination Report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

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ANNEXES

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ANNEX-2 MONITORING PLAN FOR PERFORMANCE INDICATORS (MATRIX)

ANNEX-3 SUMMARY OF THE PUBLIC CONSULTATION

ABBREVIATIONS

ADB	Asian Development Bank
CO	Carbon Mono-Oxide
COI	Corridor of Influence
DISCO	Distribution Company
DGS	Distribution Grid Station
DFO	Divisional Forest Officer
DIZ	Direct Impact Zone
DoF	Department of Forests
E&SS	Environment & Social Safeguards
EA	Environnemental Assessment
EARF	Environment Assessment Review Framework
EIA	Environment Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
GDP	Gross Domestic Product
GIS	Gas Insulated Switchgear
GOP	Government of Pakistan
GS	Grid Station
GSO	Grid System Operation
LARP	Land Acquisition and Resettlement Plan
LB	Left Bank
MFF	Multi-tranche Financing Facility
MPL	Maximum permissible level
NEQS	National Environmental Quality Standards
NGO	Non Governmental Organization
NO	Nitrogen Oxide
NO ₂	Nitrogen Di-Oxide
NTDC	National Transmission & Dispatch Company
PC	Public Consultation
PCB	Poly chlorinated Bi-Phenyls
PDEIP	Power Distribution Enhancement Investment Project (Program)
PDEMFF	Power Distribution & Enhancement Multi-tranche Financing Facility
PEPAct	Pakistan Environment Protection Act 1997 (as regulated and amended)
PEPCO	Pakistan Electric Power Company
PMU	Project Management Unit
PPMS	Project Performance Monitoring System
RB	Right Bank
SIA	Social Impact Assessment
SO ₂	Sulphur Di-Oxide
SR	Sensitive Receiver
TL, T/line	Transmission Line
TSG	Technical Service Group
TSP	Total Suspended Particals
WAPDA	Water & Power Development Authority
WASA	Water And Sanitation Authority
WHO	World Health Organization

UNITS

Cu. M	Cubic Meter
dB(A)	Decibel (Sound Pressure Level)
KM, km	Kilo-Meter
kV	Kilo Volt
Mg	Milli-gram
m ³	Cubic Meter
Leq	Equivalent sound pressure level
Rupee, PKR	Pakistani Ruppes, Unit of Pakistan currency. SUS approx Rs. 79.8
Sq. m	Square Meter

1. INTRODUCTION

1.1 Overview

1. This document is the Initial Environmental Examination (IEE) Study for the conversion of 4 No of 66kV existing grid stations to 132kV grid stations i.e, (i) Dera Murad Jamali, (ii) Rojhan Jamali, (iii) Usta Muhammad and (iv) Jhal Magsi along with 170km associated transmission line funded by Asian Development Bank (ADB) under the loan No 2972 Power Distribution Enhancement Investment Project (PDEIP) - Tranche 3 saving subproject proposed by Quetta Electric Supply Company (QESCO).

2. Government of Pakistan (GoP) has requested ADB to provide the PDEMFF to facilitate investments in power distribution and development of networks of eight independent distribution companies (DISCOs) that distribute power to end user consumers. The funding from ADB is to be released in stages (tranches). The Power Distribution Enhancement Investment Program (PDEIP) is part of the GoP long term energy security strategy. The proposed ADB intervention will finance new investments in PDE and assist capacity building of sector related agencies. The investment program will cover necessary PDE development activities in secondary transmission / distribution networks of eight DISCOs. The PDEMFF activities include extension (additional transformers) and augmentation (replacement of transformers with higher capacity) distribution line extensions, new and replacement distribution lines, additional substations, transformer protection and other non network activities such as automatic meter reading, construction equipment and computerized accounting. New distribution lines to and from various network facilities and some of the above activities will also be included in the later tranches. The proposed PDEMFF facility has been designed to address both investment and institutional aspects in the electrical power sector.

3. This IEE Report covers the environmental examination of the proposed subproject of QESCO. PEPCO has been nominated by Ministry of Water and Power (MoWP) to act as the Executing Agency (EA) with QESCO being the Implementing Agency (IA) for work in its own area.

4. Under GoP regulations, the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations (2000) categorizes development subprojects into two schedules according to their potential environmental impact. The proponents of subprojects that have reasonably foreseeable impacts are required to submit an Initial Environmental Examination Report for their respective subprojects (Schedule I). The proponents of subprojects that have more adverse environmental impacts (Schedule II) are required to submit an Environmental Impact Assessment (EIA). The graphic representation of EIA process in Pakistan is provided as **Figure 1.1**. EIA is required by GoP for all subprojects involving sub transmission / distribution lines of 11kV and above and for Grid Station [grid station] substations (Schedule II).

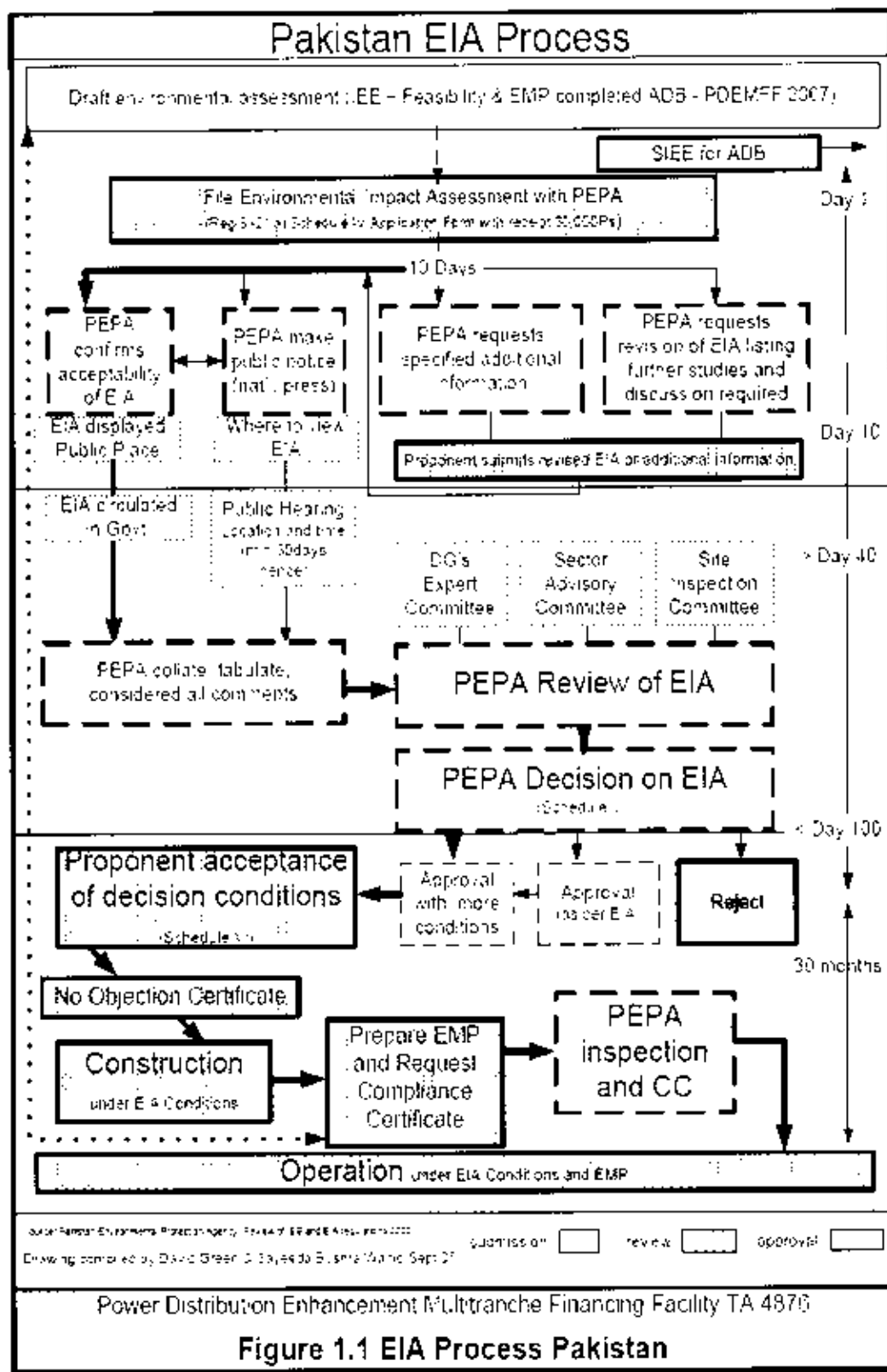


Figure 1.1: EIA Process - Pakistan

5. Most of the construction impacts will take place with only local impacts and there are no potential significant environmental impacts associated with the Tranche-3 sub-subproject construction. A Framework of Environmental Assessment (FEA) power extensions and augmentation subprojects was prepared by consultants and submitted to the Pakistan EPA, after hearings with provincial EPAs. In response to the FEA submitted by QESCO to the Pakistan EPA¹ it has been clarified that all proponents must follow section 12 of the Pakistan Environmental Protection Act for all subprojects – Figure 1.2 (below).

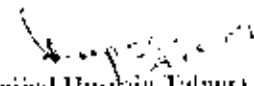
GOVERNMENT OF PAKISTAN PAKISTAN ENVIRONMENTAL PROTECTION AGENCY II # 311, MAIN MARGALLA ROAD, F-11/3, ISLAMABAD. *****	
No. 2(1)-2004-W/KCP-DD(EIA)	Islamabad, 29 th June, 2007
Subject: <u>ASIAN DEVELOPMENT BANK (ADB) FUNDED TRANSMISSION ENHANCEMENT PROJECT – ENVIRONMENTAL IMPACT ASSESSMENT.</u>	
I am directed to refer to NTDC's letter No. PD/PPTA/NTDC 531-33, dated 1 st February, 2007 on the subject cited above.	
2. It is stated that the contents of the draft frame work for Environmental and Social Impact Assessment of Grid Station Extension and Augmentation Projects in Power Sector has been carefully examined. Kindly appreciate that under section 12 of Pakistan Environmental Protection Act, 1997, it is mandatory requirement to ensure compliance of EIA/PIA Regulations, 2000, the proponent of project has to ensure to follow prescribed procedure.	
3. However, while going through the contents of draft framework, it has been noted that the proponent of this development activity will be following the prescribed procedure under EIA/PIA Regulations, 2000. However, only for augmentation of existing facilities, the framework would apply. Kindly note that this agency presumes that the proponent while taking developmental activities would also be consulting the provincial EPAs and follows their advice.	
 (Mir Sajjad Hussain Talpur) Dy. Director (EIA/Mont) Ph: 92351157 Fax: 9267622	
➤ Mr. Muhammad Tahir Khan, Project Director PPTA, National Transmission & Dispatch Company Ltd., Office of the Project Director (PPTA), 146-141-WAPDA House, Lahore.	

Figure 1.2: Pak-EPA letter dated 29th June, 2007

¹ Letter dated 29th June 2007 – Ref 2(1)2004-W/KCP-DD from Pak EPA Sajjad Hussein Talpur, Dy Director (EIA/Mont) to, Mr Muhammad Tahir Khan, Project Director PPTA, NTDC WAPDA House, Lahore.

1.2 Scope of The IEE Study and Personnel

6. The Study Area included the identification of 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 about 100m of the Transmission Line and Grid Station boundary. The proposed subproject under Tranche-3 savings is the conversion of 04 existing 66kV grid stations (Dera Murad Jamali, Rojhan Jamali, Usta Mohammad and Jhal Magsi) to 132kV and 170km associated transmission line. The construction of the bases, foundation pads and towers to support the distribution line will also be carried out under the same subproject by QESCO and supervised by the QESCO management.

7. The field studies were undertaken by the subproject's environment team with experience of environmental assessment for power subprojects in Pakistan. QESCO Environment and Social Team conducted preliminary scoping, survey and assessment activities, coordinated the field sampling and analysis, and were also responsible to supervise collection of information and co-ordinate the various public consultation activities. The team conducted preliminary scoping, survey and assessment activities, and carried out the report writing. Facility Management Consultant (SMEC International Pty. Ltd Team) provided leadership and guidance in planning the field work and in finalization of the report. The environmental team also benefited from technical support and other information on the impacts of the proposed power works provided in feasibility summaries prepared with QESCO by expert Facility Management Consultants (SMEC) dealing with engineering, designing, power distribution, socio-economic, re-settlement and institutional aspects.

8. A scoping and field reconnaissance was conducted on the subproject sites, during which Environmental assessment was carried out to establish the potential impacts and categorization of subproject activities. The methodology of the IEE study was then elaborated in order to address all interests. Subsequently primary and secondary baseline environmental data was collected from possible sources, and the intensity and likely location of impacts were identified with relation the sensitive receivers; based on the work expected to be carried out. The significance of impacts from construction of the project was then assessed and, for those impacts requiring mitigation, measures were proposed to reduce impacts to within acceptable limits.

9. Public consultations (PC) for the project were conducted in August 2015. The Public Consultation process included verbal disclosure of the sub-subproject works as a vehicle for discussion. Consultations were conducted with local families and communities along the transmission line, around the proposed conversion subproject sites and with the staff of subproject management. The responses from correspondents have been included in **Annex-3** and summarized in **Section 7** of this IEE Report.

10. Resettlement Plans have been prepared as a separate document for the proposed conversion subproject.

2. POLICY AND STATUARY REQUIREMENTS IN PAKISTAN

11. Direct legislation on environmental protection is contained in several statutes, namely; the Pakistan Environmental Protection Act (1997); the Forest Act (1927); the Balochistan Wildlife Act (1974). 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 which have an indirect bearing on the subproject or general environmental measures.

2.1 Statutory Framework

12. 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, only the federal government has enacted laws on environment, and the provincial environmental institutions derive their power from the federal law. The key environmental laws affecting this subproject are discussed below.

2.1.1 Pakistan Environmental Protection Act, 1997

13. 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. 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.

2.1.2 Pakistan Environmental Protection Agency Review of Environmental Assessment Study and EIA Regulations, 2000

14. The Pakistan Environmental Protection Act, 1997 (PEPAct- 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 a potentially 'significant' environmental impact, 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, 2002 (the 'Regulations'), prepared by the concerned EPA under the powers conferred upon it by the PEPAct - 1997, categorizes subprojects for IEE and EIA. Schedules I and II, attached to the Regulations, list the subprojects that require IEE and EIA, respectively.

15. 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 (see also Figure 1.1).

16. A subproject is categorized as requiring an IEE or EIA using the two schedules attached to the Regulations.

- i) An EIA or IEE is conducted as per the requirement and following the Pak-EPA guidelines.
- ii) The EIA or IEE is submitted to the Concerned EPA. The Fee (depending on the cost of the subproject and the type of the report) is submitted along with the document.
- iii) The IEE/EIA is also accompanied by an application in the format prescribed in Schedule IV of the Regulations.
- iv) 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.
- v) 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.
- vi) Then the EPA accords their approval subject to certain conditions:
- vii) Before commencing construction of the subproject, the proponent is required to submit an undertaking accepting the conditions.
- viii) 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/EIA.
- ix) An EMP is to be submitted with a request for obtaining confirmation of compliance.
- x) The EPAs are required to issue confirmation of compliance within 15 days of the receipt of request and complete documentation.
- xi) The IEE/EIA approval is valid for three years from the date of accord.
- xii) A monitoring report is to be submitted to the EPA after completion of construction, followed by annual monitoring reports during operation.

17. Distribution lines and grid substations of 11 kV and above are included under section A-1 of Schedule II, requiring an EIA to be carried out by the proponents.

2.1.3 National Environmental Quality Standards

18. 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 3 subprojects:

- i) 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)
- ii) Maximum allowable concentration of pollutants (2 parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles.

2.1.4 Balochistan Environmental Protection Act 2012

19. The Balochistan Environmental protection Agency/ Govt of Balochistan under BEP Act says the project falling within the geographical jurisdiction of Balochistan shall undergo for submission of IEE and EIA to environmental protection agency for review and approval. As section 15 (1) Says that "No proponent of a project of public and private sector shall commence construction or operation unless he has filed an Initial Environmental Examination with the Government Agency designated by Balochistan Environmental Protection Agency, as the case may be, or, where the

project is likely to cause an adverse environmental effects an environmental impact assessment, and has obtained from the Government Agency approval in respect thereof."

2.1.5 Other Relevant Laws

20. There are a number of other federal and provincial laws that are important in the context of environmental management. The main laws potentially affecting subprojects in this MFF are listed below.

A. The Balochistan Wildlife Protection Ordinance, 1972

21. The Baluchistan Wildlife Protection Ordinance, 1972 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.

B. The Forestry Act, 1927

22. The Forestry Act, 1927 empowers the government to declare certain areas reserved forest. As no reserved forest exists in the vicinity of the proposed project, the provisions of this law are not applicable to the proposed project.

C. The Antiquities Act of 1975

23. The Antiquities Act of 1975 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 Government of Pakistan to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the project proponents are obligated to:

- Ensure that no activity is undertaken in the proximity of a protected antiquity
- Report to the Department of Archaeology, Government of Pakistan, any archaeological discovery made during the course of the project.

24. No protected or unprotected antiquity was identified in the vicinity of the proposed project that may be affected by the project.

2.2 Structure of Report

25. This Environmental Assessment Report 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 subproject enhancement and expansion. This Environmental Assessment Report also proposes various environmental management measures. Following this introduction the report includes:

- Description of the Subproject
- Description of Environmental and Social Conditions
- Assessment of Environmental Impacts and Mitigation Measures

- Mitigation Measures for identified impacts
- Environmental Management Plan (EMP)
- Environmental Monitoring Plan
- Public Consultation
- Recommendations and Conclusions

3. DESCRIPTION OF THE PROJECT

3.1 Type Of Project

26. The proposed subproject under Tranche-3 savings is the conversion of 4 existing 66kV grid stations (Dera Murad Jamali, Rojhan Jamali, Usta Mohammad and Jhal Magsi) to 132kV and approximately 170km 132 kV transmission line (Figure 3.1). The details of the conversions and 170km 132kV associated transmission line subproject is as follows:

- a. The Conversion of existing 66kV Dera Murad Jamali grid station and the construction of 5km 132kV double circuit feeding transmission line from 220/132kV Uch Power House grid station
- b. The Conversion of existing 66kV Rojhan Jamali grid station and the construction of 44km 132kV SDT feeding transmission line from Dera Murad Jamali to Rojhan Jamali grid station
- c. The Conversion of existing 66kV Usta Muhammad grid station and the construction of 30km 132kV SDT feeding transmission line from Rojhan Jamali to Usta Muhammad grid station
- d. The Conversion of existing 66kV Jhal Magsi grid station and the construction of 91km 132kV SDT feeding transmission line from Usta Muhammad to Jhal Magsi grid station

3.2 Categorization Of The Project

27. Categorization is based on the environmentally most sensitive component of a subproject. The aspects of the subproject with potential for significant environmental impacts need to be assessed in detail and this environmental assessment has therefore focused on the significant impacts possible from the construction activities of the subproject.

28. The sites for the proposed conversions as well as the route of the proposed transmission line, is located in a rural setting, with some minor settlements and other infrastructure around the site. The proposed subproject is categorized as a Category B sub-subproject under ADB requirements and this IEE report is based on that assumption. Figure 3.1 Jurisdiction of QESCO.

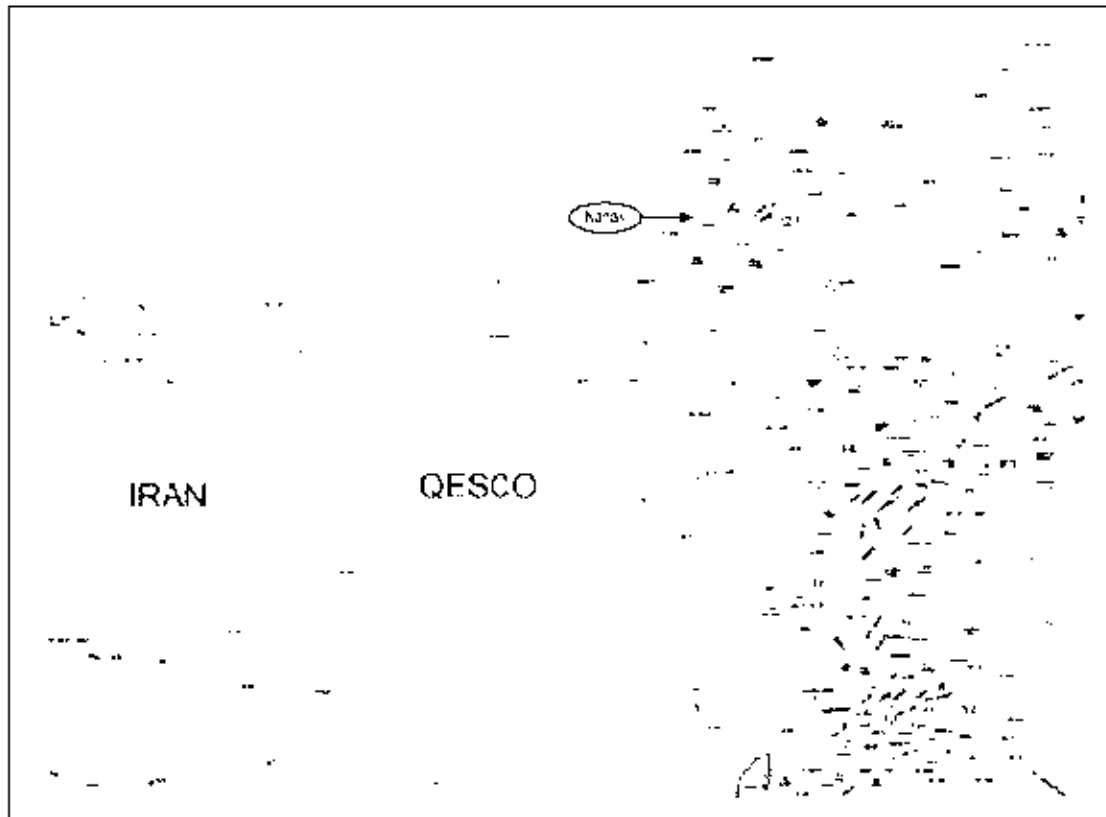


Figure 3.1: QESCO Jurisdiction (Service Area)

3.3 Need For The Project

29. Pakistan is a country with an economy of improving performance with a wide network of power distribution. However the standards and conditions of the power distribution are inadequate to meet rapidly growing power demand. This situation limits reliable power distribution and therefore the contribution of the power sector to national development and economic growth. To cope with the constraints, the existing power distribution infrastructure has to be improved and upgraded. 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 PDEMFF Project has been designed in addressing both investment and institutional aspects in the sector. The project capacity building of the QESCO's PMU and PD GSC Staff as well as Environmental & Social Safeguard Cell officers who are directly responsible for the environmental and Social compliance of Health Social Safeguard & Environmental standards/regulations. The orientation and refresher trainings (Capacity building) of the contractor staff and labour force to ensure safety at work place and EMP implementation with Environment friendly and good HSE practices at the construction sites.

30. The Tranche-3 projects will contribute to the improvement of the overall performance of the power distribution sector, improving distribution efficiency, broadly widening access to power to drive economic opportunities. The beneficiaries of the sub-projects will be people, companies, and government and non-government agencies in Pakistan that use power distribution services directly and indirectly. Communities indirectly served by the sub-projects will benefit from improved, secure faster distribution services. Power users will benefit in terms of secure power and improved power safety and potentially increased productivity.

3.4 Location And Scale Of The Project

31. This IEE has been conducted based on the assumptions available in August 2015, when the preliminary design for the proposed conversion subproject was planned and over all requirements for installation of the equipment were being identified. The detailed designs are currently being processed by QESCO. At this stage, the construction activities under the subproject are expected to include the usual localized civil works such as excavation and concreting of foundations for the new towers, equipment and fittings, erection of the towers, cabling and installation of allied equipment.

32. This IEE has included field reconnaissance of the conversion sites and surroundings of the new proposed transmission lines. The proposed project RoW is determined by a committee, comprising of professionals from: planning; design; construction; operation; and social formations of the DISCO. The committee selects the best route based, from a number of alternatives, on the following considerations: Least cost technically and socially acceptable alternative; least social impacts; soil; and atmospheric conditions that are not likely to impose a higher cost or damage the planned facilities; acceptable living conditions for staff members (health, education, water etc.); reasonable access conditions to allow movement of heavy equipment; reasonable access conditions to allow incoming and outgoing transmission lines Right of Way (RoW).

33. The designs for the proposed subproject will be developed under the subproject support component of the MFF. This IEE, however, is based on line route surveys (which includes alternative routes and the route which minimizes the social impacts is chosen). The line route is then submitted to the NTDC design formation which determines the line profiles and tower locations, these towers are then located on ground.

34. WAPDA / NTDC have accepted current international standards for conductor to ground clearance for the construction of EHV T/L Projects. The specific standards accepted are that of the National Electrical Safety Code (ANSI C2), currently applicable in the United States. This 132KV transmission line design is based on the given below parameters in Table 3.1.

Table 3.1: Permissible Conductor Ground Clearances at 65.5°C

Sr. No.	Description	Clearances (m) for 132KV
1	Cultivated land traversed by vehicles	6.7
2	Roads & Streets	7.9
3	Communication and power lines (up to 66 kV)	2.7
4	Highways	7.9
5	Railroads	7.9
6	Electrified railroads trolley wire	3.85
7	River at high flood	9.1
8	Places accessible to pedestrians only	7.9
9	Building roofs not accessible to people	5.2
10	Tops of trees (Orchards)	5
11	Canals	9.1

35. Impacts from the conversion of existing grid stations and construction of the new transmission line subproject are envisaged to be minor as no additional land needs to be acquired for construction of the towers because the towers will mostly be erected in parallel to the existing route

of 66kV transmission line. The new towers would transverse an area of cultivated land and EMP is provided to mitigate the damages with in acceptable level.

36. The total length of the proposed transmission line is 170km from Dera Murad Jamali - Jhal Magsigrid station and passes across three districts (Naseerabad, Jafar abad and JhalMagsi) of Baluchistan. The proposed transmission line will be comprised of more than 618 towers. The alignment that has been studied is about 100 to 150 meters away from the nearest houses and other places of human settlement.

37. The project proponent Quetta Electric Supply Company (QESCO) has planed to complete the proposed subproject as soon as possible. The proposed subproject is a part of proposal submitted by QESCO to ADB. The details for the implementation of the sub-project are being developed.

38. The staff of QESCO support the project and its early implementation. Dera Murad Jamali is remote area of Baluchistan and environmental team have visited the site on random basis and consulted with stake holders of the project. Lack of clean drinking water could create problems for the construction members.

39. Construction of the transmission lines are presumed utilize pads and foundations for metal towers. The proposed transmission line is located in a traditional rural and agricultural setting on occupied fertile agricultural land and disturbance to these areas due to the proposed project will be very localized, as all the construction work will take place within the an existing RoW. Any disturbance outside the RoW for the line should not be significant if routine environmental management procedures and engineering controls are implemented thoroughly.

3.5 Project Alternatives

3.5.1 Management Alternatives

40. **No Project Alternative:**Electricity demand has been increasing during the past several years, and this trend is expected to continue as a result of the on-going economic uplift in the country. The key factors fueling the increasing power demand include increasing population, rapid urbanization, industrialization, improvement in per capita income and village electrification. In order to match the increasing trend in the power demand, regular investments in various segments of the power network generation, transmission, and distribution is vitally important. Otherwise, the gap between the supply and demand will keep on increasing.

41. The proposed project seeks to provide additional load capacity the QESCO system from 66kV to 132kV for 4 grid stations and construction of 170km 132kV transmission line.

42. In case the proposed project under Tranche-3 are not undertaken, the QESCO system will not be able to cope with the increasing demand, the existing system will remain over-loaded, line losses will also remain high, and the system reliability will progressively decrease, with increasing pressure on the system. The Utility will also forego the opportunity of increasing its consumers as well as revenue associated with the system expansion. In view of the above, the "no project" option is not a preferred alternative.

3.5.2 Siting Alternative

43. The sites selected for the proposed grid station conversion subprojects have negligible impacts to the nearby communities as they will be built on existing sites owned by QESCO. The transmission lines will be selected in such a way that minimum disturbance to stakeholders occurs, and will be sited to avoid settled areas, mosques, Schools & hospitals.

3.5.3 Technical Alternatives

A. Type of Circuit Breaker

44. Traditionally, oil-filled circuit breakers used to be installed at the 132kV and 11kV levels. At 66 kV Grid Station Circuit Breakers of 70kV are installed. For conversion to 132 kV Grid Station, Circuit Breakers of 140 or 145 kV would be required. Under tranche-3 subprojects, vacuum type Sulfur Hexafluoride circuit breakers will be procured for installation at 132 kV converted Grid Stations. These breakers have very effective arc-quenching characteristics, compared to the old oil-type breakers. Therefore, these modern circuit breakers are the preferred option for the proposed project.

45. The environment aspects of the oil-filled circuit breakers essentially pertain of soil and water containment caused by the possible oil leakage. For the QESCO's proposed projects, vacuum type Sulfur Hexafluoride circuit breakers would be installed at the grid stations.

46. The transmission lines connect to the network will involve erection of towers that will be strung with the new 132 kV lines. The designs for the Tranche-3 subprojects will be developed under the subproject support component of the MFF. The IEE study is, therefore is not based on line design which is final (barring any unforeseen occurrence) and will be changed at implementation stage if so warranted by new developments.

3.6 Decommissioning and Disposal of Materials

47. Decommissioning and disposal of discarded material from the project will be recycled and reused within the PEPCO system. No waste will be generated that can be classified as hazardous and requiring special disposal. In addition, in case any old transformers are to be replaced, they are not going to be disposed off or discarded and would be recycled and reused within the PEPCO system. As per policy.

4. DESCRIPTION OF THE ENVIRONMENT

48. The proposed conversion subproject of QESCO Tranche-3 savings is located in three districts i.e. Jafarabad, Nasirabad and Jhal magsi of Balochistan Province. The proposed subproject will include the conversion from 66kV to 132kV of 04 66kV existing grid stations (i) Dera Murad Jamali, (ii) Rojhan Jamali, (iii) Usta Muhammad and (iv) Jhal Magsi along with about 170km 132kV associated feeding transmission line.

4.1 General Characteristics of the Project Area

49. The proposed associated transmission line of about 170km will cross three districts with agriculture land that may come in the right of way of the transmission line and many small villages and towns. There are no sensitive receivers near the existing grid stations, along with the route of the selected transmission line. Typically there are a few buildings including residential and other social infrastructure that are located within 100m of the grid stations boundaries.

4.2 Affected Administrative Units

50. The proposed transmission line will pass through different villages affecting trees (the number depends on the final route design). The area to be affected by the conversion works for the proposed grid station and associated transmission line falls in 3 districts (Jafarabad, Nasirabad and Jhal Magsi) of Balochistan. Interviews were conducted with the public near the grid station site and transmission line proposed corridor to obtain their views on the subproject and any perceived impacts.

4.3 Physical Resources

4.3.1 Topography, Geography, Geology, and Soils

51. The topography of the whole area is relatively flat with the land sloping gently in a northeast-southwest direction and a surface gradient of about 0.02 m per km.

52. Dera Murad Jamali in Naseerabad district lies between 28°32'40"N and 68°13'33"E. The total geographical area of nasirabad district is 3387 Km². The general character of the district is flate. The land is fairly uniform most of population depends on agriculture, the source of water is irrigation by canals and there are three main canals i.e. Pafeder canal, khirther canal and uch canal. Quetta lies in the active seismic region; therefore earthquakes occur from time to time. The worst earthquake occurred in May, 1935, when a large part of Quetta was destroyed and 60,000 people died. As recent as February 1997 a seven earthquakes (7.1 on Richter scale hit Balochistan).

53. There is no perennial river in the Quetta district. The Quetta Lora comes out near Sariab and traverses the western side of the Quetta valley. The Quetta Lora carries rain and waste water near Baleli and continues northward through the Kuchlak valley. Water from the Quetta Lora is used for irrigation in villages like Khazi Samungli and Nohsar.

54. Physiographically, the soils of Quetta district may be described by four main types i.e. (1) Piedmont plains (very deep and well-drained soil) (2) Piedmont basins, (3) Saline and Alkaline soils (4) Gravelly piedmont fans and aprons bordering the mountains and loess plains. Each physiological unit has different parent material.

55. **Minerals:** There is limited information available regarding the major mineral resources of the target project area. However, the major minerals are in district Quetta i.e. coal, limestone and building stone. Coal mining activity in the private sector has been in operation at Sorange for the

past hundred years. Only male labour is involved in its production and marketing. It is marketed through middle men (commission agents) who transport it to Sindh and Balochistan where it is mostly used in brick kilns. According to the Geological Survey of Pakistan (GSP), the division has further potential for coal production.

56. Also new technology and safety measures should be applied in the mining sector. However, its exploitation is becoming more difficult and expensive as the base of coal reserve is horizontal and narrow. Similarly there is also scope for limestone, which is mostly used in the cement industry.

4.3.2 Climate and Hydrology

57. The proposed project is situated at an altitude of about 217ft. Therefore, the weather is extremely hot in summer and an tropical climate prevails in the area. The winter is moderate cold and the minimum temperature ranges between 18 to - 28 degrees Celsius.

58. Summer is relatively hot and the maximum temperature ranges between 42 to 46°C. July is generally the hottest month. The project area lies outside the range of the monsoon currents and the rainfall is scant and irregular. The average annual rainfall for Quetta City is 481mm, whereas in the spring and summer seasons there is very little rainfall. The heaviest rainfall and snowfall occurs in January and February. There is no weather center for Dera Murad Jamali – JhalMagsi. However, the data of Quetta city can be taken as a reference for the project areas.

59. According to the information supplied by the Meteorological Department, the average total annual mean rainfall in the year 1999 was 308.2 mm, ranging from 143.2mm in the month of June to 68.5mm in the month of March. Climate will have little bearing on the minor environmental impacts from the construction of this sub-project.

60. Nasirabad inherits comparatively wet climate varying with the low elevation. At low elevation it is hot and wet with occasional rainfall and severe agriculture land. Whereas in the town like rojhan jamali and usta mohammad and other south and east areas, temperature is more uniform in winter but very hot in summer. The district lies near the monsoon area (deraAllayar and jacobabad). District jafarabad can be distributed climatically into arid and tropical and continental low lands. The winters are cold and windy and summers are hot and wet. Rainfall occurs twice a year in its peak. Part of the winter precipitation is in the form of rainfall. In July - August along the eastern belt on rural area weather is dominantly influenced by the monsoon season.

4.3.3 Groundwater and Water Supply

61. The quality of ground water in nasirabad district varies from place to place. In most of the places, water is of good quality while in dera allahyar, rojhan, and usta mohammad the quality of water is very poor (saline / brackish) and not potable. According to the P.H.E.D authorities, the water found in most of the rural areas entirely satisfies the criteria laid down by W.H.O. Water provided by canals is filtered and chlorinated. There have been some studies indicating that there is potential for exploiting water in the districts, but due to very low water table it will be very expensive to utilize that water in future. The underground potential needs to be charged and this could be done through construction of delay action dams and plantations of vegetation on a massive scale.

62. Most of QESCO staff at the proposed sites complained about lack of potable piped water supply in the grid stations as well as staff colonies. In outlying areas, the local population is generally reliant on supply from tube wells, as well as occasional open wells and hand pumps. There should be no impact on these sources of water by the construction of the proposed subproject.

4.3.4 Surface Water

63. The proposed sub-project sites are in three districts i.e. Jafarabad, Nasirabad and Jhal Magsi which have river water through canals irrigation system. Major canal is Kirthar originated from Sukkur Barrage and Patfeeder canal from Gudu. The sub-project has the natural soils which allow the surface water to drain away from some areas to the underlying soil. In other areas, brick and concrete channels are diverting the water to surface mostly being utilized for agriculture purpose.

64. Canal and the groundwater resources are the key source of drinking and irrigation water. In the Khushkaba or dryland agriculture farming system the fields receive moisture directly from rainfall or from localized runoff.

4.3.5 Air Quality

65. Air quality in the most of the sub-project area appears fairly good based on observation during the study period although areas nearer the busy main roads are clearly impacted by vehicle fumes and dust. It is unlikely that large powered mechanical equipment will be needed for the sub project other than delivery lorries and lifting cranes. There may also be neighboring domestic sources of air pollution, such as emissions from wood and kerosene burning stoves as well as small diesel standby generators in some households. Other industrial sources are very few and limited to occasional factories. The major source of atmospheric pollution for the operational phase will be from vehicles on nearby roads and any industrial facilities nearby. Such emissions will be very well dissipated in the open terrain. The project area is distant from major sources of air pollution like industries or urban type traffic, domestic sources such as burning of wood and kerosene stoves, etc. or fugitive sources such as burning of solid wastes. Air quality in the project area appeared very good during the study period. Air quality measurements in major urban centers, carried out by Pak-EPA, revealed that CO, SO₂ and NO levels were in excess of the acceptable levels in some areas but the average levels were found below WHO standards. Air quality testing by DISCOs (average values are: TSP 1.09 mg/m³, CO 634 ppb, SO₂ 24.34 ppb, NO₂ 23.73 ppb) through various consultants has revealed that most sub stations have NO₂, CO₂ and CO values below international standards although TSP levels at some locations was higher than international standards.

4.3.6 Noise

66. Noise from vehicles and other powered mechanical equipment is intermittent in most urban areas. There are also the occasional calls to prayer from the PA systems at the local religious locations and there are other occasional disturbances typical of the urban setting. However the proposed power transmission lines sub projects should not be noisy or create vibration nuisance. DISCOs have carried out noise level measurements at various sub stations and transmission line locations within the system. These analyzed to calculate Leq values have resulted in Leq values much below the 65 dBA limit prescribed under the NEQs established by the EPA or the 75 dBA used by DISCOs/NTDC/QESCO in the equipment specifications. Typical values were average 46.21 dBA; high 63.14 dBA; and low 34.35 dBA.

4.4 Biological Resources

4.4.1 Wildlife, Fisheries and Aquatic Biology

67. Due to over-cutting of trees and illegal hunting, wild life, such as Suleman markhor, ibex, houbara, bustard, chukor, see-see etc. are vanishing very rapidly.

68. Among mammals the common species are Hill fox (*Vulpes vulpes griffithii*), Asiatic Jackal (*Canis aureus*), Cape hare (*Lepus capensis*), Porcupine (*Hystrix indica*), hedgehog, wild rabbit, wild pig and bafelos etc.

69. Among birds the common species are teetar, bater (*Alectoris*), See see partridge (*Ammoperdix griseogularis*), Magpie (*Pica pica*), Houbara Bustard (*Chlamydotis undulate*), a number of sparrows, Finches, buntings, seasonal/migratory waterfowls, hawks, and sand grouse etc. The area also provide corridor to the migratory bird species; the key species like Common Crane (*Grus grus*) and Demoiselle Crane (*Anthropoides virgo*).

70. And among reptiles the common species are wild Tortoise (*Agrionemys horsfieldi*), Indian Cobra (*Naja naja naja*), Saw-scale viper (*Echis carinatus*), Levantine viper (*Macrovipera lebetina*), etc.

4.4.2 Terrestrial Habitats, Forests and Protected Species

71. **Vegetation cover and trees:** The major forests in Quetta are Karkhasa (4048 Ha), Takatu south (2894 Ha) and Hazargunji forest (2202 Ha). Major forests in Urak are Spin Karez (7260 Ha), Tagha Tarkhar (6125 Ha) and Zarghun central. These are well away from the subproject location.

72. The flora of project division is diversified the area adjoining the bolan district contains major tree species like Obusht (*Juniperus excelsa polycarpus*), Wild Ash (*Fraxinus xanthoxyloides*). The main shrubs and bushes are Janglee Beri, Sparae (*Cotoneaster* spp.), Tharkha (*Artemisia maritime*), Makhi (*Caragana ambigua*), Khakshir (*Sisymbrium sophia*), Zralg (*Berberis lyceum*), and Surae (*Rosa* spp.).

73. **Protected and Religious Trees:** There are no protected or religious trees on, or around the proposed subproject site or in transmission line route. The works, however, must deal with any trees that need to be lopped or removed for safety reasons, with the necessary permissions, if there are unexpected impacts later.

4.4.3 Protected Areas / National Sanctuaries

74. In Pakistan, there are several areas of land devoted to the preservation of biodiversity through the dedication of national parks and wildlife sanctuaries. There are no protected areas near the transmission line alignment. In Pakistan, there are several areas of land devoted to the preservation of biodiversity through the dedication of national parks and wildlife sanctuaries. There are no protected areas near the proposed subproject sites.

4.5 Economic Development

4.5.1 Agriculture, Crops, Horticulture and Industries

75. Quetta City is the biggest trade centre in the Province, which exports and imports a variety of different goods, not only with other parts of the country but also with Iran. Its major industrial trade includes electrical goods, rubber products, bicycles, food products, beverages, handicrafts, leather shoes, printing and chemicals, photo and cinematic goods, as well as agriculture products and dried fruits.

76. The proposed project area near Dera Murad jamali and Jhal Magsi produces rice and vegetables. The marketing of rice and vegetables is not restricted to the province, but in many cases crosses the provincial boundaries. It is estimated that 60-70% of the rice production is marketed and consumed in other provinces. The market infrastructure, regulation, marketing costs, directly affects

the prices received by the growers for their produce. There are numerous intermediaries operating at various stages of marketing.

4.5.2 Transportation and Tourism

77. The Quetta airport is a major entry point to the province and the railways and major roads all operate from Quetta. Longer haul journeys are made by public bus and mini bus. Trucks are used to transmit freight over longer routes across the study area and goods between market centres. Farm tractors are available in some areas and are used to convey local produce to market as well as for agricultural purposes. The air, rail and road transport systems are all reliant to some extent on electrical power and thus the majority of the local population is reliant on the power network for transportation. The important linking roads are:

- Quetta - Sibi Road
- Sibi-Dera Murad Road
- Quetta - Sibi-Dera Murad - Sukkur Road
- Sibi - Dera Murad -Usta Mohamad Road
- Sibi-Dera Murad-Usta mohamad-Jhal Magsi Road

78. The presence of roads has benefited the residents of other provinces as well. The road construction has had a stimulating effect on different sectors of the economy like agriculture, industry and transport. Further roads have reduced the traffic pressure on the railway. Thus consumers, producers and intermediaries have benefited from the spread effects of road development.

79. The construction, rehabilitation and maintenance of roads in the district are handled by different organizations. These organizations include: National Highway Authority, C&W Department, Municipal Corporation, Nasirabad Development Authority and District Council.

80. The main source of transportation is road in all of the target districts. There is a good network of metalled and un-metalled roads in these areas. Pakistan Railways serves only a part of these districts. Almost every village in the target districts has telephone facilities. Quetta has an international airport while there are small airports at sibi.

4.5.3 Energy Sources

81. Economic growth increases the demand for power supply. To gauge the economic development of a country, the criterion of per capita energy consumption is a good indicator. Electricity has multi-dimensional uses. It is used in the rice mills and agricultural sector to run tube-wells. In the industrial sector it is vital for running machinery, and for households it facilitates life to a great extent. For households, electricity is not only a source of light, but also a source of power for a range of appliances. Electricity is also produced locally at Uch power plant, Dera Murad and Guddu. There are seven grid stations and one power house in the project districts.

82. Nasir Abad is the one of largest districts of Balochistan as the existing 66kV is inadequate for domestic and industrial purpose. The main sources of energy are methane and wood, however, kerosene oil, electricity and LPG are also used. For lighting purposes electricity and kerosene oil is mostly used, for cooking purposes biofuels, LPG, and dung. In urban areas mostly electricity and LPG is used, whereas in rural area where electricity is not available kerosene oil, wood/bushes and dungare used.

4.6 Social and Cultural Resources

4.6.1 Population and Communities/ Population Communities and Employment

83. The Nasirabad district is ethnically diverse. There are many newly developing urban localities where families from middle and upper classes of society from all religions and castes are taking up residence and these are all demanding better provision of electrical power from the network. This sub-project will not require relocation or resettlement..

84. The district is multilingual as there are five major ethnic groups, and each group has its own cultural values. They are Rind, Bugti, Umrani, Balochs, Brahvis, Jamots and Balochistanis. Some other minor ethnic groups like Urdu speaking Mehajirs and Sindhis are also living in the city. The mode of living differs from group to group. In the urban area except Kachi Abadis, the way of living is somewhat modern, especially among the wealthier people. In the rural area, the style of living is more traditional.

85. The major sources of income of the residents are agriculture, trade, transport, government jobs and local labour. Like in other urban centers, in Nasirabad city a large number of shops, street vendors, small garages (auto repair shops) and tailoring shops are operating.

86. Food habits among the major ethnic groups are almost identical, they take meals twice a day, along with a light breakfast. Meat is the main item of the meal and wheat is the staple food. However, food habits of Balochi and Siraiki speaking are different. Their meals usually contain mutton, vegetables, pulses flavoured and cooked with chillies. Tea is normally offered in the houses to guests. In summer, lassi (a yoghurt drink) is widely used as refreshment.

4.6.2 Education and Literacy

87. In Nasirabad District, there are 13 Madras schools for boys, while there are 36 primary boys schools and 32 primary girls schools run by government. The number of privately run primary schools is 28. There are 31 middle schools, 19 for boys and 17 for girls while there are 28 government and 16 private High schools in the district. The proportion of girls' high school within the total number is 23.7%.

4.6.3 Health Facilities

88. People of the project area have access to good curative and preventive health facilities. There are 8 government hospitals working in the district providing treatment facilities to men and women. However, there is no separate government hospital for women. Moreover, there are hospitals run by various organizations for their staff members and their families such as the private clinics in the town. They also provide treatment facilities to the general public. There are at least 23 private hospitals in Nasirabad division. The treatment cost of private hospitals is much higher than that of the government controlled hospitals. People also visit Hakeems who treat them with traditional oriental herbs and shrubs. The people of Nasirabad also visit Quetta for medical treatment.

4.7 Cultural Heritage and Community Structure

89. There are no officially protected heritage sites or historic, religious or archeologically important sites located in the sub-project works areas. There are no major historic or archaeological features of note but there are a few places of worship within about 500 m of the works.

4.7.1 Occupation

90. Generally the people are illiterate and earn living as tenants on land owned by landlords. However some people are in government services and private enterprise. A large portion of population is working abroad.

4.7.2 Handicrafts

91. The traditional handicrafts of the province include embroidery work on coats, shoes, caps, leather and women's and children's shalwar and kameez. Embroidery work is carried out by women and girls as traditional activity in every house. In case they sell their work, they sell it to middlemen, but sometimes it is bought by NGOs which sell it through exhibitions.

92. In Nasirabad There is strong social cooperation among the local communities living in the project area villages. The cooperation is based on the basis of extended families as well as tribal system of clans and tribes. The primary institution of society i.e. family has still good influence. Family members support each other. Similarly, the clans and casts are also one of the primary sources of social support.

5. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1 Impact Assessment And Mitigation

93. The proposed subproject will include the conversion from 66kV to 132kV of 4 66kV existing grid stations: Dera Murad Jamali, Rojhan Jamali, Usta Muhammad and Jhal Magsi along with about 170km associated transmission line. The proposed conversion subproject of QESCO Tranche-3 savings is located in three districts i.e. Jafarabad, Nasirabad and Jhal magsi of Balochistan Province. The sensitive receivers (SR) including structures of houses, schools, colleges, and factories are away from the transmission line RoW and there are no sensitive receivers or structures close to the transmission line RoW which could be possibly affected by certain activities of the subprojects works.

94. The location and scale of the works are very important in predicting the environmental impacts. 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 with reference to the conditions on the ground in the affected areas in the spirit of the environmental assessments process. In this section the potential environmental impacts are reviewed. If impacts are predicted to be significant enough to exceed accepted environmental standards, mitigation is proposed in order to reduce residual impact to acceptable levels and achieve the expected outcomes of the project being implemented. Therefore, it is essential that a proper analysis is carried out during the project planning period. 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 sub-projects.

95. The environmental management plan (Section 6 and Annex-1) has been compiled based on the available information and shall be reviewed in due course at project inception and through construction in order to feed back and provide revised mitigation for any significant unpredicted impacts. The analysis primarily the key environmental issues likely to arise from sub-project implementation, to prescribe mitigation measures to be integrated in the project design, to design monitoring and evaluation schedules to be implemented during sub-project construction and operation, and to estimate costs required for implementing sub-project mitigation measures. The EMP plan must be reviewed when the sub-projects reach the inception stage by the project management and be 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

96. During the preparation for the sub-project construction phase the future contractors must be notified and prepared to co-operate with the executing agency, project management, 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 trained environmental management staff to audit the effectiveness and review mitigation measures as the project proceeds. The effective implementation of the EMP will be audited as part of the loan conditions and the executing agency (PEPCO) must be prepared for this. In this regard the QESCO must fulfill the requirements of the law and guidance prepared by Pak-EPA on the environmental aspects of power projects and the recommendations already made for sub-projects in this IEE report and under Pakistan's Environmental Protection Act.

97. The location of the residences, temples, schools, hospitals and civic cultural and other heritage sites has been reviewed in **Section 3 & 4**. There could be some potential impacts in the construction stage from disturbance and significant noise and dust. However, the alignment is through cultivated fields and barren area, and no receptors such as residences, mosques or schools close enough to the alignment to be significantly affected by the works.

98. 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 through out all seasons. If any where shortage of water occurs the alternative approach is recommended that where works are within 15m of any residential sensitive receivers, the contractor should install segregation between the works and the edge of the sensitive receivers. The segregation should be easily erectable 2.5m high tarpaulin sheet and designed to retain dust and provide a temporary visual barrier to the works. Where dust is the major consideration the barrier can take the form of tarpaulins strung between two poles mounted on a concrete base. These can be moved along from tower base to tower base as the work proceeds.

99. 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. The location of mosques and other cultural and other heritage SR sites has been reviewed in **Section 4**. There are no mosques or other religious sites close to the transmission line RoW.

5.3 Potential Environmental Impacts In Construction

5.3.1 Encroachment, Landscape and Physical Disfiguration

100. The extent of the proposed power expansion is moderate and should not extend beyond the power corridor (RoW) created by the subproject. Therefore, no significant landscape impacts are expected from the proposed conversion subproject.

101. Potential disfiguration of the landscape can however result from the uncontrolled excavation of raw materials such as soil, gravel and sand from neighboring areas.

5.3.2 Cut and Fill and Waste Disposal

102. The Tranche-3 conversions sub-projects will not require any significant cutting and filling but minor excavations and piling. The proposed subproject will involve the minor excavations (down to 4m) and piling may be required to create the foundations for the towers. 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.

103. Mitigation measures must focus on the minimization of impacts. In order to allow the proper functioning of the settlement sites (access to villages) during construction it is recommended that consideration be given to erect temporary hoardings immediately adjacent to the nearest houses and shops if they are within 15m of the power transmission line tower construction.

104. If surplus materials arise from the removal of the existing surfaces these can be used elsewhere on the sub-projects before additional soil rock, gravel or sand extraction is considered. The use of this immediately available material will minimize the need for additional rock based materials extraction. The extraction of raw materials should be minimized by the re-use on-site for

landscaping of all rock and soil based materials extracted for excavation of foundations etc. The subproject detailed designers have so far estimated that no substantial additional materials will be required.

105. The material (cement, sand and aggregate) requirement of a typical 132 kV sub station (about 150 cu.m) and a 132 kV transmission tower (4.8 cu.m, or 40 bags of cement per tower) are not large. In transmission line construction sand and aggregate are delivered directly to the tower location from the quarry / source, there is no intermediate or bulk storage of these materials. Similarly construction materials for the sub station are stored within the sub station site are scheduled as per the work progress (which is staggered as the buildings which require bulk of the construction materials are built in phases over 6 to 12 months period), which means that at any given point in time the amount of construction material stored is not significant. The quantities of construction material required for a typical sub station or transmission tower are not so larger that they potentially represent a traffic hazard, these requirements are time dispersed in case of sub stations and time and space dispersed in case of transmission lines. 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.

106. Mitigation measures shall seek to control the impacts at source in the first place. The construction supervising consultant (engineer) shall be responsible to update the cut and fill estimates and create Materials Master Plan to facilitate materials exchange between the different contracts in the Tranche-3 sub-projects to provide an overall balance for materials and minimize impacts on local resources.

107. Decommissioning and disposal of discarded material for the subproject will be recycled and reused within the PEPCO system. And no waste will be generated that can be classified as hazardous and requiring special disposal.

5.3.3 Trees, Ecology and Protected Areas

108. Surveys have been made at all sub-project locations and whereas trees are present in some sub-stations there should not be any need for disturbance of trees in the Tranche 3 saving sub-project.

109. There are no reserved or protected forests or trees near the GS site or transmission line alignment. The Transmission lines will require the installation of towers which will be installed for transmission line route and will not affect many trees. However, in case of removal of any tree on private or forest land during the works, written permission should be sought.

110. If for some unforeseen reason or change of alignment, any trees with religious significance or other trees need to be removed, written permission should be obtained from the forest authority and the owner after written justification by QESCO. Trees shall be planted to replace the lost trees with three trees planted to replace every cut tree (3:1) or more as agreed with the authority.

111. At this stage no areas require removal of woodland. However if specimen trees of religious plantations are affected the owners should be given the resources and opportunity to reinstate the woodland long term and a plantation compensation plan should be drawn up to replant the woodland/trees. In the event that the land is not suitable for plantation then other areas should be identified to replace the cut trees and sufficient areas should be identified to allow plantation of trees at a rate of say 3:1. The replacement ration should allow for a high mortality rate among the newly planted trees in the dry environment or otherwise as based on advice from the forest authority.

112. A requirement shall be inserted in the contracts that no trees are to be cut within the ROW on the Transmission Line route or outside without the written permission from the Supervising Consultant who may permit the removal of trees if unavoidable on safety, technical or engineering grounds after written justification.

5.3.4 Hydrology, Sedimentation, Soil Erosion

113. The Tranche-3 proposed subproject is on flat sites and should only require minor excavations and piling. Therefore there is little potential for the works to have impact on local water resources. There should be no need for erosion control and there should not be any significant runoff from stockpiles.

114. The drainage streams en-route of the Transmission Line subprojects should not be impeded by the works. The scale of the works does not warrant hydrological monitoring.

5.3.5 Air Pollution from Earth Works and Transport

115. Field observations indicate that ambient air quality is generally acceptable and that emissions from traffic and other powered mechanical equipment in the area are rapidly dispersed. There will be a few items of powered mechanical equipment to be used in the construction of the distribution line works that may give rise gaseous emissions. However these should be well dissipated. The major sources of complaint will likely be any necessary earthworks and local soil compaction.

116. Major earthworks are not envisaged but minor excavations and piling will be required which can contribute to increasing dust. However the scale of the works at any one location is not likely to cause excessive dust. Therefore dust control from works at this scale should be easy to achieve at little extra cost. In order to avoid complaints of dust nuisances the following mitigation measures should be carried out as a matter of good housekeeping:

- (i) Dust suppression facilities (back pack water sprayer) shall be available where earth and cement works are required.
- (ii) Areas of construction (especially where the works are within 20m of the SRs) shall be maintained damp by watering the construction area.
- (iii) Construction materials (sand, gravel, and rocks) and spoil materials will be transported trucks covered with tarpaulins.
- (iv) Storage piles will be at least 30m downwind of the nearest human settlements.
- (v) All vehicles (e.g., trucks, equipment, and other vehicles that support construction works) shall be well maintained and not emit dark or smoky emissions in excess of the limits described in the NEQS.

117. At any given point in time the amount of construction material stored is not significant. The quantities of construction material required for a typical substation or transmission tower are not so large that they potentially represent a traffic hazard, these requirements are time dispersed in case of substations and time and space dispersed in case of transmission lines

118. The need for large stockpiles should be minimized by careful planning of the supply of materials from controlled sources. If large stockpiles (>25m³) are necessary they should be enclosed with side barriers and covered with tarpaulins when not in use and at the end of the working day to enclose dust.

5.3.6 Noise, Vibration and Blasting

119. It is anticipated that powered mechanical equipment and some local labour with hand tool methods will be used to construct the subproject works. No blasting is anticipated. Powered mechanical equipment can generate significant noise and vibration. The cumulative effects from several machines can be significant. To minimize such impacts, the contractor for 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 NEQS requirements.

Table 5.1 National Environmental Quality Standards for Noise

S No.	Category of Area/Zone	Effective from 1 st July, 2010		Effective from 1 st July, 2012	
		Limit in dB(A) Leq ^a			
		Day time	Night time	Day time	Night time
1.	Residential are (A)	65	50	55	45
2.	Commercial area (B)	70	60	65	55
3.	Industrial area (C)	80	75	75	65
4.	Silence zone (D)	55	45	50	45

Note:

- i. Day time hours: 6.00 am to 10.00 pm
- ii. Night Time hours: 10.00 pm to 6.00 am
- iii. Silence zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts and courts.
- iv. Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.
- v. dB(A) Leq: time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

120. Noise will be monitored right in front of any residential unit, with in 50 m of area as ADB's suggested and should follow the NEQS of 55dB(A).

121. It is recommended that no construction should be allowed during night time (9 PM to 6 AM) Any noisy equipment should be located within existing grid station or as far from SRs 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.

122. Vibration from construction of piles to support pads may be required for some tower construction and may be a significant impact but this should be short duration. Where vibration could become a major consideration (within say 100m of schools, religious premises, hospitals or residences) a building condition survey should take place prior to construction. The physical effect of piling should 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.

5.3.7 Sanitation, Solid Waste Disposal, Communicable Diseases

123. The main issues of concern are uncontrolled disposal of waste by construction workers, unmanaged disposal of solid and liquid wastes into watercourses and natural drains. In order to maintain proper sanitation around construction sites the workforce will be allowed to use the flush toilets in the sub-station control facilities.

124. Construction worker camps will not be necessary, based on the scale of the works needed. If for some unforeseen reason a larger workforce is needed any construction camp should not be located in settlement areas or near sensitive water resources and portable lavatories or at least pit latrines should be provided.

125. There should not be any significant amounts of waste from the works and because the works will be under close supervision of the QESCO authority, these issues can be controlled at source.

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

5.4 Potential Impacts In The Operational Stage

5.4.1 Air Pollution and Noise from the Enhanced Operations

127. Based on observations by the construction of transmission line sub-projects sites, noise and vibration should not be a nuisance to any nearby SRs. The noise levels will not cause a significant disturbing effect for the SRs in the vicinity of the sub-project.

128. The construction and the extended level of operation of the facility will 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.

129. The transmission line component of subproject works will extend the power distribution lines but no houses, masjids or schools will be close to the new transmission line in the operational phase. There should be no source of atmospheric pollution from the subproject.

130. In the operational phase any nearby industrial facilities with fuel powered mechanical equipment will be the main polluters. All such emissions will be very well dissipated in the open terrain and there will be no cumulative effect from the subproject.

5.4.2 Pollution from Oily Run-off, Fuel Spills and Dangerous Goods

131. No significant impacts from oily residues such as transformer oil and lubricants are expected to arise in this subproject. However control measures will be needed for oily residues such as transformer oil and lubricants in the case of accidental or unexpected release. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. There are facilities in some sub-project grid station maintenance yards for recycling (dehydrating) oil for breakers. However the areas upon which these recycling facilities are located have no dedicated drainage which can capture run-off. Oily residues and fuel should be captured at source and

refueling and maintenance should take place in dedicated areas away from surface water resources.

132. No significant impacts should be allowed to arise in sub-projects. However control measures will be needed for oily residues such as transformer oil and lubricants in the case of accidental or unexpected release. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. There are facilities in some subproject grid station 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 by installing bunds and refueling and maintenance should take place in dedicated areas away from surface water resources. Contaminated residues and waste oily residues should be disposed at a site agreed with the local authority. DISCOs are served by the Technical Services Group (TSG), TSG prepare a detailed routine maintenance schedule for each piece of hardware. TSG also supervise and monitors the implementation of this schedule by Grid System Operation (GSO). 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 should preempted by routine maintenance. TSG and GSO have a written down procedure to deal with oil spills.

133. If for some reason there are oily releases, they be cleaned up immediately. TSG ensure that the maintenance schedule of each piece of hardware is adhered to. DISCOs have also established a safety unit, which among other tasks, investigates all accidents. Frequency of accidents, on average is about 1 per DISCO per year (based on last 4 years record), about 60% of these are non-fatal. Most accidents occur due to staff and supervision negligence. Detailed report of each accident is prepared.

134. QESCO already prohibits use of PCBs in new power transformers, there is however, need to prepare an inventory of any PCB carrying old equipment in the system and all such equipment be replaced. The maintenance instructions prepared by the Technical Services Group needs to be reviewed and revised to add PCB based equipment maintenance and a procedure for handling any PCB spills. The Kot Lakhpat and Shalimar workshops already follow such procedures, however, these needs to be reviewed and upgraded in the light of best international practice. This would include provision of special clothing availability of oil absorptive solvents, availability of steel containers. Training to staff on oil spills and special care during transportation of equipment using PCB's is required.

5.4.3 Prevention of Ground Contamination

135. Transformer oil and lubricants that may be released in the operational stage from maintenance and from a catastrophic failure would result in loss of all transformer oil. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site. The transformers, transformer oil stocks and the transformer oil dehydration machines are not installed on impervious surfaces. Therefore in order to be in line with best international practice some mitigation measures are required to prevent soil contamination.

136. The areas upon which the new transformers, transformer oil stocks and the transformer oil dehydration machines located should have an impervious surface with bunding and high enough edges to capture 110% of the total volume of oil that is housed within the bunded area. Oil and oily residues should therefore be captured at source and maintenance should take place in these dedicated areas away from surface water resources. With such mitigation installed no impacts should arise in sub-projects. A programme to introduce bunding in all substations should be introduced in the medium to long term as the transformers are upgraded or replaced as resources permit.

5.4.4 Enhancement

137. Environmental enhancements are not a major consideration within the numerous Tranche-3 project sites. However it is noted that it is common practice at many such sites to create some local hard and soft landscaping and successful planting of fruit trees and shrubs has been accomplished in many sites. This practice should be encouraged as far as practicable.

138. Other opportunities for enhancements can be assessed prior to construction and proposed enhancements should 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. Trees removed for construction purposes should be replaced as compensation in line with best practice at ratio of three replaced for one removed however additional trees should be planted as enhancements where there is space in the grid stations and along the transmission line.

5.4.5 Provosion of Clean Drinking Water And wefare facilities

139. As per governemnt/labour Regulation it is the basic responsibility of employer to provide the clean drinking water and other welfare facities at site. In this project contractor will be bound to provide basic health facity with clean drinking water and other welfare facilities at site to ensure health and unility of his workers/Employees.

6. INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MANAGEMENT PLAN (EMP)

140. In this section, the mitigation measures that are required for the Tranche-3 proposed conversion subproject, to reduce residual impact to acceptable levels and achieve the expected outcomes of the project, are discussed. The Environmental Management Plan is based on the type, extent and duration of the identified environmental impacts for the under study Tranche-3 subprojects. The EMP has been prepared following best practice and by reference to the National Law ADB Safeguards Policy Statement (SPS, 2009).

141. It is important that the recommendations and mitigation measures are carried out according to the spirit of the environmental examination process and in line with the guidelines. The EMP matrix is presented as **Annex-1**. The impact prediction (**Section-4&5**) has played a vital role in reconfirming typical mitigation measures and in identifying any different approaches based on the feasibility and detailed design assumptions and any alternatives available at this stage.

142. Prior to implementation and construction of the subprojects the EMP shall be amended and reviewed by the QESCO in due course after detailed designs are complete. Such a review shall be based on reconfirmation and additional information on the assumptions made at this feasibility stage on positioning, alignment, location scale and expected operating conditions of the subprojects. For example, in this case if there are any additional transmission lines or extension of the substation boundaries to be included, the designs may be amended and then the performance and evaluation schedules to be implemented during project construction and operation can be updated and costs estimates can be revised. The Environmental Examination Report and EMP should then be revised on a subproject basis.

143. The Initial Environmental Examination Report and EMP must be reviewed by the project management and approved by the ADB before any construction activity is initiated. This is also an ADB requirement in order to take account of any sub-sequent changes and fine tuning of the proposals. It is recommended that, before the works contract is worked out in detail and before pre-qualification of contractors, a full extent of EMP is included in the bidding documents. Professional experience indicates that past environmental performance of contractors and their awareness of environmentally responsible procurement should also be used as indicator criteria for the prequalification of contractors.

144. In order to facilitate the implementation of the EMP, during the preparation for the construction phase the QESCO must prepare the future contractors to co-operate with all stakeholders in the mitigation of impacts. Furthermore the contractor must be primed through the contract documentation and ready to implement all the mitigation measures. QESCO will need to engage at least one trained environmental management staff and the staff should audit the effectiveness and review mitigation measures as the subprojects are rolled out. The effective implementation of the EMP will be audited as part of the midterm review of loan conditions and the executing agency must prepare for this at the inception stage.

145. The detailed EMP is given in the **Annex-1**. The impacts have been classified into those relevant to the design/preparation stage, construction stage and operation and maintenance stage. The matrix provides details of the mitigation measures recommended for each of the identified impacts, time span of the implementation of mitigation measures, an analysis of the associated costs and the responsibility of the institution. The institutional responsibility has been specified for the purpose of the implementation and the supervision. The matrix is supplemented with a monitoring plan (**Annex-2**) for the performance indicators. An estimation of the associated costs for

the monitoring is given with the plan. The EMP has been prepared following best practice and the ADB's Safeguard Policy Statement (SPS), 2009.

146. Prior to implementation of the subproject, the QESCO needs to comply with several environmental requirements, such as submitting of EIA report to concerned EPA and obtaining EPA clearance ("No Objection Certificate" compelling acceptable EMP and Clearance Certificate) under PEPAct-1997 (guidelines and regulations 2000) and any other permissions required from other authorities. QESCO will also need to confirm that contractors and their suppliers have complied with all statutory requirements and have appropriate and valid licenses and permits for all powered mechanical equipment and to operate in line with local authority conditions.

147. QESCO has appointed 01 Deputy Manager (Environment & Social safeguard), 01 Assistant Manager (Social safeguard) and 01 Assistant Manager (Environment). The officers working in Environment & Social Safeguard are having relevant qualification and experiences therefore it can be said that (E&SS) Section of QESCO is fully functional. The appointed staff have a good level of awareness and will be responsible for addressing environmental concerns for subprojects potentially involving hundreds kilometers of distribution lines and grid station. Whereas some of their work may in future be delegated to consultants they will need more capacity building training and resources if they are effectively provide quality control and oversight for the EMP implementation. They will require robust support from senior management staff members and the management consultant if they are to address all environmental concerns for the subprojects effectively. Specific areas for immediate attention are in EMP auditing, environmentally responsible procurement, air, water and noise pollution management and ecological impact mitigation.

148. It is also recommended that QESCO Board allow direct reporting to Board level from the in-house Environmental and Social Safeguard Unit (E&SS). If the E&SS Section requires resources for larger subprojects then environmental specialist consultants could be appointed through the project implementation unit to address all environmental aspects in the detailed design. It is recommended that the project management unit (PMU) should liaise directly with the E&SS to address all environmental aspects in the detailed design and contracting stages.

149. Overall implementation of the EMP will become QESCO's responsibility. QESCO and other parties to be involved in implementing the EMP are as follows:

150. **Contractors:** responsible for carrying out the contractual obligations, implementing all EMP measures required to mitigate environmental impacts during construction;

151. The **QESCO Board of Directors** will be responsible to ensure that sufficient timely resources are allocated to process the environmental assessments and to monitor implementation of all construction and operational mitigation measures required to mitigate environmental impacts.

152. Other **government agencies** such as the Balochistan and Pak-EPA and also the state pollution authorities, Department of Forests, Department of Wildlife Services, who will be responsible for monitoring the implementation of environmental conditions and compliance with statutory requirements in their respective areas and local land use groups at the local levels.

153. Considering that other government agencies that need to be involved in implementing the EMP, training or harmonization workshops should be conducted for all Environmental and Social Safeguard Section (E&SS) in all DISCOS every six months, for the first 2 years (and annually thereafter) to share the monitoring report on the implementation of the EMP in each DISCO and to share lessons learned in the implementation and to achieve a consistent approach decide on remedial actions, if unexpected environmental impacts occur.

154. The monitoring plan (Annex-2) was designed based on the project cycle. During the preconstruction period, the monitoring activities will focus on (i) checking the contractor's bidding documents, particularly to ensure that all necessary environmental requirements have been included; and (ii) checking that the contract documents' references to environmental mitigation measures requirements have been incorporated as part of contractor's assignment and making sure that any advance works are carried out in good time. Where detailed design is required (e.g. for power distribution lines and avoidance of other resources) the inclusion and checking of designs must be carried out. During the construction period, the monitoring activities will focus on ensuring that environmental mitigation measures are implemented, and some performance indicators will be monitored to record the Subprojects environmental performance and to guide any remedial action to address unexpected impacts.

155. At this stage, due to the modest scale of the new power distribution projects and by generally keeping to non-sensitive and non-critical areas, the construction and operational impacts will be manageable. No insurmountable impacts are predicted providing that the EMP is implemented to its full extent and required in the contract documents. However experience suggests that some contractors may not be familiar with this approach or may be reluctant to carry out some measures. In order that the contractors are fully aware of the implications of the EMP and to ensure compliance, it is recommended that environmental measures be coasted separately in the tender documentation and that payment milestones are linked to environmental performance, *viz* the carrying out of the EMP.

156. The effective implementation of the EMP will be audited as part of the ADB loan conditions and the executing agency must be prepared for this. In this regard the QESCO (the IA) must be prepared to guide the design engineers and contractors on the environmental aspects.

7. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

7.1 Approach To Public Consultation

157. The public consultation (PC) process with various stakeholders for proposed conversion subproject of Tranche-3 savings has been approached so as to involve public and other stakeholders from the earliest stages. Public consultation has taken place during the planning and design and viewpoints of the stakeholders have been taken into account and their concerns and suggestions for possible improvements have been included where appropriate. Much of the PC process to date has revolved around concerns for the mitigation of construction impacts and the possible side effects from the proximity of high voltage power lines and the GS and its equipment. PC has therefore been conducted for the sub-station and line sub-projects that may incur some impacts over land outside existing sub-stations.

158. There is also a requirement for ongoing consultation for land acquisition and resettlement plan (LARP). In this case Resettlement Plan (RP) is documented separately. It is expected that this process will continue through all stages of the subproject in order to accommodate stakeholders' aspirations and to orient the stakeholders positively towards the project implementation and where possible to harness cooperation over access issues in order to facilitate timely completion.

7.2 Public Consultation Process

159. 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 project and preferences. The stakeholders involved in the process were the population likely to be impacted along the route of the proposed power lines; the village leaders and school teachers.

160. Prior to the implementation of the consultation, feedback, etc. has been carried out to support this IEE and recorded. The focus of attention has been the population near the proposed transmission line that may be affected by the Subproject implementation. The level of engagement varied from the stakeholder to stakeholder with some registering no major comment but it is noted that none registered any outright opposition to the subproject.

161. The disclosure of the enhancement project 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 better serve the stakeholders.

162. The Initial Environmental examination/ environmental impact assessment process under the Pakistan Environmental Protection Act only 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 Environmental Assessment Report, the consultation process was performed to satisfy the ADB requirements. The locations of consultation and people consulted are listed in the full table of public consultation presented in Annex-3.

7.3 Results Of Public Consultation

163. The Tranche-3 saving sub-project in design, construction and operational stages are unlikely to affect any public or private land. There are unlikely to be any significant impacts except excavation and stringing stage for perhaps temporary minor inconveniences to traffic when materials are transported to the sites. QESCO as a major relevant stakeholder conducted

consultation with residents of the area and other stakeholders of saving subproject (Annex-3) and the major concerns of the public, based on consultation at the substation projects, seems to be to get employment in the construction phases.

164. The consultations along the transmission line routes identified some potential environmental and social impacts and perceptions of the affected communities. (Annex-3). The community generally supports the construction of the GS and transmission lines. The local poor people predominantly requested for unskilled and semi skilled jobs on priority basis with the contractors during implementation of the project.

165. No land acquisition and resettlement is involved in the subprojects. However, compensation will be paid to the concerned parties / owners of land under the towers and where the loss/damage to crops is expected.

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

7.4 Grievance Redress Mechanism

167. In order to receive and facilitate the resolution of affected peoples' concerns, complaints, and grievances about the project's environmental performance an Environmental Grievance Redress Mechanism (GRM) will be established for the project. The mechanism will be used for addressing any complaints that arise during the implementation of projects. In addition, the GRM will include a proactive component whereby at the commencement of construction of each project (prior to mobilization) the community will be formally advised of project implementation details by Environment Specialist of DISCO, Environment Specialist of SMEC, the Design and Supervision Consultant (DSC) and Environmental Specialist of the contractor (designs, scheduled activities, access constraints etc.) so that all necessary project information is communicated effectively to the community and their immediate concerns can be addressed. This proactive approach with communities will be pursued throughout the implementation of each project.

168. The GRM will address affected people's concerns and complaints proactively and promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people at no costs and without retribution. The mechanism will not impede access to the Country's judicial or administrative remedies.

7.4.1 Redress Committee, Focal Points, Complaints Reporting, Recording and Monitoring

169. The Grievance Redress Mechanism (GRM), which will be established at each project level is described below:

170. EA will facilitate the establishment of a Grievance Redress Committee (GRC) and Grievance Focal Points (GFPs) at project location prior to the Contractor's mobilization to site. The functions of the GRC and GFPs are to address concerns and grievances of the local communities and affected parties as necessary.

171. The GRC will comprise representatives from local authorities, affected parties, and other well-reputed persons as mutually agreed with the local authorities and affected persons. It will also comprise the Contractor's Environmental Specialist, SMEC's Environmental Specialist and PIU Safeguards/Environmental Specialist. The role of the GRC is to address the Project related

grievances of the affected parties that are unable to be resolved satisfactorily through the initial stages of the GRM.

172. EA will assist affected communities/villages identify local representatives to act as Grievance Focal Points (GFP) for each community/village.

173. GFPs are designated personnel from within the community who will be responsible for i) acting as community representatives in formal meetings between the project team (contractor, DSC, PIU) and the local community he/she represents and ii) communicating community members' grievances and concerns to the contractor during project implementation. The number of GFPs to be identified for each project will depend on the number and distribution of affected communities.

174. A pre-mobilization public consultation meeting will be convened by the EA Environment Specialist and attended by GFPs, contractor, DSC, PIU representative and other interested parties (e.g. District level representatives, NGOs). The objectives of the meeting will be as follows:

- (i) Introduction of key personnel of each stakeholder including roles and responsibilities;
- (ii) Presentation of project information of immediate concern to the communities by the contractor (timing and location of specific construction activities, design issues, access constraints etc.) This will include a brief summary of the EMP - its purpose and implementation arrangements;
- (iii) Establishment and clarification of the GRM to be implemented during project implementation including routine (proactive) public relations activities proposed by the project team (contractor, DSC, PIU) to ensure communities are continually advised of project progress and associated constraints throughout project implementation;
- (iv) Identification of members of the Grievance Redress Committee, and
- (v) Elicit and address the immediate concerns of the community based on information provided above.

175. Following the pre-mobilization public consultation meeting, environmental complaints associated with the construction activity will be routinely handled through the GRM as explained below and shown on Figure 7.1.

- (i) Individuals will lodge their environmental complaint/grievance with their respective community's nominated GFP.
- (ii) The GFP will bring the individual's complaint to the attention of the Contractor.
- (iii) The Contractor will record the complaint in the onsite Environmental Complaints Register (ECR) in the presence of the GFP.
- (iv) The GFP will discuss the complaint with the Contractor and have it resolved;
- (v) If the Contractor does not resolve the complaint within one week, then the GFP will bring the complaint to the attention of the DSC's Environmental Specialist. The DSC's Environment Specialist will then be responsible for coordinating with the Contractor in solving the issue.
- (vi) If the Complaint is not resolved within 2 weeks the GFP will present the complaint to the GRC.
- (vii) The GRC will have to resolve the complaint within a period of 2 weeks and the resolved complaint will have to be communicated back to the community. The Contractor will then record the complaint as resolved and closed in the Environmental Complaints Register.

- (viii) Should the complaint not be resolved through the GRC, the issue will be adjudicated through local legal processes.
- (ix) In parallel to the ECR placed with the Contractor, each GFP will maintain a record of the complaints received and will follow up on their rapid resolution.
- (x) EA will also keep track of the status of all complaints through the Monthly Environmental Monitoring Report submitted by the Contractor to the DSC and will ensure that they are resolved in a timely manner.

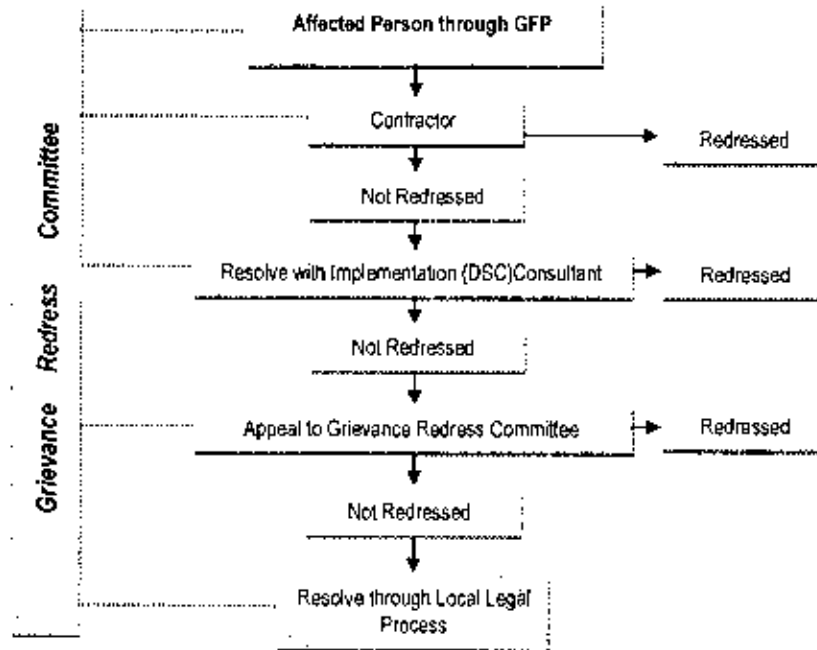


Figure 7.1 Grievance Redress Mechanism

8. FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

8.1 Findings And Recommendations

176. This study was carried out at the planning stage of the project. Predominantly secondary data and site reconnaissance were used to assess the environmental impacts. The potential environmental impacts were assessed in a comprehensive manner. The report has provided a picture of all potential environmental impacts associated with the sub-projects, and recommended suitable mitigation measures.

177. There are some further considerations for the planning stages such as obtaining clearance for the project under the Pakistan Environmental Protection Act (1997) but environmental impacts from the Tranche-3 Power Distribution Enhancement Investment Project will mostly take place during the construction stage. There are also some waste management issues for the construction and operational stage that must be addressed in the detailed design and through environmentally responsible procurement. The impacts are likely to be broadly similar at most locations and impacts have been reviewed in the environmental impact section of this IEE report.

178. There are a number of key actions required in the detailed design phase. Prior to construction the QESCO must receive clearance certification from the BEPA and QESCO must complete an EMP that will be accepted by the BEPA and agreed by the contractor prior to signing the contract.

179. No land acquisition and resettlement is involved. However, some crops will be compensated to the concerned parties. However, provisions may be made in LARP, based on the proposed alignments these should not be difficult tasks and can be conducted as the detailed designs are worked out and to dovetail with the existing system and minimize adverse impacts and maximize benefits. A social impact assessment and resettlement action plan (LARP) has been completed in tandem with this Environmental Examination Report for the whole subproject. The study has:

- (i) Examined and assessed the overall social and poverty profile of the project area on the basis of the primary and secondary data sources and preparation of a socio-economic profile of the project districts.
- (ii) Prepared a social and poverty analysis, taking into account socio-economic and poverty status of the project area of influence, including the nature, extent and determinants of poverty in the project area including assessment. In addition, estimation of the likely socioeconomic and poverty reduction impacts of the project should be included.
- (iii) Held consultations with relevant officials from the government and other relevant officials, including consultation with affected communities to assess responses to the project and ascertain the nature and scope of local participation in project planning and implementation.
- (iv) Identified, analyzed and, where appropriate, quantified the potential resettlement impacts (minimal) of the proposed Project on the area and the population.

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

181. During the commissioning phase waste disposal monitoring should ensure that statutory requirements have been met. Monitoring activities during project operation will focus on periodic

recording environmental performance and proposing remedial actions to address any unexpected impacts.

8.2 Conclusion

182. There are no major environmental impacts for the proposed conversion subprojects that are feasible and sustainable options from the power distribution, engineering, environmental, and socioeconomic points of view. The implementation of the EMP is required and the environmental impacts associated with the sub-project need to be properly mitigated, and the existing institutional arrangements are available. Additional human and financial resources will be required by the QESCO to complete the designs and incorporate the recommendations effectively and efficiently in the contract documents, which should be linked to payment milestones. The proposed mitigation and management plans are practicable but require additional resources.

183. This Environmental Examination, including the EMP, should be used as a basis for an environmental compliance program and be included as an Annex to the contracts. In addition, any subsequent conditions issued by concerned EPA as part of the environmental clearance should also be included in the environmental compliance program. Therefore, continued monitoring of the implementation of mitigation measures, the implementation of the environmental conditions for work and environmental clearance, and monitoring of the environmental impact related to the operation of the proposed conversion sub-project should be properly carried out and reported at least twice per year as part of the project performance reports.

8.3 SUMMARY OF ESTIMATED COSTS FOR EMP IMPLEMENTATION

		Rs	US \$
Staffing , audit and monitoring	1 Person for 2 years	1400,000	13461.5
Monitoring Activities	As detailed in EMP	5000,000	48076.9
Mitigation measure	As Prescribed in EMP & IEE	7,000,000	67307.6
Contingency	3% contingency	402,000	3865.4
Total		13,802,000	132707.8

ANNEX – 1

ENVIRONMENTAL MANAGEMENT PLAN – MATRIX

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp. Imp MM	Resp. Mon MM
DESIGN STAGE						
1. Flora and Fauna	To minimize damage to flora and fauna	1. Ensure that minimal flora is damaged 2. Ensure that fauna especially bird nesting's are not damaged	Before the commencement of construction activities/during design stage	Flora and Fauna sensitive locations	ES SMEC	ES QESCO
2. Hydrological Impacts	To minimize hydrological and drainage impacts during constructions.	1. Hydrological flow in areas where it is sensitive, such as water courses or bridges and culverts. 2. Design of adequate major and minor culverts facilities will be completed	Before the commencement of construction activities/during design stage	If lines or substation are relocated near water courses, culverts or bridges in the design stage reports	ES QESCO with the ES SMEC (Design Consultant)	ES QESCO
3. Noise barriers	Ensure cumulative noise impacts are acceptable in construction and operational phase.	1. Conduct detailed acoustic assessment for all residential, school, (other sensitive structures) within 50m of grid station and line. 2. If noise at sensitive receiver exceeds the permissible limit, the construction activities should be mitigated, monitored and controlled. 3. If noise at sensitive receiver exceeds the permissible limit, the design to include acoustic mitigation (noise barrier or relocation of noisy equipment) and monitoring.	1. During detailed design stage. No later than pre-qualification or tender negotiations. 2. Include acoustic specification in the contract.	Noise sensitive locations identified in the IEE/EIA/EMP or as required	ES QESCO with the ES SMEC (Design Consultant)	ES QESCO and ES SMEC
4. Waste disposal	Ensure adequate disposal options for all waste including transformer oil, residually contaminated soils, scrap metal.	1. Create waste management policy and plan to identify sufficient locations for storage and reuse of transformers and recycling of breaker oils and disposal of transformer oil, residually contaminated soils and 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.	1. Prior to detailed design stage no later than pre-qualification or tender negotiations 2. Include in contract.	QESCO ESU. And local waste disposal authorities.	ES QESCO with the ES SMEC (Design Consultant)	ES QESCO with the ES SMEC
5. Temporary drainage and erosion control	Include mitigation in preliminary designs for erosion control and	1. Identify locations where drainage or irrigation crossing RoW may be affected by works. 2. Include protection works in contract as a payment milestone(s).	During designing stage no later than pre-qualification or	Locations based on drainage or irrigation crossing RoW near grid	ES QESCO with the ES SMEC	ES QESCO with the ES SMEC

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp. Imp MM	Resp. Mon MM
6. Contract clauses	temporary drainage.		tender negotiations.	station.		
	Ensure requirements and recommendations of environmental assessment are included in the contracts.	<ol style="list-style-type: none"> 1. Include EMP Matrix in tender documentation and make contractors responsible to implement mitigation measures by reference to EIA/IEE in contract. 2. Include preparation of EMP review and method statement WMM plan, TD and EC Plan in contract as a payment milestone(s). 3. Require environmental accident checklist and a list of controlled chemicals / substances to be included in the contractor's work method statement and tender documentation. 	<ol style="list-style-type: none"> 1. During tender preparation. 2. No later than pre-qualification or tender negotiations 3. In bidding documents as evaluation criteria. 	Noise sensitive locations identified in the EIE/EIA/EMP	ES QESCO with the ES SMEC	ES QESCO with the ES SMEC
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"> 1. Consideration of weather conditions when particular construction activities are undertaken. 2. Limitations on excavation depths in use of recharge areas for material exploitation or spoil disposal. 3. Use of landscaping as an integrated component of construction activity as an erosion control measure. 4. Minimizing the removal of vegetative cover as much as possible and providing for it's restoration where construction sites have been cleared of such areas. 	<p>Prepare a thorough drainage management plan to be approved by CSC one month prior to a commencement of construction</p> <p>Proper timetable prepared in consideration with the climatic conditions of the area, the different construction activities mentioned here to be guided.</p>	<ol style="list-style-type: none"> 1. Locations of each construction activity to be listed by the CSC engineer. 2. Special locations are identified on the site by the contractor to minimize disturbances. 3. A list of locations of irrigation channels / drains to be compiled and included in the contract. 	ES SMEC and ES QESCO	
			Induction course for all site agents and above including all relevant QESCO staff / new project staff before commencement of work.	All staff members in all categories. Monthly induction and six month refresher course Quarterly as necessary until contractor complies.	QESCO ES, Contractor and CSC/SMEC	ES QESCO with the ES SMEC
2. Orientation/Capacity building of GSC staff Contractor, and Workers	To ensure that the GSC staff, contractor and workers understand and have the capacity to ensure the environmental requirements and implementation of	<ol style="list-style-type: none"> 1. QESCO ESU specialist has to build their capacity regarding Environmental monitor and progress all environmental statutory and recommended obligations. 2. Conduct Awareness trainings / special briefing for managers and other staff in house & also on-site training for the contractors and workers on the environmental requirement of the project. <p>Record attendance and achievement test for contractors site agents and</p>				

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to Implement MM	Resp. Imp MM	Resp. Mon MM
3. Water quality	Mitigation measures:	<p>ensure TMA and repeat sessions Quarterly.</p> <p>3. Agreement on critical areas to be considered and necessary mitigation measures, among all parties who are involved in project activities.</p> <p>4. Continuous progress review and refresher sessions to be followed.</p> <p>Compile temporary drainage management plan one month before commencement of works.</p> <p>1. Proper installation of temporary drainage and erosion control before works within 50m of water bodies.</p> <p>2. Proper maintenance and management construction of TD and EC measures, including training of operators and other workers to avoid pollution of water bodies by the considerate operation of construction machinery and equipment.</p> <p>3. Storage of lubricants, fuels and other hydrocarbons in self-contained dedicated enclosures > 50m away from water bodies.</p> <p>4. Proper disposal of solid waste from construction activities.</p> <p>5. Cover the construction material and spoil stockpiles with a suitable material to reduce material loss and sedimentation and avoid stockpiling near to water bodies.</p> <p>6. Topsoil stripped material shall not be stored where natural drainage will be disrupted.</p> <p>7. Borrow sites (if required) should not be close to sources of drinking water.</p>	<p>At early stages of construction for all construction employees as far as reasonably practicable.</p> <p>1 month prior to construction.</p>	<p>1. 50m from water bodies</p> <p>2. Relevant locations to be determined in the detailed project design.</p>	<p>1. ES Contractor</p> <p>2. Contractor has to check water quality and report to QESCO.</p>	<p>ES SMEC and ES QESCO review results</p>
4. Air quality	To minimize dust effectively and avoid complaints due to the airborne particulate matter released to the atmosphere.	<p>CONTROL ALL DUSTY MATERIALS AT SOURCE.</p> <p>1. 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 Road Act).</p> <p>2. Stockpiled soil and sand shall be slightly wetted before loading, particularly in windy conditions.</p> <p>3. Fuel-efficient and well-maintained haulage trucks shall be employed to minimize exhaust emissions.</p>	During all construction.	<p>1. Construction sites within 100m of sensitive receivers.</p> <p>2. A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works.</p>	<p>Contractor should maintain acceptable standard.</p> <p>ES SMEC to supervise activities.</p>	QESCO ES / ES SMEC

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp. Imp MM	Resp. Mon MM
		<ol style="list-style-type: none"> 4. Vehicles transporting soil, sand and other construction materials shall be covered. Limitations to speeds of such vehicles necessary. Transport through densely populated area should be avoided. 5. To plan to minimize the dust within the vicinity of orchards and fruit farms. 6. Spraying of bare areas with water. 7. Concrete plants, to be controlled in line with statutory requirements should not be close to sensitive receptors. 				
5. Ground Vibration	To minimize ground vibrations during construction.	<ol style="list-style-type: none"> 1. Review requirements for piling and use of powered mechanical equipment within 100m of SRs. 2. Review conditions of buildings and conduct public consultation with SRs to establish less sensitive time for works involving piling and schedule works accordingly. 3. Non-percussive piling methods to be used wherever practicable. 4. Percussive piling shall be conducted in daylight hours. 5. Hammer-type percussive pile driving operations shall not be allowed at night time. 	1 month prior to construction.	<ol style="list-style-type: none"> 1. Construction sites within 100m of sensitive receivers. 2. A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works. 	<p>Contractor should maintain the acceptable standards</p> <p>ES SMEC to supervise relevant activities.</p>	QESCO ES / SMEC ES
6. Noise	To minimize noise increases during construction.	<ol style="list-style-type: none"> 1. Review requirements for use of powered mechanical equipment within 100m of SRs 2. Conduct public consultation with SRs to establish less sensitive time for works and schedule works accordingly. 3. All heavy equipment and machinery shall be fitted in full compliance with the national and local regulations and with effective silencing apparatus to minimize noise. 4. Heavy equipment shall be operated only in daylight hours. 5. Construction equipment, which generates excessive noise, shall be enclosed or fitted with effective silencing apparatus to minimize noise. 7. Well-maintained haulage trucks will be used with speed controls. 8. Contractor shall take adequate measures to minimize noise nuisance in the vicinity of construction sites by way of adopting available acoustic 	1 month prior to construction.	<ol style="list-style-type: none"> 1. Construction sites within 100m of sensitive receivers. 2. A list of locations to be included in contract and other sensitive areas identified by the CSC along the ROW during works. 	<p>Contractor should maintain the acceptable standards</p> <p>ES SMEC to supervise relevant activities.</p>	QESCO ES / SMEC

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp. Imp MM	Resp. Mon MM
		methods.				
		SCHEDULE WORKS IN SENSITIVE AREAS (e.g. NEAR RIVERS) FOR DRY SEASON 1. In the short-term, temporary drainage and erosion control plan to be presented with tender. Temporary drainage and erosion control plan one month before commencement of works to protect all areas susceptible to erosion. (Permanent drainage works shall be in the final design). 2. Installation of TD and EC before works construction within 50m of water bodies. 3. Clearing of groyne surface cover to be minimized during site preparation. 5. Meaningful water quality monitoring up and downstream at any tower site during construction within a river or stream bed. Rapid reporting and feedback to CSC. 5. Back-fill should be compacted properly in accordance with QESCO 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 or cause slippage. 8. Measures shall be taken to prevent ponds of surface water and scouring of slopes. Newly eroded channels shall be backfilled and restored to natural contours. 9. Contractor should arrange to monitor and adjust working and adopt suitable measures to minimize soil erosion during the construction period. Contractor's TD and EC plan should be endorsed and monitored but CSC after consulting with concerned authorities. 10. Replanting trees to be done before the site is vacated and handed back to QESCO with appropriate trees (other vegetation cover as appropriate) to ensure interception of rainwater and the deceleration of surface run-off.	1 month prior to construction because the area can be subject to unseasonal heavy rain. Plan before and during construction (cut and fill, land reclamation etc.) while considering the climatic conditions.	1. Locations based on history of flooding problems indicated by local authorities. 2. A list of sensitive areas during construction to be prepared by the detail design consultant in consideration with the cut and fill, land reclamation, borrow areas etc. 3. Locations of all rivers, streams, culverts, irrigation channels, roads and roads.	ES Contractor and ES SMEC QESCO ES / SMEC ES	
7. Soil Erosion / Surface Run-off	Prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively. To minimize soil erosion due to the construction activities of towers, stringing of conductors and creation of access tracks for project vehicles.					

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp. Imp MM	Resp. Mon MM
		<p>7. Only wastes must not be burned. Disposal location to be agreed with local authorities/EPA</p> <p>8. Waste breaker insulating oil to be recycled, reconditioned, or reused at DISCO's facility.</p> <p>9. Machinery should be properly maintained to minimize oil spill during the construction.</p> <p>10. Machinery should be maintained in a dedicated area over drip trays to avoid soil contamination from residual oil spill during maintenance.</p> <p>11 Solid waste should be disposed at an approved solid waste facility and not by open burning which is illegal and contrary to good environmental practice.</p>		agreement (in W M Plan)		
10. Work Camp Operation and Location (if required)	To ensure that the operation of work camps does not adversely affect the surrounding environment and residents in the area.	<p>1. Identify location of work camps in consultation with local authorities. The location shall be subject to approval by the QESCO. If possible, camps shall not be located near settlements or near drinking water supply intakes.</p> <p>2. Cutting of trees shall not be permitted and removal of vegetation shall be minimized.</p> <p>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 vacating of the sites.</p> <p>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 of to the nearest sanitary landfill or site having complied with the necessary permits of local authority permission.</p> <p>5. The Contractor shall organize and maintain a waste separation, collection and transport system.</p> <p>6. The Contractor shall document that all liquid and solid hazardous and non-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>	UPDATE Once a month	Location Map is prepared by the Contractor.	Contractor	QESCO ESU / CSC

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp. Imp MM	Resp. Mon MM
		<p>8 Exposed areas shall be planted with suitable vegetation.</p> <p>9 QESCO and Construction Supervising Consultant shall inspect and report that the camp has been vacated and restored to pre-project conditions.</p>				
		<p>1. Tree location and condition survey to be completed one month before tender.</p> <p>2. The route for the distribution line should be selected so as to prevent the loss or damage to any orchard trees or other trees. Use of higher towers to be preferred to avoid trees cutting</p> <p>3. Cleaning of green surface vegetation cover for construction, borrow of soil for development, cutting trees and other important vegetation during construction should be minimized by careful alignment. Written technical justification for tree felling included in tree survey.</p> <p>4. At completion all debris and waste shall be removed and not burned.</p> <p>5. The contractor's staff and labour will be strictly directed not to damage any vegetation such as trees or bushes outside immediate work areas. Trees shall not be cut for fuel or works timber.</p> <p>6. 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.</p> <p>7. The contractor will plant three (3) suitable new trees outside the 30 meter corridor of the transmission line in lieu of one (1) tree removed.</p> <p>8. Landscaping and road verges to be re-installed on completion.</p> <p>9. Compensatory planting of trees/shrubs/ornamental plants (at a rate of 3:1) in line with best international practice.</p> <p>10. After work completion all temporary structures, including office buildings, shelters and toilets shall be removed.</p>				
11. Loss of Trees and Vegetation Cover of the Areas for Towers and Temporary Work-space	To avoid negative impacts due to removing of landmark, sentinel and specimen trees as well as green vegetation and surface cover.		Route design and site identification (1 & 2) during design stage and other matters during construction of relevant activities	Tree survey to be completed one month before tender at relevant Locations with a Map to be compiled prior to tender by the design consultant / QESCO ESU during detailed design and CSC to update as necessary.	SMEC ES and ES Contractor	QESCO ES / SMEC ES
12. Health, Safety and Precautions for the Workers	To ensure safety of workers	<p>1. Providing induction safety training for all staff adequate warning signs in health and safety matters, and require the workers to use the provided safety equipment</p> <p>2. Providing workers with skull guard or hard hat and hand toe shoes.</p>	Prior to commencement and during construction	Location to be identified by the CSC with contractor.	ES Contractor	ES QESCO/ ES SMEC
13.	Minimize disturbance of	1. Submit temporary haul and access routes plan one month prior to	Prior to and	The most important	ES Contractor	QESCO

Environmental concern	Objectives	Mitigation Measures recommended	Timing to Implement MM	Locations to implement MM	Resp. Imp MM	Resp. Mon MM
Traffic Condition	vehicular traffic and pedestrians during haulage of construction materials and equipment.	1. start of works. 2. Routes in vicinity of schools and hospitals to be avoided.	Throughout the construction.	Locations to be identified and listed. Relevant plans of the Contractor on traffic arrangements to be made available.		ESU / CSC
14. Social Impacts	To ensure minimum impacts from construction labour force, on public health.	1. Potential for spread of vector borne and communicable diseases from labour camps shall be avoided (worker awareness orientation and appropriate sanitation should be maintained). 2. Complaints of the people on construction nuisance / damage close to ROW to be considered and responded to promptly. 3. Contractor should make alternative arrangements to avoid local community impacts.	Complaints of public to be solved as soon as possible	All subprojects all tranches	ES Contractor ES QESCO	ES QESCO
15. Institutional Strengthening and Capacity Building	To ensure that QESCO officials are trained to understand and to appreciate EMP	Environmental Management Unit (EMU) was setup with in QESCO under Chief Engineer (Dev) in Tranche-1 Development of strengthening plan for the EMU should be taken up with resources. Various Capacity building activities have been taken by Environmental Section since from execution of tranche 1 and onwards till to date and in future tranches. Capacity building with training and information of national and international agencies regulations is mandatory part of organization. ADB through its Technical Assistance RETA would be strengthening the QESCOs staff's capacity building often.	Initiate preconstruction and continue beyond project completion.	Awareness training for all management and senior staff in QESCO at senior engineer and above in PMU and related units. ADB through its RETA Trainings program	QESCO ESU QESCO ADB	QESCO & ADB
OPERATIONAL STAGE						
1. Air Quality	Minimize air quality impacts	No significant impacts Tranche 3 Monitor designs and plans for all future tranches.	Operational phase	all subprojects in future tranches	ES QESCO	QESCO ESU
2. Noise	Minimize noise impacts	No significant impacts Tranche 3. Acoustic designs checking and plan for all future tranches.	Operational phase	all subprojects in future tranches	ES QESCO	QESCO ESU
3. Waste disposal	Minimize improper waste disposal	Continue waste management arrangements in operational phase of all subprojects and QESCO activities.	Operational phase	all subprojects in future tranches	ES QESCO	QESCO ESU
3. Compensatory tree planting	Maintain survival of trees planted	Employ landscaping contractor to monitor, water and feed replacement saplings and replace dead specimens as necessary.	Operational phase	all subprojects in future tranches	ES QESCO	QESCO ESU
4. Landslides and	Avoid landslides and loss	No significant impacts in Tranche 3. Review designs checking and plan	Operational phase	all subprojects in future tranches	ES QESCO	QESCO

Environmental concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Resp. Imp MM	Resp. Mon MM
soil erosion	of productive land	for all future tranches.		tranches		ESU
5. Water quality	Minimize water quality impacts	No significant impacts in Tranche 3. Review designs checking and plan for all future tranches.	Operational phase	all subprojects in future tranches	ES QESCO	QESCO ESU
6 Crops and vegetation	Monitor impacts from maintaining tree clearance under transmission lines	Track growth of large trees under the conductors.	Operational phase	all subprojects in future tranches	ES QESCO	QESCO ESU
7. Social safety impacts	Ensure no encroachments / construction under the transmission line. No violation of clearance spaces.	Necessary signboards with limits of height clearances to be placed all along the line. Identify and prevent any illegal encroachments under the DXLs..	Operational phase	all subprojects in future tranches	ES QESCO	QESCO ESU

Note:

ADB: Asian Development Bank (the financier)
EC: Erosion control
EPA: Environmental Protection Agency,
RoW: Right of Way

CFCs: Chloro-Floro-Carbons
EIA: Environmental Impact Assessment
QESCO: Quetta Electric Supply Company
TD: Temporary Drainage

E&SS: Environment & Social Safeguard Section of PMU QESCO
EMP: Environmental Management Plan
NGO: Non-Government Organization

ANNEX-2: MONITORING PLAN FOR PERFORMANCE INDICATORS (MATRIX)

Sr. No.	Monitoring Parameter	Monitoring Locations	Timing	Responsibility
Design Phase				
1.1	Audit project bidding documents to ensure IEE and EMP is included.	-	Prior to issuance of bidding documents.	QESCO through environmental officer.
1.2	Monitor final site selection and its environmental compliance with EMP.	-	Prior to PEPCO's approval of contractor's survey.	QESCO through environmental officer.
1.3	Monitor performance of environmental trainings and briefings for the environmental awareness of project staff and QESCO.	-	Ongoing, prior to and during implementation of works.	QESCO through environmental officer.
Construction Phase				
2.1	Observation of soil erosion	Construction sites, campsites	During routine monitoring	QESCO through environmental officer.
2.2	Water Quality	At wells and surface water bodies near grid station and construction campsites	Before mobilization	Contractor/QESCO
		Selected local wells	Monthly	Contractor/QESCO
		Selected locations at nearby surface water bodies	Monthly	Contractor/QESCO
		Construction sites, campsites	Daily	Contractor/QESCO
2.3	Water Consumption	-	-	-
2.4	Checks for any damage to water course, groundwater wells	Construction sites	During routine monitoring	QESCO
2.5	Ambient air quality	Construction sites,	Before mobilization	Contractor/QESCO

Sr. No.	Monitoring Parameter	Monitoring Locations	Timing	Responsibility
2.6		campsites		
		Construction sites, campsites	Once every two months	
	Checks for exhaust emissions	Construction sites, campsites	During routine monitoring	Contractor/QESCO
	Checks for dust emissions	Construction sites, campsites, project roads	During routine monitoring	
2.7	Noise	At nearby communities	Fortnightly or during the construction activities causing noise.	Contractor/QESCO
2.8	Public concerns	At nearby communities	Throughout field activities	QESCO
Operation/Maintenance Phase				
3.1	Compensatory tree planting	Selected sites for plantation of trees	After construction phase	QESCO

Note:

LARP	- Land Acquisition and Resettlement Plan	AP	= Affected Persons	LAC	= Local Authority Council
TD	= Temporary Drainage	EC	= Erosion Control	WM	= Waste Management
GSC	= Construction Supervision Consultant or Equivalent	TXL	= Transmission Line	GSS	= Grid Substation
DDS	= Detailed design stage. Based on EIA/IEE reports to be revised at DDS, RAP, SIA and other engineering considerations may change.			EIA	= Environmental Impact Assessment
EMP	= environmental management action plan = environmental management plan	NEQS	= National Environmental Quality Standards	EPA	= Environmental protection Agency
EC	= Erosion control. MGO = non-government organization			TD	= Temporary drainage
ADB *	= ADB checks that processes have been completed and signed off by DISCO before moving to construction stage				
ADB	= Asian Development Bank (the financier)	ESS	= Environment & Social Safeguard Section of PMU QESCO		

ANNEX - 3: SUMMARY OF THE PUBLIC CONSULTATION

Sl. No.	Name	Gender	Date	Public Consultation		Remarks	
				Topic	Response	Topic	Response
1	D M Jamal	Male	08/08/2015	Noise generated by vehicle	Use of well maintained vehicles	Work at day light hours only	-----do-----
2	-----do-----	Male	-----do-----	-----do-----	-----do-----	-----do-----	-----do-----
3	-----do-----	Male	-----do-----	Dust Pollution	Sprinkling water on the site	Sprinkling twice a day	-----do-----
4	-----do-----	Male	-----do-----	-----do-----	-----do-----	-----do-----	-----do-----
5	Rojhan Jamal	Male	9/08/2015	-----do-----	-----do-----	-----do-----	-----do-----
6	-----do-----	Male	-----do-----	Waste disposal	Waste management activities	Waste management plan imp	-----do-----
7	-----do-----	Male	-----do-----	-----do-----	-----do-----	-----do-----	-----do-----
8	Usta muhammad	Male	10/08/2015	Crops trees RoW issues	Preparation of LARP	LARP Implementation	-----do-----
9	-----do-----	Male	-----do-----	-----do-----	-----do-----	-----do-----	-----do-----
10	-----do-----	Male	-----do-----	-----do-----	-----do-----	-----do-----	-----do-----
11	-----do-----	Male	-----do-----	traffic condition issues	Avoiding traffic on school routs	Prior or during transport avoided	-----do-----
12	-----do-----	Male	-----do-----	-----do-----	-----do-----	-----do-----	-----do-----
13	Jhal Magsi	Male	11/08/2015	Work camp	No camp near the water supply	Camp location suggested by local authorities	-----do-----
14	-----do-----	Male	-----do-----	-----do-----	-----do-----	-----do-----	-----do-----
15	-----do-----	Male	-----do-----	-----do-----	-----do-----	-----do-----	-----do-----
16	-----do-----	Male	-----do-----	-----do-----	-----do-----	-----do-----	-----do-----

Annex 1: Location Maps



Figure 8.1: Usta Muhammad Grid Station

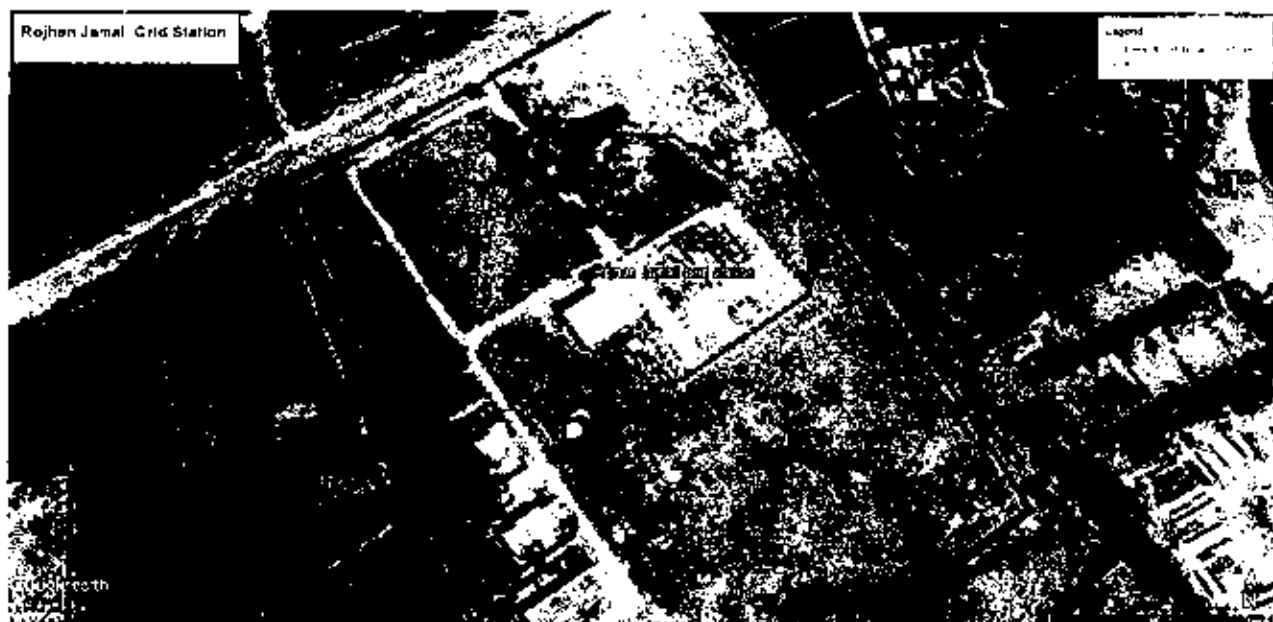


Figure 8.2: Rojhan Jamali Grid Station



Figure 8.3: Jhal Magsi Grid Station



Figure 8.4: Dera Murad Jamali Grid Station