Initial Environmental Examination

Construction of New 132kV GIS Grid Station Punjab University

February 2017

PAK: MFF – Power Distribution Enhancement Investment Program (Tranche 4)

Prepared by Lahore Electric Supply Company, Punjab 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.

This Initial Environmental Examination 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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Fw: Re: L2972 PDEIP: Revised IEE Punjab University Grid Station
Safia Shafiq
to:
Liaqat Ali
27/02/2017 11:38 AM
Cc:
Nurlan Djenchuraev, Ehtesham Z. Khattak, Zhang Lei
Hide Details
From: Safia Shafiq/Consultants/ADB
To: Liaqat Ali/PRM/ADB@ADB
Cc: Nurlan Djenchuraev/CWRD/ADB@ADB, Ehtesham Z. Khattak/PRM/ADB@ADB, Zhang Lei/CWRD/ADB@ADB
1 Attachment

IEE of Punjab University (FINAL 23022017).doc

Dear Liaqat Sb.,

The attached IEE of Punjab University is approved for disclosure.

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 02/27/2017 11:33AM -----

To: "sshafiq.consultant@adb.org" <sshafiq.consultant@adb.org>
From: Muhammad Usman <uniqueromi@yahoo.com>
Date: 02/23/2017 10:39AM
Cc: "ndjenchuraev@adb.org" <ndjenchuraev@adb.org>, Liyaqat Ali <lali@adb.org>
Subject: Re: L2972 PDEIP: Revised IEE Punjab University Grid Station

Respected Madam

Please find enclosed herewith the updated IEE of Punjab university for your kind perusal please

Regards

Muhammad Usman
Deputy Manager(E&S) PMU LESCO

On Thursday, 23 February 2017, 6:27, "ndjenchuraev@adb.org" <ndjenchuraev@adb.org> wrote:

Safia,
Sorry, this is a correct file.
Nurlan

From: Safia Shafiq/Consultants/ADB
To: Nurlan Djenchuraev/CWRD/ADB@ADB
Cc: Ehtesham Z. Khattak/PRM/ADB@ADB, Liaqat Ali/PRM/ADB@ADB, uniqueromi@yahoo.com
Date: 22/02/2017 09:50 PM
Subject: Re: L2972 PDEIP: Revised IEE Punjab University Grid Station

Dear Nurlan,

The sample IEE is not attached with your email. Only the IEE of Punjab University was attached. Please send the sample you referred to so LESCO may amend paragraph 30 accordingly.

Thanks and regards,

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

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-----Nurlan Djenchuraev/CWRD/ADB wrote: -----
To: Safia Shafiq/Consultants/ADB@ADB
From: Nurlan Djenchuraev/CWRD/ADB
Date: 02/22/2017 07:06AM
Cc: Ehtesham Z. Khattak/PRM/ADB@ADB, Liaqat Ali/PRM/ADB@ADB
Subject: Re: L2972 PDEIP: Revised IEE Punjab University Grid Station

Dear Safia,

All my comments were addressed. In addition, I would recommend LESCO to improve Para 30 as shown in the attached IEE. The IEE can be disclosed after incorporation of this comment.

Best regards,
Nurlan
(See attached file: IEE of Punjab University (22022017).doc)
Nurlan Djenchuraev
Senior Environment Specialist

PSG, Office of the Director General
Central & West Asia Department
Asian Development Bank
Dir (632) 683 1983
Fax (632) 636 6318
www.adb.org

Safia Shafiq---21/02/2017 05:43:21 PM---Dear Nurlan, The revised IEE of Punjab University is attached for your review.

From: Safia Shafiq/Consultants/ADB
To: Nurlan Djenchuraev/CWRD/ADB@ADB
Cc: Ehtesham Z. Khattak/PRM/ADB@ADB, Liaqat Ali/PRM/ADB@ADB
Date: 21/02/2017 05:43 PM
Subject: Re: L2972 PDEIP: Revised IEE Punjab University Grid Station

Dear Nurlan,

The revised IEE of Punjab University is attached for your review.

Regards,

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

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-----Nurlan Djenchuraev/CWRD/ADB wrote: -----
To: Safia Shafiq/Consultants/ADB@ADB
From: Nurlan Djenchuraev/CWRD/ADB
Date: 02/21/2017 10:39AM
Cc: Ehtesham Z. Khattak/PRM/ADB@ADB, Liaqat Ali/PRM/ADB@ADB
Subject: Re: L2972 PDEIP: Revised IEE Punjab University Grid Station

Dear Safia,

I noticed that the quality of the IEE is much improved as compared with the earlier version. Attached to the IEE text are additional comments to ensure full compliance with the SPS requirements.

Best regards,
Nurlan
(See attached file: IEE of Punjab University (20022017)-nd.doc)
Nurlan Djenchuraev
Senior Environment Specialist
PSG, Office of the Director General
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ADB

Safia Shafiq---20/02/2017 07:17:09 PM---Dear Nurlan, The revised IEE of Punjab University Grid Station and the comments matrix is attached f

From: Safia Shafiq/Consultants/ADB
To: Nurlan Djenchuraev/CWRD/ADB@ADB
Cc: Ehtesham Z. Khattak/PRM/ADB@ADB, Liaqat Ali/PRM/ADB@ADB
Date: 20/02/2017 07:17 PM
Subject: L2972 PDEIP: Revised IEE Punjab University Grid Station

Dear Nurlan,

The revised IEE of Punjab University Grid Station and the comments matrix is attached for your review.

Regards,

Safia Shafiq
Environment Specialist (Consultant)
Pakistan Resident Mission
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Tel: +92-51-2087300, Ext: 344
Fax: +92-51-2087397-8 & 2600365-6
Cell: +92-333-2154462[attachment "CM for IEE University Road (20022017).doc" deleted by Nurlan Djenchuraev/CWRD/ADB] [attachment "IEE of Punjab University (20022017).doc" deleted by Nurlan Djenchuraev/CWRD/ADB] [attachment "IEE of Punjab University (20022017).doc" deleted by Nurlan Djenchuraev/CWRD/ADB]

[attachment "IEE of Punjab University (20022017)-nd.doc" removed by Safia Shafiq/Consultants/ADB]
[attachment "IEE of Punjab University (21022017).doc" deleted by Nurlan Djenchuraev/CWRD/ADB]

[attachment "IEE of Punjab University (22022017).doc" removed by Safia Shafiq/Consultants/ADB]

[attachment "IEE of Punjab University (21022017)-nd22Feb17.doc" removed by Safia Shafiq/Consultants/ADB]

Draft Initial Environmental Examination (IEE) Report

Project Number: 3096-Pak
{September-2016}

Islamic Republic of Pakistan: Power Distribution Enhancement Investment Program (Multi-Tranche Financing Facility)

Tranche-IV: Construction of New 132KV GIS Grid GIS Station Punjab University

Prepared by:

Lahore Electric Supply Company (LESCO)
Government of Pakistan

EXECUTIVE SUMMARY

INTRODUCTION

Lahore Electric Supply Company Limited (LESCO) is a public limited utility company responsible for distribution of electric power. In order to improve its transmission system and its expansion within its area of jurisdiction, LESCO decided to construct new *132kV GIS Punjab University Grid Stations*. The project is financed by Asian Development Bank. The Projects which are financed by the Asian Development Bank have to comply with Bank's guidelines relevant to environmental and social safeguard policies as well as applicable laws and regulations. The Initial Environmental Examination (IEE) Study of the Project was conducted by LESCO Environmental &Social Cell.

THE PROJECT OVERVIEW

The objectives of the Project are to help increase the efficiency, reliability, and quality of electricity supply in terms of the overall technical and commercial losses reduction, continuous availability and the improved voltage profile of electricity. The Project shall also facilitate electricity sector reforms, investment planning, financing and technical assistance.

POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS

The National Environmental Policy had been announced by Government of Pakistan in the year 2005. Pakistan Environmental Protection Council is the apex decision making body of the country. Submission of the Initial Environmental Examination report to the concerned Environmental Protection Agency is mandatory under the Pakistan Environmental Protection Act, 1997. Similarly the global financial institution and donor agencies also demand for the undertaking the IEE studies respecting the developmental projects.

PROJECT ENVIRONMENT

The project area occupies almost level alluvial plain. The soils are free from physical and chemical hazards and do not present any problem for foundation construction. The area is not prone to earthquakes. The climate of the area is sub-humid, sub-tropical and continental and has no negative impact on the performance of electrical insulations. The wildlife does not exist in the congested project area. Similarly, no forest is found. Total 10 persons were consulted along the 132kV Grid Station Punjab University and noted their concerns about the construction of Grid Station.

ENVIRONMENTAL IMPACT ASSESSMENT

As a first step, the screening of the Project was done considering the ADB guidelines. The project falls in Environmental Category B for which limited scale initial environmental examination (IEE) is required.

To ensure participation of local communities and Project stakeholders, consultative meetings, scoping sessions and group discussions were held in which 10 participated. The participants were of the view that Project should be implemented as early as possible. The main concerns of the participants were that local people should be provided jobs during construction and work should be completed before summer, load shedding should be minimized, electricity /voltage should be stabilized, load shedding causes disruption in water supply and burning of electronic appliances. Considering these difficulties, the participants were of the view that improvement of electricity supply through construction of Grid Station is the need of the day.

Major Negative Impacts

There are only one major negative impacts i.e. disruption of traffic.

Major Positive Impacts

The major positive impacts include improvement in power supply in old areas and improved reliability and stability of electricity, improvement in voltage profile, control existing load shedding and creation of jobs during construction.

MITIGATION MEASURES

Mitigation measures for amelioration of negative impacts are included in EMMP. The noise can be mitigated by using silencers and earmuffs. The dust pollution can be mitigated by sprinkling water 2 to 3 times a day and controlling of speed of moving vehicles. For controlling the traffic, traffic management plan has been proposed in Environmental Management and Monitoring Plan (EMMP).

The other mitigation measures include periodic cleaning and de-silting of sewerage drains, careful driving in work areas, avoidance of vehicle and machinery movements during peak hours, transportation of equipment and machinery at night and careful collection and disposal of oils and lubricants.

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (EMMP)

The EMMP has been prepared. It includes actions proposed for mitigation of negative impacts and effective monitoring of the implementation of proposed mitigation measures during pre-construction, construction and operation phases. This will form part of contract. LESCO is responsible for its implementation.

ENVIRONMENTAL AND SOCIAL COSTS

Environmental Cost is estimated as Rs.16.346million

CONCLUSIONS

Environmental Aspects

The construction stage will face negative impacts in form of dust, smoke and noise on account of employment of vehicles, machinery and equipment. The generation of construction waste, solid waste and oil spills/seepage will have negative impacts on land and air resources. Further, will involve traffic congestion in commercial areas. All such impacts are temporary and are of minor nature. The mitigation measures have been suggested in the EMMP.

Major Positive Impacts
Significant improvement in reliability and stability of electric supply system.
Improvement in voltage profile.
Control of existing load shedding.
There is insignificant environmental damage to local land, water and biological resources.

RECOMMENDATIONS

Environmental Aspects

In view of the above mentioned conclusions of the IEE study following recommendations for implementation by the LESCO.

Being a responsible customer oriented corporate body the LESCO should devise the Health, Safety and Environmental (HSE) Policy, Quality Policy and Social Policy on priority basis.

The LESCO should work towards obtaining quality, environmental and social certifications for the international standards. This will improve their public image also.

Capacity should be strengthened the earliest in order to meet the environmental challenges of the modern and environment friendly electric supply system.
Adoption of SOP on Environmental and safeguards from BOD and its implementation.

Table of Contents

Figures and Maps

List of Annexure

Units of Measurements

1 inch = 2.54cm
1 Foot = 12 inches = 0.3048m
1 yard = 3feet = 0.9144m
1 Kilometer = 1000m
1 Mile = 1760 yards = 1.6093 km
1 Kanal =20Marla=4500square feet
1 square Feet=0.0929m^2

ABBREVIATIONS

ADB	Asian Development Bank
DGS	Distribution Grid Substation
DISCO	Distribution Companies
DHA	Defence Housing Authority
DSC	Design and Supervision Consultant
EA	Executing Agency
EARF	Environment Assessment Review Framework
ECR	Environmental Complaints Register
EIA	Environment Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ESC	Environmental & Social Cells
ESIC	Environmental and Social Implementation Cell
FEA	Framework of Environment Assessment
FEPA	Federal Environmental Protection Agency
GFPs	Grievance Focal Points
GoP	Government of Pakistan
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GSC	Grid System Construction
GSO	Grid System Operation
IA	Implementation Agency
IEE	Initial Environment Examination
ITC	Increase transformer capacity
km	Kilometer
KV	Kilo Volts
LARP	Land Acquisition & Resettlement Plan
LAR	Land Acquisition & Resettlement
LESCO	Lahore Electricity Supply Company
MVA	Mega Volt Ampere
MW	Mega Watt
MFF	Multi-Tranche Finance Facility
NEQS	National Environmental Quality Standards
NGO	Non-Governmental Organization
NTDC	National Transmission and Despatch Company
Pak-EPA	Pakistan Environmental Protection Agency
PA Systems	Public Announcement System
PC	Public Consultation / Planning Commission
PFR	Project Financing Requests
PDE	Power Distribution Enhancement
PDEMFF	Power Distribution and Enhancement Multi-tranche Finance Facility
PEPCO	Pakistan Electric Power Company Private Limited
PEPA	Pakistan Environmental Protection Act
PMU	Project Management Unit
PIU	Project Implementation Unit
PIC	Project Implementation Consultants
REA	Rapid Environmental Assessment
RP	Resettlement Plan
ROW	Right of Way
S-P	Sub-Project
SR	Sensitive Receivers / Receptors

SPS	Safeguard Policy Statement
TSP	Total Suspended particles
TSG	Technical Services Group
TOR	Terms of Reference
WHO	World Health Organization

1. INTRODUCTION

1.1 Overview

1. This document is the Initial Environmental Examination (IEE) for the *Construction of New 132KVGIS Grid Station at Punjab University* subproject being proposed by Lahore Electricity Supply Company (LESCO). This IEE was prepared under **Tranche-IV (Saving)** of the Asian Development Bank (ADB) loan for Power Distribution and Enhancement Multi-tranche Finance Facility (PDEMFF). The substation and distribution line are taken to be one project.

2. Government of the Islamic Republic 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 expected to be released in stages (tranches). The Power Distribution Enhancement (PDE) Investment Program 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), augmentation (replacement of transformers with higher capacity) distribution line extensions, new and replacement of distribution lines, additional sub-stations, 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.

3. This IEE presents the results and conclusions of environmental assessment for *Construction of New 132KV GIS Grid Station at Punjab University* subproject proposed by LESCO and submitted by Pakistan Electric Power Company (PEPCO) to Ministry of Water and Power on behalf of LESCO. PEPCO has been nominated by Ministry of Water and Power to act as the Executing Agency (EA) with each LESCO being the Implementing Agency (IA) for work in its own area. PEPCO's role in the processing and implementation of the investment program is that of a coordinator of such activities as preparation of PC-1s and Project Financing Requests (PFRs), monitoring implementation activities; that includes submission of environmental assessments for all subprojects in all tranches of the PDEMFF under ADB operating procedures. An IEE has been carried out to fulfill the requirements of ADB *Safeguards Policy Statement, 2009*.

1.2 Requirements for Environmental Assessment

4. A scoping and field reconnaissance was conducted on the subproject site, during which a Rapid Environmental Assessment (REA) was carried out to establish the potential environmental and social impacts and for categorization of subproject activities. Most of the construction impacts will take place locally and there are few site-specific potential environmental and social impacts associated with the Tranche-IV (saving) subproject construction. Initial environmental reconnaissance and Rapid Environmental Assessment (REA) carried out by consultants under ADB requirements indicated that the *Construction of New 132KV GIS Grid Station Punjab university* subproject is a Category B subproject, as the grid station site has boys hostel servant quarters as environmentally sensitive receptor as the site is provided by Punjab University voluntarily,

5. The environmental assessment requirements of the GOP for grid stations and power distribution subprojects are different to those of ADB. Under GOP regulations, the Pakistan Environmental Protection Agency (Pak-EPA) Review of Initial Environmental Examination and Environmental Impact Assessment Regulations (2000) categorizes development projects into two schedules according to their potential environmental impacts. The proponents of projects that have reasonably foreseeable impacts are required to submit an IEE for their respective projects (Schedule I). Projects that have more adverse environmental impact (Schedule II) are required to submit an environmental impact assessment (EIA) to the respective provincial Environmental Protection Agency (EPA). Distribution lines and sub-stations are included under energy projects and IEE is required for *Transmission lines less than* 11kV, *and large distribution projects* (Schedule I). An EIA is required by GOP for all projects involving *Transmission Lines (*11kV *and above) and grid stations* (Schedule II). For this subproject EIA is required as per PEPA 1997, and an IEE report is prepared as per environmental safeguard requirements stipulated in ADB's Safeguard Policy Statement (SPS), 2009.

Refer to the **Figure 1.1** Pakistan EIA Approval Process.

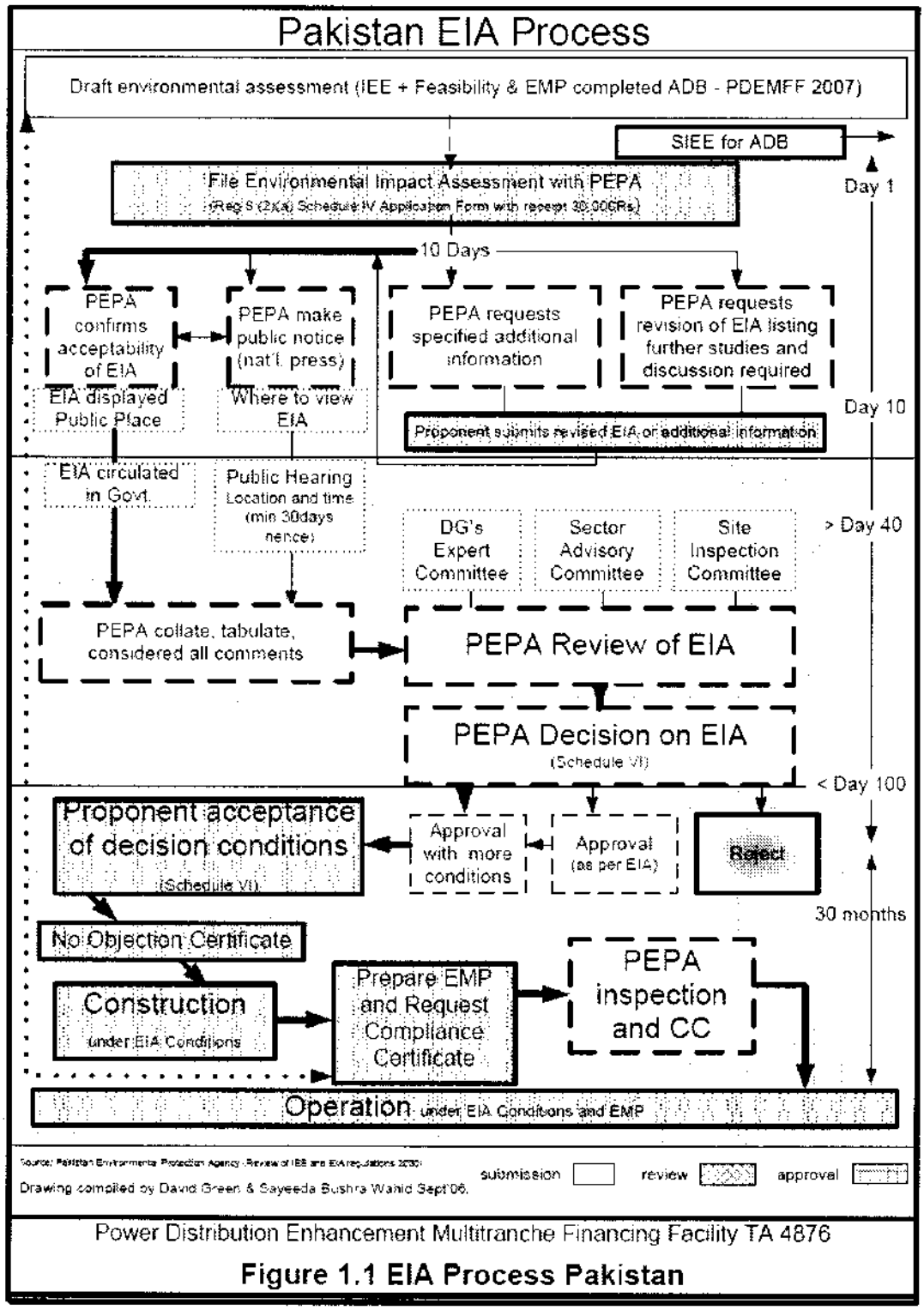


Figure 1.1 EIA Process Pakistan

Figure 1.1 Pakistan EIA Approval Process

1.3 Scope of the IEE Study and Personnel

6. This IEE study has included field reconnaissance for proposed subproject in July & August 2016. The study 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 proposed Distribution Grid Station (DGS) boundary. The works are generally envisaged to involve construction of the DGS. Construction of the bases, foundation pads and towers to support the distribution line will be carried out also under the same subproject by LESCO and supervised by the LESCO management.

7. The field studies were undertaken by a core study team with experience of environmental assessment for power projects. Mr. Muhammad Usman, Mr. Tahseen Yousaf and Ms. Zartashia Mazhar conducted preliminary scoping, surveys and assessment activities, coordinated field surveys and analysis and were also responsible to supervise collection of information and coordinate with public consultation activities. The environmental team also benefited from technical support and other important information on the impacts of the proposed power works provided in feasibility reports prepared for LESCO' by consultant experts dealing with engineering, power transmission, socio-economic, re-settlement and institutional aspects.

8. The study process began with scoping and field reconnaissance during which REA was carried out to establish the potential impacts and categorization of network enhancement activities. The environmental impacts and concerns requiring further study in the environmental assessment were then identified. The methodology of the IEE study was then elaborated in order to address all interests. Subsequently secondary baseline environmental data was collected and the intensity and likely location of impacts were identified with relation to the sensitive receivers (SRs) based on the work expected to be carried out at subproject site. The significance of impacts from the construction and operation of the proposed subproject was then assessed and, for those impacts requiring mitigation, measures were proposed to reduce impacts to within acceptable limits.

9. Public Consultation was carried out in August 2016, in line with ADB's *Safeguard Policy Statement (SPS), 2009*. According to the ADB requirements, the environmental assessment process must also include meaningful public consultation during the completion of the draft IEE. In this IEE the Public Consultation process included *verbal disclosure* regarding the subproject works as a vehicle for further discussion. Consultations were conducted with local families and communities around and proposed subproject site.

1.4 Structure of Report

10. This report reviews information on existing environmental attributes of the areas around 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 IEE also proposes various environmental management measures. Details of all background environmental quality, environmental impact/pollutant generating activities, pollution sources, pollution control equipment, predicted environmental quality and related aspects have been provided in this report. Following this introduction, the report follows ADB Safeguard Policy Statement 2009 and includes:

- *Policy Framework*
- *Description of the Subproject*
- *Description of Environmental and Social Conditions*
- *Project Alternatives*
- *Assessment of Environmental Impacts and Mitigation Measures for the Identified Impacts*
- *Institutional Requirements and Environmental Management Plan*
- *Public Consultation*
- *Findings, Recommendations and Conclusions*

2. POLICY FRAMEWORK

2.1 Policy Framework

11. The Ministry of Environment is the authority responsible for policy making for environmental protection in Pakistan.

2.2 National Environment Policy, 2005

12. In March2005, Government of Pakistan (GOP) launched its National Environmental Policy, which provides an overarching framework for addressing environmental issues. Section 5 of the policy commits for integration of environment into development planning as instrument for achieving the objectives of National Environmental Policy. It further states in clause (b) of sub section 5.1 that EIA related provisions of Environmental Protection Act, 1997, would be diligently enforced for all development projects. It also provides broad guidelines to the federal government, provincial governments, federally administered territories and local governments to address their environmental concerns and to ensure effective management of their environmental resources.

2.3 Draft National Resettlement Policy, 2002

13. In March – 2002, Pakistan Environmental Protection Agency (Pak-EPA), GOP issued its National Resettlement Policy which explains the basis for compensation, rehabilitation and relocation of project affected persons. It also explains the requirements and implementation of Resettlement Action Plan (RAP).

2.4 Legal Framework

14. GOP has promulgated laws, acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. In addition to this, they have also developed environmental assessment procedures governing developmental projects. The relevant excerpts of these laws and procedures are attached below.

2.5 Pakistan Environmental Protection Act,1997

15. The Act enacted on December 06, 1997 by repealing the Pakistan Environmental Protection Ordinance - 1983. It provides the framework for implementation of the PNCS -1992, establishment of provincial sustainable development funds, protection and Conservation of species, conservation of

renewable resources, establishment of Environmental Tribunals, appointment of Environmental Magistrates, Initial Environmental Examinations (IEE), and Environmental Impact Assessments(EIA). Section12 of the Acts tresses the need to carryout EIA/IEE studies prior to construction or operation of a project. PEPA, 1997 is available at official website of EPD, Punjab.

16. After the passing of the 18th Amendment to the Constitution of Pakistan, Pakistan's Federal Ministry of Environment devolved to the provincial level on June30, 2011. Thus, amendment in Pakistan Environmental Protection Act - 1997 was presented and published in Punjab Gazette on April18, 2012 as an Act of Provincial Assembly of Punjab. Twenty-three amendments were incorporated in ***Punjab Environmental Protection (Amendment) Act, 2012.*** The amendments are categorized as follows:

Amendments in "Short Title" and commencement as Punjab Environmental Protection Act (PEPA) and it extends to the province of Punjab only;

Amendments in administrative jurisdiction (Transfer of powers and control from Federal to Provincial Government);

Definitions and reference to the territorial waters, exclusive economic zone and historic waters shall be omitted based on the devolution of powers from Federal to provincial levels; and

Amendments in penalties

2.6 Pakistan Environmental Protection Agency (Review of IEE/EIA) Regulations,2000

17. These regulations provide criteria for projects requiring IEE and EIA. They also briefly describe the preparation and review of environmental reports. These Regulations are also available at official website of EPD, Punjab.

2.7 Pakistan Environmental Assessment Procedures, 1997

18. Protection of the environment with regards to toxic and hazardous waste is covered by the Pakistan Penal Code (PPC), 1860. Environment Protection Department (EPD), Punjab is mandated to monitor the transportation of hazardous materials within the provincial limits. Pakistan Environmental Assessment Procedures (1997) contains the following sets of information relevant to the proposed project.

2.7.1 Policy and Procedures for Filing, Review and Approval of Environmental Assessment Reports

19. It describes environmental policy and administrative procedures to be followed for filing of environmental examination/assessment reports by the proponents and their review and approval by the concerned environmental protection agencies.

2.7.2 Guidelines for the Preparation and Review of Environmental Reports

20. These guidelines are developed to facilitate both the proponents and decision makers to prepare reports (inclusive of all the information contained therein) and carry out their review so as to take informed decisions.

2.7.3 National Environmental Quality Standards (NEQS), 2010

21. Pakistan Environmental Protection Council (PEPC) first approved these standards in1993 subsequently revised in 1995, 2000 and 2010. They furnish information on the permissible limits for discharges of municipal and industrial effluent parameters and industrial gaseous emissions in order to control environmental pollution. The National Environmental Quality Standards (NEQS), 2010 are available at official website of EPD, Punjab. Local NEQS are compatible with international standards and where the local NEQS are silent, international standards for the same are observed.

2.7.4 Comparison of International and Local Environmental Legislations

22. The ADB SPS requires application of pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards. The SPS states that when host country regulations differ from these standards, the EA will achieve whichever is more stringent.

23. A comparison of applicable local and international guidelines for air quality has been provided in Annexure 3, Table 1. In general, the NEQS standards for air quality are most stringent in comparison to USEPA, WHO and the World Bank standards. The only exception is the TSP parameter for the annual mean where the World Bank standard (100 ug/m^3) is more stringent than the NEQS standard (360 ug/m^3). Apart from this one exception, the NEQS standards have been used for the proposed project.

24. Similar to the standards for air quality, the comparison of noise standards provided in Annexure 3, Table 2 clearly shows that NEQS standards for noise are more stringent in comparison to the World Bank/IFC standards. The only exception is the daytime noise level standard for Industrial areas where the World Bank/IFC standard is more stringent (70 dB(A)) in comparison to NEQS (75 dB(A)) and so for this particular parameter, the World Bank/IFC standard will be used. Apart from this one exception, the NEQS standards have been used for the proposed project.

25. Moreover, the standards for water quality clearly show that NEQS for water are same as WHO standards as shown in the Table at **Annexure-III.**

In Pakistan LESCO is legally bound to comply with NEQS as per requirement of EPD Punjab for obtaining NOC. Moreover as per comparison, it is clear that NEQS are more stringent.

2.8 Other Relevant Laws

26. 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:

I. **The *Punjab 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 subproject.

II. **The *Forestry Act, 1927*** empowers the government to declare certain areas as reserved forest. As no reserved forest exists in the vicinity of the proposed subproject, this law will not affect to the proposed subproject.

III. **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 GoP to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the subproject proponents are obligated to ensure that no activity is undertaken in the proximity of a protected antiquity, report

to the *Department of Archaeology, GoP*, if any archaeological discovery made during the course of the subproject. This law will not affect the proposed subproject as no historical sites are located nearby.

2.9 ADB's Safeguard Policy Statement (SPS), 2009

27. The Asian Development Bank's Safeguard Policy Statement (SPS) 2009 requires that environmental considerations be incorporated into ADB's funded project to ensure that the project will have minimal environmental impacts and be environmentally sound. Occupational health & safety of the local population should also be addressed as well as the project workers as stated in SPS. All loans and investments are subject to categorization to determine environmental assessment requirements. Categorization is to be undertaken using Rapid Environmental Assessment (REA) checklists, consisting of questions relating to (i) the sensitivity and vulnerability of environmental resources in subproject area, and (ii) the potential for the subproject to cause significant adverse environmental impacts. Projects are classified into the following environmental categories:

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

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

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

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

SPS 2009 also define the associated facilities that are not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project".

2.10 OSHA Standards Health Safety

28. The Occupational Safety and Health Administration (OSHA) are issuing safety and health program management guidelines for use by employers to prevent occupational injuries and illnesses. The Occupational Safety and Health Act of 1970 (OSHA) representatives have noted a strong correlation between the application of sound management practices in the operation of safety and health programs and a low incidence of occupational injuries and illnesses. Where effective safety and health management is practiced, injury and illness rates are significantly less than rates at comparable worksites where safety and health management is weak or non-existent. The Occupational Safety and Health Administration (OSHA) have concluded that effective management of worker safety and health protection is a decisive factor in reducing the extent and the severity of work-related injuries and illnesses. Effective management addresses all work-related hazards, including those potential hazards, which could result from a change in worksite conditions or practices. It addresses hazards whether or not they are regulated by government standards. **Annexure-III**

3. DESCRIPTION OF THE PROJECT

3.1 Type of Project

29. This IEE includes *Construction of New 132KV GIS Grid Station at Punjab university* subproject prioritized by LESCO and selected to be included in the PDEMFF Tranche-IV(saving). The environmental assessments have been carried out to follow the ADB *Safeguards Policy Statement, 2009* and GOP's environmental assessment regulations and guidelines.

30. The proposed site covering approximately **5** Kanals is located within the wall of Punjab University adjacent to Sohail Iftikhar Research Institute, boys hostel and servant quarters. Moreover, a 500 meter Transmission Line will be constructed by LESCO's own resources (an associated facility[1]) and RoW will be provided by Punjab University and total 04no's of poles will be constructed inside the university boundary. No land acquisition involved in this subproject

3.2 Categorization of the Project

31. Categorization is based on the most environmentally 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.

The *Construction of New 132KV GIS Grid at Punjab university* is categorized as a Category 'B' sub-project under ADB requirements, as the construction of the grid station will have minor site specific impacts on surroundings of sensitive receptors like Boys Hostel, Servant Quarters etc.

3.3 Need for the Project

32 The conditions of the power transmission system in Pakistan are inadequate to meet rapidly growing demand for electrical power. This situation limits national development and economic growth. To cope with the constraints, the existing power transmission infrastructure has to be improved, expanded and upgraded. The overall contribution of power infrastructure also requires institutional arrangements and capacity that support strategic management of the sector, as well as planning and management of investments. Overall the proposed PDEMFF

[1] According to ADB's SPS 2009: "Associated facilities that are not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project". The scope of this IEE includes both DGS and the associated TL.

facility has been designed to address both investment and institutional aspects in the electrical power sector.

33. The city of Lahore has been expanding in all possible directions. In the south and west of the city there is an expansion and development of housing schemes such as Press Club, Bahria Town, Sukhchain, Green Fort, NESPAK, Eden Lands, Valancia, DHA Rahbar, Jubilee Town, and Central Park etc. Therefore, the domestic, commercial and industrial power demand in and around the Lahore City (Refer to the Jurisdiction of LESCO, Figure 3.1) has increased rapidly, especially in summer months, so that the existing DGS are unable to cope up with the increasing demands of the domestic, commercial and industrial sectors. Due to the increased power demand of the area the existing grid stations have become overloaded and insufficient to meet the increased demand. There is need to improve the power supply of the area. For this purpose LESCO is planning to construct a new grid station at *Punjab University* to cope with the increasing load demand.

34. The Tranche-IV (saving) sub-project will contribute to the improvement of the overall performance of the power distribution sector, improving distribution efficiency and broadly widening access to power to drive economic opportunities. The beneficiaries of the subprojects will be the 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 Project

35. This IEE has included field reconnaissance of site and surroundings of proposed Grid Station. The proposed Grid Station is located within LESCO Jurisdiction.

36. Substations site location is determined by a committee comprising of professionals from planning, design, construction, operation and social formations of the DISCO. The committee selects the best site from a number of alternatives, based 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 line's Row.

37. The subproject will involve the construction of one new 132 kV GIS substation whereas associated 500 meter 132 kV double circuit TXL will be constructed by LESCO's own resources. The University will provide the RoW for the construction

of poles, which are all located inside the university. Impacts of the transmission line are discussed in the EMP. However, the proposed route to the nearest 132 kV TXL appears to be environmentally feasible and technically appropriate and will join DGS.

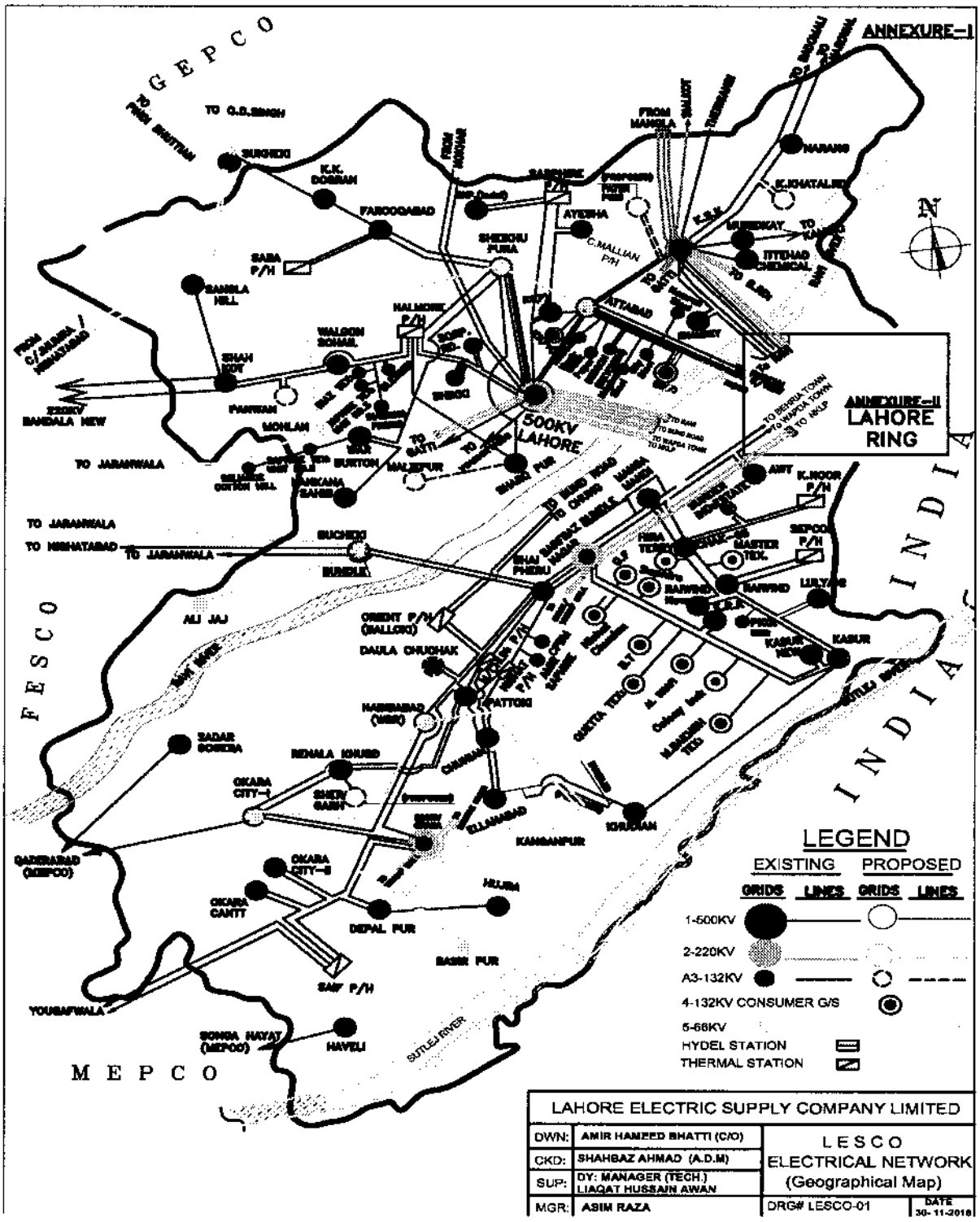


Fig 3.1 Jurisdiction of LESCO

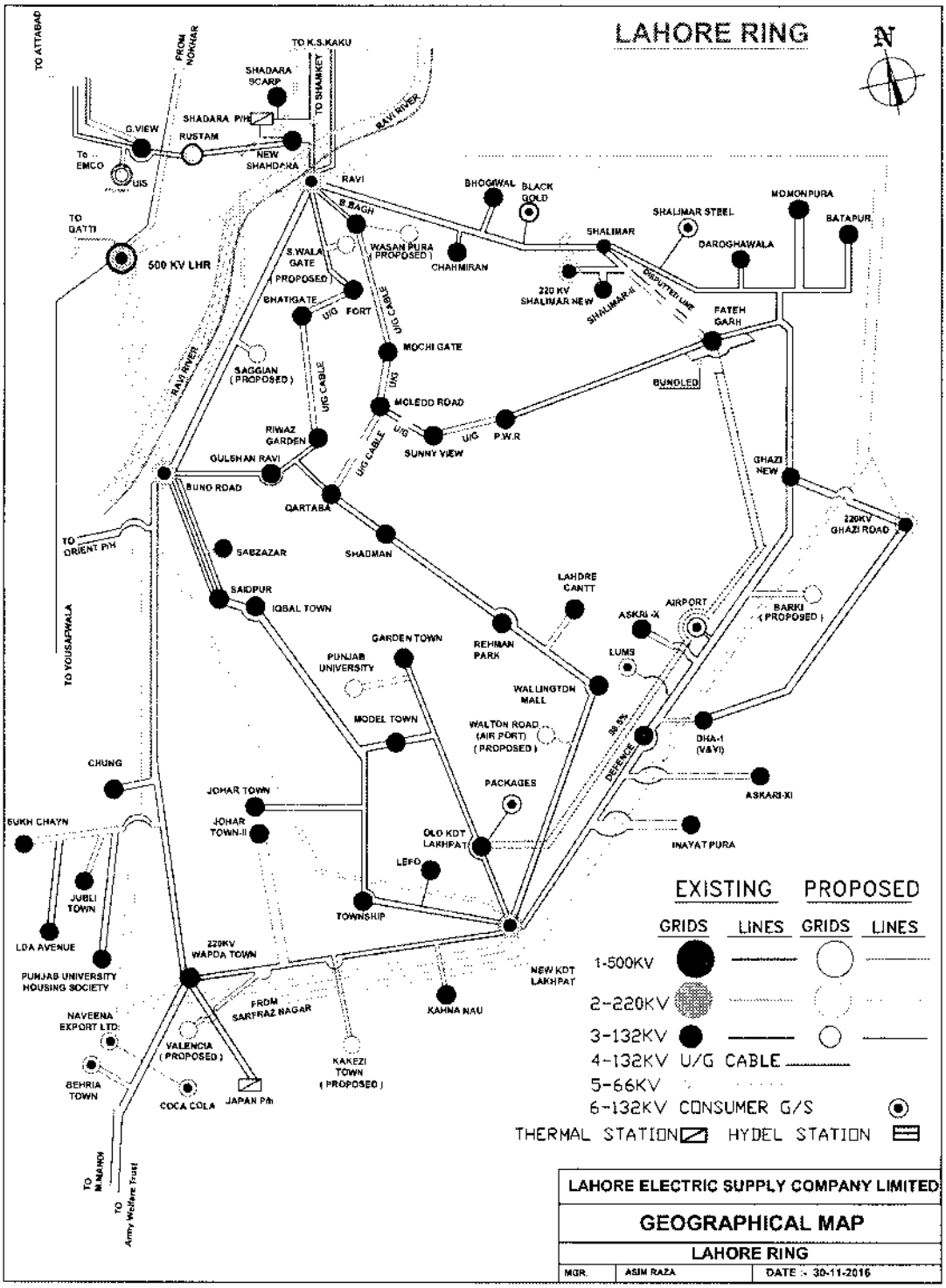


Fig 3.1-2 Jurisdiction of LESCO (Lahore Ring)

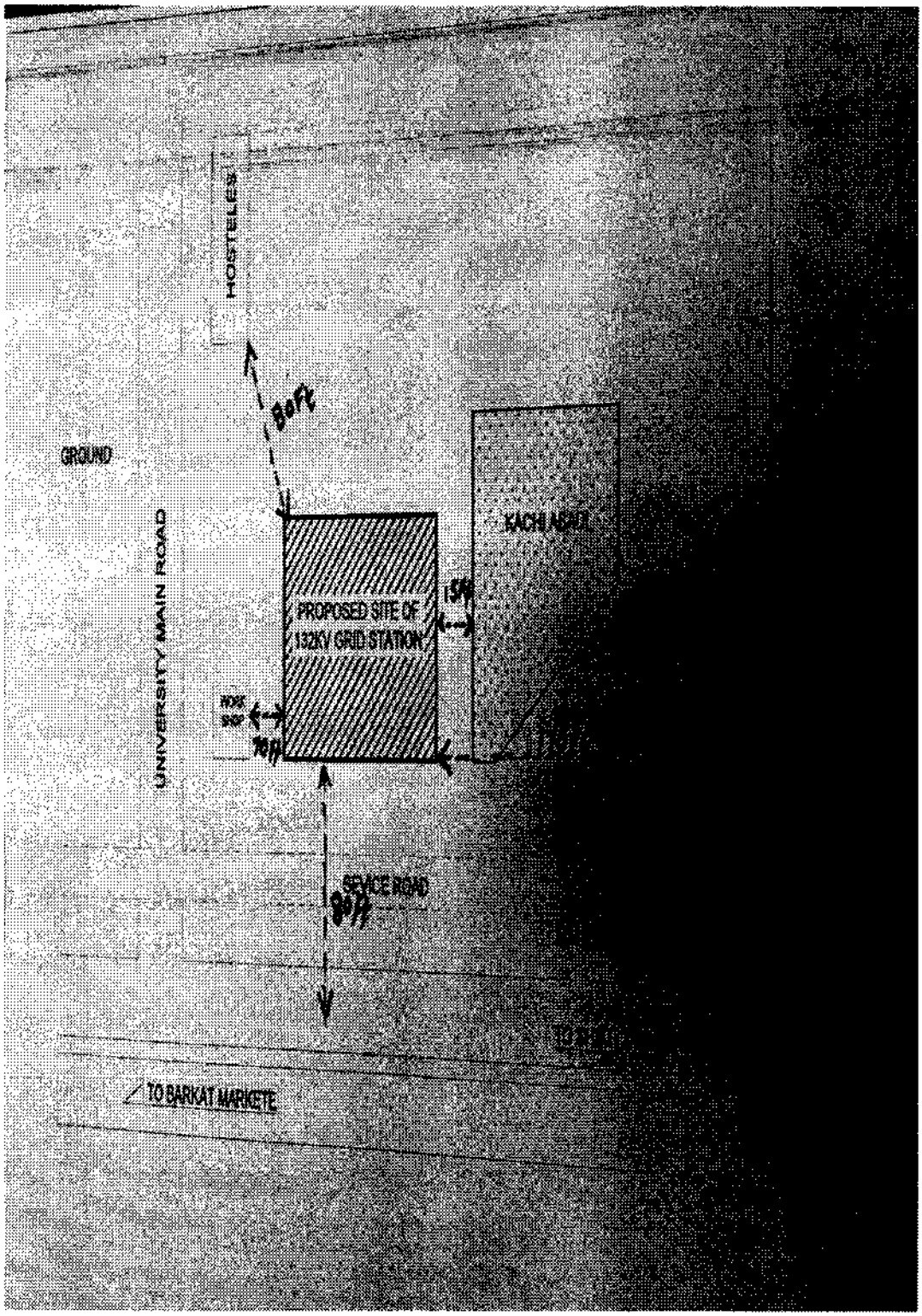


Fig 3.1a: Site for 132kV Grid Station Punjab University

Fig 3.1b: Site for 132 kV Grid Station Punjab University

38. This IEE has been conducted based on the assumptions available in August 2016 when the preliminary designs for the DGS and was completed and the overall requirement for installation of the equipment had been identified. The detailed designs are currently being processed by LESCO. At this stage, the construction activities under the subproject are expected to include the usual localized civil works such as extension of the main yard, including excavation and concreting of foundations for the new transformers, capacitor banks, cable trays and terminal tower, installation of the transformers, equipment and fittings, erection of the towers, cabling, construction of the control rooms and installation of allied equipment, and construction of the offices and residences. Impacts from construction are envisaged to be minor, since additional land needs to be acquired for construction of the DGS, the works for the construction of DGS will be on the land previously owned by societies and donated to LESCO voluntarily.

39. The designs for the subprojects will be developed under the subproject support component of the MFF. This IEE, however, is based on preliminary site and line route surveys (which includes alternative site, routes and the route which minimizes the social impacts is chosen). The line route is then submitted to the design formation, which determines the line profiles and tower locations, these towers will then be located on ground. The IEE is therefore based on preliminary line design, which is in initial stage (barring any unforeseen occurrence) and will subject to change at detailed design stage if so warranted by new developments. The line design is based on the following parameters issued by NTDC Design.

Table 3.2: Clearance Parameters for Transmission Line at 65°C (Design Specifications NTDC)

Sr. No.	Description	Clearance (Meters)
1	Cultivated land traversed by vehicles	6.7
2	Road and Streets	7.9
3	Communication and Power Lines Power Lines up to 66 kV Power Lines up to 33 kV	 2.7 2.7
4	Highways	7.9
5	Rail, roads	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	Top of Tree Orchards	5.0
11	Canals	9.1

3.5 Affected Administrative Units

40. This subproject will be inside the Punjab University. Interviews were conducted with public near the proposed site to obtain their views on the subproject and any perceived impacts. Moreover, 500m line will also be located inside the university premises and all poles are constructed inside the boundary of university.

3.6 Decommissioning and Disposal of Materials

41. Decommissioning and disposal of discarded material the project will be recycled and reused within the PEPCO system. In addition, no waste will be generated that can be classified as hazardous and requiring special disposal.

3.7 Proposed Schedule for Implementation

42. Designs of power transmission arrangements, access, review of environmental management and construction processes could take several months. When the detailed designs are completed, tendering and award of contract will take place over about three to six months. The tentative construction period will follow and best estimates indicate about twelve months.

4. PROJECT ALTERNATIVES

43. In general, the project alternatives are considered in terms of the available project sites, current technologies, design variations, operational situation, capital, recurrence costs, environmental & social issues, and their potential impacts. The alternative encompassing without project situation is also taken into account. In this chapter feasible alternatives for the grid station is discussed in detail:

4.1 Alternatives for Grid Station

44. Alternatives for grid station in view of above criteria is given below:

4.2 Alternatives for Grid Station

Alternate I- No project situation

Presently the localities along campus bridge, Garden Town, Muslim **T**own and Punjab university are experiencing electricity failures and shut downs. If this grid Station is not constructed the local people will continue to suffer from disturbance of business and economic growth.

Alternate II- Punjab University

The proposed site is the property of university of Punjab. The project intervention will not cause any environmental and social issues. There will be no need to acquire the RoW for feeding line which is the most difficult task in this posh area. **Hence, this site is recommended**

Alternate III- Possible sites in Surrounding Areas

A detailed reconnaissance of the surrounding areas was made by IEE study team. No suitable land was found available for the said purpose in that posh area. The cost of the land is too high to be paid by LESCO. The entire area is highly populated with immense commercial business.

4.3 Technical Alternatives

45. With the advancement of technologies in the world for quality and types of various equipment, machinery materials and processes used for the grid station keep improving. In the following various technical options with respective merits and demerits have been highlighted.

4.4 Alternatives for Grid Stations

- There are two types of grid stations, that is Gas insulated (GIS) and air insulated (AIS).
- GIS grid station has more advantages than AIS as given below:
    - GIS grid stations are not affected by external environmental factors.
    - GIS bays are compact. These help in space saving up to 80%
    - GIS grid stations are highly reliable. Therefore, these need minimum maintenance.
    - The operation life of GIS is 40 to 50 years as compared to 25 to 30 years of AIS grid stations.
    - Due to compact design and light weight there is substantial saving in the cost of civil works.
    - GIS Grid Station causes no risk of injury to operating personnel.
    - Fully encapsulated enclosures reduce risk of outages caused by lizards and vandalism.
    - Factory assembled and tested units offer unbeatable performance3 in terms of reliability and continuity of Power Supply.

Conclusively, the GIS grid station represents a better technical option than the AIS grid station. Hence this option was selected for the Punjab University Grid Station subproject.

4.5 Alternatives for Transmission Lines

Overhead Transmission Lines

This alternative includes construction of traditional overhead transmission lines. Its characteristics are:

- Technically, this option is simple as compared to underground cable system as trained manpower is available.
- Economically construction and operation & maintenance costs of overhead transmission line are lower.
- Socially, this system is problem free as it poses no threat to existing utilities (water supply, telephone lines, gas lines etc) as no large scale digging / excavation is involved.
- This system is not very safe / public friendly as the poles and conductors are susceptible to fall during bad weather conditions (high wind speed and heavy rains) causing damage to life and property.

- Although overhead power lines are typically more economical, they are susceptible to damage from wind-borne tree branches, debris, and high wind conditions from extreme weather. The damages can cause extended power outages that in extreme cases cannot be restored for days or even weeks.

Underground Cable

The option includes construction of underground cable system instead of over-head transmission line.

- Technically, its maintenance is costly and difficult and trained manpower to undertake the system is available with LESCO.

- Economically, this is costlier as compared with the overhead option. Roughly, it costs 3 times more the overhead option, as expressed by the LESCO engineers.

- The adoption of this option may cause greater number of social problems as compared with the overhead option in terms of threat to the existing utilities (water supply, telephone lines, gas lines). During digging/excavation process, traffic disturbance and environmental degradation due to dust and smoke, loss of access or difficult access of the residents to their residences and business dwellings at the busy and populated routes of project area.

Conclusively, the overhead transmission line represents a better technical option than the underground counterpart More over all poles will construct inside the boundary of university and RoW will be provided by university.

5. DESCRIPTION OF THE ENVIRONMENT

5.1 Subproject Areas

5.1.1 General Characteristics of Subproject Area

46.The subproject covers only the construction of and installation works in 132KV GIS Grid Station at *Punjab University* and 500m Transmission line. The University of Punjab has allotted the land to LESCO as this grid station will cater the increasing electricity demand of Punjab University due to development of more departments and hostels moreover, this grid station will help to distribute the electricity to adjacent area of Garden Town, Muslim Town etc. RoW will be provided by university for the construction of poles

5.2 Physical Resources

5.2.1 Topography, Geography, Geology, and Soils

47. According to the district census report, Lahore District derives itself naturally between the central up-lands and alluvial lands of Ravi, having no hills or mountains of any kind. The alluvial land of Lahore can be sub-divided into a) Uttar Land b) Hither land. Uttar lies in the North and forms about 2/3rd of the entire land. The low lands are known as Hither, which are generally inundated by the water of the Ravi River during Monsoon floods. Ravi flows in the west of District along its boundary with Sheikhupura District. The general height of the area is 150-200 meters above sea level. The soil is very different in character and generally inclined to be dry. However, it is rich in plant nutrients. The Proposed DGS has been selected within the grid boundary to avoid settlements and to minimize the impacts. No impact is expected on local soils and topography. The soils and subsoil conditions beneath the alignment have not been investigated in detail before the finalization of drawings. In any unexpected event, soft unsuitable soils will have to be removed and replaced with suitable soils and subsequently piled or otherwise made suitable to support the tower/pole construction.

5.2.2 Climate and Hydrology

48. There is negligible variation of altitude above sea level in the area over which the selected DGS is situated, which means no variation between the climates of the various subproject area. The climate in general is typical of that of the central Punjab.

49. According to the district census report, the maximum temperature in summer reaches 45°C. In winter the minimum is 1°C. The mean maximum and minimum temperatures in summer are 41°C and 27°C; and in winter 19°C and 4°C respectively. The summer season starts from April and continues till October.

May, June and July are the hottest months. The winter season on the other hand starts from November and continues till March, December, January and February are the coldest months.

50. The rainy season starts in July and ends in September. Annual rainfall is 628.7mm. More rains occur in July and August than any other months. Most of the winter rains are received in the months of January, February and March.

5.2.3 Groundwater and Water Supply Resources

51. Irrigation is largely dependent on the canals, but tube wells have also been sunk in the areas where water is fit for irrigation. The chemical quality of ground water in the district varies area wise and depth wise. The sweet potable water is available in a belt five to twenty miles wide paralleling the river Ravi. In hither irrigation supplies are perennial and tube wells have been installed to make up the deficiencies. The strata near the DGS are water bearing and alluvial deposits, giving groundwater potential throughout the project area and the water table is fairly near the surface. The water table is not seasonal and dug wells do not generally run dry. Groundwater sources exist in the area and there are tube wells within 500m of the proposed site but the wells are generally well away from the proposed Grid Station site. Elsewhere the local population is generally reliant on supply from tube wells. There should be no impact on these sources of water during the construction. The contractor is bound to conduct water analysis before the start of construction activities for baseline data.

5.2.4 Surface Water Resources

Rivers and Tributaries

52. The Ravi is the only river, which flows through the district. It enters the district from Amritsar, by the village of Ichogil after a course of 55km leaves it on the borders of Kasur district. The Ravi is the smallest of the five rivers of the Punjab. Just above Lahore city the course of the stream is carefully directed by the Mahmud Booti Bund, which keeps it to one channel and protects the city from floods. In rainy season its floods are heavy and of a very strong current. Alterations in its course are frequent and extensive. After construction of the Bari Doab Canal, most of its flow is diverted. There are ferry services at Khudpur, Chung and Kariolwar. A canal is also passes approx 200m away from the proposed site and originates from Bambawali River Bedian (BRB) canal.

Lakes and Wetlands

53. There are no lakes or marshes in the district. The only permanent body of water is the Hudyara Rohi (Nullah-Drain) which enters the district from Amritsar District near the villages of Moujoki and Padhana (Badhana) and runs parallel to Ravi and falls into the same near village Khudpur in Lahore district. At places its

channel is two to three hundred yards wide. During the monsoon season huge volume of water comes down this Rohi Nullah and very often spills over its banks, causing loss to crops and other properties. In the year 1962 and 1976 because of the floods in the Nullah, many neighbouring villages were inundated and extensive damage was done to the crops and houses etc. Since it has a gentle slope, sand was not deposited on its banks.

Surface Drains

54 In addition, there are 76 minor drains (collecting drains) which connect eight major drains namely Satto Kattla drain, Mian Mir drain, Lakshami drain, Sukh Nehar drain, Upper Chotta Ravi drain, Lower Chotta Ravi drain, Siddique Pura drain and Shahdara drain which ultimately connect into the river Ravi.

5.2.5 Air Quality

55. Air quality in most of the subproject area appears good based on observation during the study period. Emissions should be controlled at source under the EMP. There will be a few items of powered mechanical equipment to be used in the construction of the transmission line works that may give rise to many complaints about dust and other emissions, however there should be well dissipated. The major sources of complaint will likely be any necessary earthworks and local soil compaction. In comparison domestic sources of air pollution, such as emissions from wood and kerosene burning stoves as well as small diesel standby generators in some households are minor.

56. Industrial pollution sources are not present in the vicinity of DGS. 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 centres, carried out by Pak-EPA, revealed that CO, SO_2 and NO levels were in excess of the acceptable levels in some areas but the average levels were found below NEQS. Air quality testing by DISCOs (average values are: TSP 1.09mg/m^3, CO 634ppb, SO_2 24.34ppb, NO_2 23.73ppb) through various consultants has revealed that most sub-stations have NO_2, CO_2 and CO values below international standards although TSP levels at some locations was higher than international standards. The contractor is bound to conduct air analysis before the start of construction activities for baseline data.

57. There should be no source of atmospheric pollution from the subproject. In the operational phase the 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.

58. The other major source of air pollution is dust arising from construction and other ground or soil disturbance. Near the access roads, when vehicles pass, dust levels will increase. Dust levels are elevated when vehicles pass intermittently over the roads based on field observations and may be high enough to obscure vision.

5.2.6 Noise and Vibration

59. Noise from vehicles and other powered mechanical equipment is intermittent. There are also the occasional calls to prayer from the speaker systems at the local mosques but there are no significant disturbances to the quiet rural setting. However the construction from the proposed power expansion will use powered mechanical equipment. Subjective observations were made of background noise and also of individual vehicle pass by events.

60. Based on professional experience background daytime noise levels are probably well below 45 dB(A)Leq. DISCOs have carried out noise level measurements at various substations and transmission line locations within the system. These analyzed to calculate Leq values and have resulted in Leq values much below the 85dBA limit prescribed under the NEQS established by the EPA or the 75dBA used by DISCOs/NTDC/PEPCO in the equipment specifications. Typical values were: average 46.21dBA; high 63.14dBA; and low 34.35dBA. The contractor is bound to conduct noise analysis before the start of construction activities as a baseline data

61. Noise and vibration from compaction during construction of foundations may be a significant local impact, but there are no habitations so close to the works that they would be expected to be affected significantly.

5.3 Ecological Resources

5.3.1 Wildlife, Fisheries and Aquatic Biology

62. There is no wildlife in Lahore district except jackals, dogs, and snakes, etc. Common species of birds found in the district are the common house sparrow, crow, pigeon, dove, tiliar (starling), lal mena, bia (weaver bird), parrot, quail, pintail, mallard, teal, and humming bird, etc. Some commercial fisheries operate in the area. There are no reservoirs and other water bodies except Ravi River.

5.3.2 Terrestrial Habitats, Forests and Protected Species

Vegetation Cover and Trees

63. Lahore District is dominated by urban suburbs and with various productive fields of monocultures that now dominate the agro-ecosystems. Common floral

species with rooted vegetation are also present in most of the water bodies of the area.

64. There is no vegetation in the DGS site as land is within the boundary of university. There is no wild growth of any bush near the area of works but natural forest cover in the district has been significantly reduced in the past but some of the older stands of trees are well established could be considered as semi-naturalized to some extent.

65. The land adjacent to the substation is property of Punjab University. The proposed grid station will be on vacant space, where there is no vegetation and provided voluntarily by Punjab University.

Protected and Religious Trees

66. There is no tree within the proposed DGS boundary. In general permission should be sought from the university for the cutting of any trees. The Land Acquisition and Resettlement Plan (LARP) may make provision for compensation of local people for the loss of trees, if needed after detailed study. The works must deal with trees that need to be lopped or removed for safety reasons with the necessary permissions.

5.3.3 Protected Areas/National sanctuaries

67. 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 DGS and transmission line alignment.

5.4 Economic Development

5.4.1 Agriculture, Industries, and Tourism

68. The sub project is located in the urban area and no agriculture site is located there. The proposed sub project is very small so the overall data of Lahore city is given. The main crops in the District Lahore area during winter are tobacco, mutter (peas) wheat and sesamum comprise 531, 489, 51 and 32 thousand hectares respectively. Mung, barley, masoor and rape-seed seem to be less cultivated as compared to the other crops.

69. Vegetables are grown in abundance as the water and soils are suitable for cultivation. Potato, carrot, lady finger, chillies, onion and cauliflowers are grown on 4131, 601, 259, 250 and 220 hectares respectively as per 2008 data. The production of coriander is very prominent in Lahore. Bitter gourd, turmeric and garlic are grown to meet the public demand. Other vegetables i.e. Radish, Tinda, Bringal is also grown. Major fruits grown are; citrus, guava, mango watermelons, banana and peach.

70. Lahore is the biggest trade centre in Punjab, which exports and imports a sizable quantity of different types of goods. Its major industrial items of trade include electrical fans, motors, transformers and electrical goods, rubber and its products, bicycles and auto cycles, food products, beverages, body building, handicrafts, leather shoes, printing and publishing chemicals, photo goods and cinema films. Besides, it trades in agriculture production and dry fruits.

71. After Karachi, Lahore is the biggest industrial area in Pakistan. There has been a steady expansion of industries in and around Lahore since independence. Industrial consumers are causing the greatest demand for electricity, and are also worst affected by power shut downs.

72. There are few industrial and commercial businesses in the vicinity of the subproject reliant on the efficient distribution of electrical power. There are also agricultural businesses on the fringes of the urban areas and tourism is also an important business in Lahore.

73. There are many places of interest that attract tourists and promote tourism e.g. Royal Fort Lahore, Shalimar Garden, Minar-e-Pakistan, Lahore Zoo, Badshahi Mosque, Wazeer Khan Mosque, Golden Mosque, Shrine of Data Hazrat Data Ali Hajvery, Shrine of Miran Shah, Anarkali Bazar, Walled city, Jallo Park, Alhamra Art Centre, Shakir Ali Museum, Tomb of Allama Iqbal, Town Hall, Chouburji and the Zamzama, etc.

5.4.2 Transportation

74. Lahore is linked with the rest of the country by air, rail and road. It lies on the Grand Trunk (GT) Road or the Shahrah-e-Azam. It has linked the eastern and western regions of the Indian subcontinent, running
from Chittagong, Bangladesh through to Howrah, West Bengal in India, across north India into Peshawar in Pakistan, up to Kabul, Afghanistan. The modern road was built by Sher Shah Suri, who renovated and extended the ancient route in the 16th century.

75. There is a complete network of roads in the district. All major villages are connected with the district headquarters through highways. The first four lanes Motorway was constructed from Lahore to Islamabad. It also provides modern facilities to the passengers at international standards.

76. The main Karachi-Peshawar railway line passes through the district. It enters Lahore from the south near Raiwind and passes through Shahdara in the north and leaves for Gujranwala. From Lahore Railway Station, a railway line goes up to Wahga at Pakistan-India border and then across the border to Amritsar in India.

77. For air traffic, there is a modern International airport in Lahore. PIA and other air companies operate regular flights from Lahore to other parts of the country as well as on international routes.

78. The number of vehicles, notably private cars, has increased dramatically over the last few years, resulting in all kinds of environmental problems. Traffic load has far exceeded the carrying capacity of roads in Lahore city, as well as in adjoining smaller towns. Valiant efforts are being made to cope with the situation by widening existing roads, and constructing new roads.

5.4.3 Energy Sources

79. The transmission lines for electrical power in the LESCO run in a complex grid with numerous local substations.

80. Reserves of fossil fuels are the main sources of energy in Pakistan others are derived from hydropower. In the study area there is no source of hydropower and other energy sources are progressively more common further away from the major towns. The biomass sourcing is concentrated on home garden production of fuel wood, the extraction of wood from forests, woodland, crop plantations and agricultural residues. The other significant energy sources in the area are kerosene and LPG. There are numerous petrol stations and LPG dealers in the district.

5.5 Social and Cultural Resources

5.5.1 Population Communities and Employment

81. The total population of Lahore was 6,318,745 persons respectively, as enumerated in March, 1998. According to the 1998 Census, the population is predominantly Muslim, i.e. 93.9%. The next higher percentage is of Christians with 5.8%, followed by Ahmadis 0.2 %. While other minorities like Hindu (Jati), Scheduled Castes etc. are very small in number. Punjabi is the predominant language being spoken in the districts, representing 86.2 and 88% of the population, followed by Urdu, Pushto and Siraiki spoken by 10.2, 1.9 ,7 and 0.4 %. Sindhi is spoken by 0.1%.

82. Of the total economically active population 98.9% were registered as employed in 1998. Nearly 52.6% were self-employed, 27.1% private employees and 14.4% government employees. Un-paid family helpers were recorded as 1.1%. In 1998 of the total employed persons, 44.7% had elementary occupations, followed by service workers and shop and market sales workers, 17.5% and professional, 9.2%. In rural areas people having elementary occupations were again in majority, followed by skilled agricultural and fishery works and service

workers and shop and market sales workers, represented 52.5, 23.7 and 8.4% respectively.

83. The main occupation of women in rural areas around the subproject is house-keeping which includes attending to the cattle, extracting butter and ghee from milk, weaving and sewing of family clothes. In addition they generally help their men-folk on farms with the lighter duties like transplanting of seedlings, threshing and winnowing of grains and sometimes they also help in harvesting. In city women are house-wives or work as professional's doctors, nurses, teachers and also in offices.

5.5.2 Education and Literacy

84. The current literacy ratio in the Lahore district is 74%. The enrolment of the students in various level of education is given in Table 4.1.

85. Lahore is a first class seat of learning in Pakistan. The world famous and the oldest university of Pakistan i.e. University of the Punjab is located in this city. The pioneering University of Engineering and Technology is also in Lahore. There has been a significant development in the educational sector of this district. University of the Punjab has been extended and its new campus is constructed along the Upper Bari Doab canal. There are also a number of government and private schools, colleges and technical institutes. Main medical colleges in Lahore include the King Edward Medical College, the Allama Iqbal Medical College and the Fatima Jinnah Medical College, as well as several private and chartered medical universities and colleges.

Table 4.1: Educational Institutions by Level of Education, 1997-98 (Lahore)

Type of Institute	Institute		Enrolment		Teaching Staff	
	Male	Female	Male	Female	Male	Female
Primary	447	496	56,103	59,417	2,422	2,422
Middle	54	91	15,639	25,729	798	1,262
Secondary	119	114	82,521	90,551	3.194	3,363
Higher Secondary (Class I-XII)	20	9	2,676	2,101	378	164
Intermediate and Degree colleges	18	27	32.563	43,275	1,634	1,798
Mosque schools	447	496	56,103	59,417	2,422	2,422
Total	**662**	**742**	**158002**	**223083**	**5319**	**9102**

Source: Punjab Development Statistics, Bureau of Statistics, Punjab (1999).

5.5.3 Health Facilities

86. Good medical and health facilities are available in the Lahore Metropolitan Corporation area and its suburbs. Shaukat Khanum Hospital is a medical care facility in Lahore for the most dangerous disease i.e. cancer. There are also other hospitals of voluntary organizations which provide health cover to the general

public. King Zaid Bin Sultan Hospital is also a very advanced addition in the medical care for Lahore. Among the prominent hospitals are General Hospital, Lady Aitchison Hospital, Lady Wellingdon Hospital, Mayo Hospital, Fatima Jinnah Hospital, Services Hospital, Gulab Devi Hospital, Ganga Ram Hospital, Shalimar Hospital, Combined Military Hospital and Ittefaq Hospital. Besides, a number of private medical practitioners, hakims and homeopathic doctors are also practicing in the city.

Table 4.2 Number of Health Institutions with Bed Capacity, 1998 (Lahore)

Medical facilities	Number	Beds
Hospital	42	11,529
Dispensary	140	68
Rural Health Centre	6	120
Basic Health Centre	37	74
T.B. Clinic	6	-
Sub-Health Centres	11	-
M.C.H. Centres	117	-
Total	**359**	**11,791**

5.5.4 Cultural Heritage and Community Structure

87. There are no official heritage sites or historic, religious or archeologically important sites located in the subproject works area. There is no historic or archaeological feature of note as site is within the premises of university but there are a few places of worship e.g. Mosques within 500m radius of proposed sites of subproject. However in case there is chance find, work will be immediate stopped and it can handled as per law and procedures.

6. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 Project Location Impact Assessment and Mitigation

88. This Tranche-IV subproject will involve the construction of 132KV GIS DGS implying an expansion of both outside and within the proposed subproject boundary. There are few SRs close to the DGS like Hostel, servant quarters etc that could be possibly affected by certain activities of the subproject works.

89. 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. Where impacts are significant enough to exceed acceptable environmental standards, mitigation is proposed in order to reduce residual impact to acceptable levels and achieve the expected outcomes of the subproject 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 subproject proposals.

90. The environmental management plan has been reviewed based on the assessment and shall be reviewed in due course at subproject inception and through construction in order to provide a feedback on any significant unpredicted impacts. It is based on the analysis of impacts, primarily to document key environmental issues likely to arise from subproject implementation, to prescribe mitigation measures to be integrated in the subproject design, to design monitoring and evaluation schedules to be implemented during subproject construction and operation, and to estimate costs required for implementing subproject mitigation measures. The EMP must be reviewed in the subproject inception by the subproject management and approved before any construction activity is initiated, to take account of any subsequent changes and fine tuning of the proposals

6.2 General Approach to Mitigation

91. Based on experience on some projects contractors have put emphasis on the financial compensation for environmental nuisances. This may be acceptable for some social impacts where evacuation is necessary or where houses have been accidentally damaged, however it is not best international practice to accept

payment for environmental impacts. An approach whereby the subproject contractor pays money for nuisances rather than control impacts at source will not be acceptable. This practice should not be allowed and financial compensation shall not be allowed as mitigation for negative environmental impacts or environmental nuisance.

92. During the preparation for the subproject construction phase the future contractors must be notified and prepared to cooperate 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 LESCO must fulfil the requirements of the law and guidance prepared by Pak-EPA on the environmental aspects of power projects and the recommendations already made for subproject in this IEE and under PEPA, 1997.

93. The location of the residences, shops colleges, mosques, temples, schools, hospitals and civic cultural and other heritage sites has been reviewed in Section 5. Few if any of the residences and schools is close enough to subproject that there will be potential impacts in the construction stage from disturbance and significant noise and dust.

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

95. 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.

6.3 Prevention of Ground Contamination

96. Best international practice includes control measures to contain oily residues. Transformer oil and lubricants may be released in the operational stage from maintenance and from a catastrophic failure that would result in loss of transformer oil. Transformer oil is supplied in drums from an imported source and tap tanks are topped up as necessary on site.

97.The areas upon which the new transformers, transformer oil stocks and the transformer oil dehydration machines located should have an impervious surface with bunds and high enough edges to capture 110% of the total volume of oil that is housed within the bunded area (Refer Section of the Typical Bunds for Transformers is attached as **Annex-II**). 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 subproject. A programme to introduce bunding in planned substations in the medium to long term as the transformers are upgraded (ITC) or replaced as resources permit.

6.4 Cultural Heritage, Temples, Religious Sites, Social Infrastructure

98. The location of mosques and other cultural and other heritage SR sites have been reviewed and there are no mosques or other religious sites close to the DGS site.

99. The nearest clinic/hospital is more than 500m from the edge of the subproject but the nearest hostel is within 100 feet from the DGS and the nearest servant quarters are at about 15-20 feet from the DGS. Apart from these features, there will be sufficient buffer distance between the works and any other SRs, so that no significant impacts should be expected. Public consultation should be undertaken at the implementation stage to ensure nuisances are not allowed to escalate for the SRs close to the DGS site.

6.4.1 Potential Environmental Impacts & Mitigation Measures in Construction Stage

6.4.2 Traffic & Transport

Effect on Local Road Network

100. Iron bars, concrete materials, equipment etc. will be transported through the provincial and local road network to the project site. Heavy transportation vehicles might disturb the local traffic especially at peak working hours. Visibility is usually minimum during nighttime where there are less streetlights, this will pose a hazard for the local traffic travelling

in night time. Additionally it is important to note that the transmission line routes are allocated in low population areas, hence traffic and transport systems will have less significant impact.

Mitigation Measures:

- Diversion routes must be allocated for normal and construction vehicular traffic to maintain normal traffic flow
- The site that has to be excavated must be barricaded by means of safety signs and symbols, such as using reflectors, danger signs, direction signs, red lights and safe drive directions to improve indication of excavated sites in night time
- The construction vehicles must not be parked on roads. A proper parking area should be assign to work safely and to prevent road accidents and road traffic congestion.
- Emergency routes must be kept clear and accessible.

A comprehensive Traffic Management Plan is provided in **Annexure–I**.

6.4.3 Encroachment, Landscape and Physical Disfiguration

101. The extent of the proposed subproject for power expansion is moderate and should not extend beyond the power corridor (RoW) created by the subproject. No significant landscape impacts are expected from construction of this subproject. The new Grid Station will be located in the area of Punjab university. It does not involve encroachment or land acquisition.

6.4.4 Cut and Fill and Waste Disposal

102. Mitigation measures must focus on the minimization of impacts. If surplus materials arise from the removal of the existing surfaces these can be used elsewhere on the subproject DGS before sourcing 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.

103. If off-site disposal of surplus materials is necessary this must also be negotiated through local authority approvals prior to the commencement of construction.

104. 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 distribution line tower construction.

105. Contractual clauses should be included to require each contractor to produce a materials management plan (one month before construction commences) to identify all sources of cement and aggregates and to balance cut and fill. The plan should clearly state the methods to be employed prior to and during the extraction of materials and all the mitigation measures to be employed to mitigate nuisances to local residents. 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 areas along the power line and sub-contractors to provide an overall balance for materials and minimize impacts on local resources.

6.4.5 Trees, Ecology and Protected Areas

106. There are no Reserved or Protected Forests or trees near the DGS site. If for some unforeseen reason, any trees with religious significance or other trees need to be removed, written permission should be obtained from the relevant authority after written justification by LESCO. 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.

107. A requirement shall be inserted in the contracts that no trees are to be cut on the Grid Station site or outside, without the written permission from the supervising consultant who may permit the removal of trees if unavoidable on safety/technical/ engineering grounds after written justification by LESCO and to the satisfaction of the forest authority and the owner.

6.4.6 Hydrology, Sedimentation, Soil Erosion

108. The 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.

6.4.7 Air Pollution from Rock Crushing, Cut, Fill, & Asphalt

109. The material (cement, sand and aggregate) requirement of a typical 132KV Grid Station (about 150m^3) and a 132KV transmission tower (4.8m^3, or 40 bags of cement per tower) are not large. Construction materials for the Grid Station are stored at the 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 Grid Station or transmission tower are not so large that they potentially represent a traffic hazard, these requirements are time dispersed in case of Grid Station The contractor will be, however, required to provide a traffic management plan before commencement of work at site. 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.

110. Earthworks will contribute to increasing dust, and the foundation earthworks for the transformers and the line poles will generate dust and the following mitigation measures are needed:

(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.

111. The need for large stockpiles should be minimized by careful planning of the supply of materials from controlled sources. Stockpiles should not be located within 50m of schools, hospitals or other public amenities such as wells and pumps and should be covered with tarpaulins when not in use and at the end of the working day to enclose dust.

6.4.8 Noise, and Vibration

112. It is anticipated that powered mechanical equipment and some local labour with hand tool methods will be used in construction of 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 1st July, 2010		Effective from 1st July, 2012	
		Limit in dB(A) Leq*			
		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.

113. Noise will be monitored at a distance of 100m from the boundary wall of any residential unit and should follow the NEQS 45dB(A)Leq. It is recommended that no construction should be allowed during night time (10PM to 6PM). Any noise equipment should be located within DGS or as far from SRs as possible to prevent nuisance 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.

114. 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.

6.4.9 Sanitation, Solid Waste Disposal, Communicable Diseases

115. 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. There should not be any significant amount of waste from the works and because the works will be under close supervision of the LESCO authority within the DGS these issues can be controlled at source.

116. In order to maintain proper sanitation around construction sites, the provision of temporary toilets (if required) should be made for workers at the proposed subproject site.

117. 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 sites. 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.

6.5 Potential Environmental Impacts & Mitigation Measures in Operational Stage

6.5.1 Air Pollution and Noise from the Enhanced Operations

118. The subproject works will extend the power distribution lines but no houses, mosques or schools will be close to the new TL in the operational phase. Nevertheless some houses, a school, a hospital and a hostel are close to the proposed subproject site. The proposed subproject will not extend level of operation to increase the air and noise level due to the other point and non-point sources of pollution. However, it is recommended that an acoustical check be made on the detailed design to determine of any noise barriers are required. There should be no source of atmospheric pollution from the subproject. In the operational phase any nearby industrial facilities in the city 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.

119. Noise impacts from the operation of the DGS equipment should be reviewed at the detailed design stage. There are no national noise standards in Pakistan for power distribution noise emissions that would apply in the operational stages. A criterion of 70db(A) Leq (exterior, boundary of DGS) has been used for assessment in compliance with NEQS. It is recommended that a check be made on the likely acoustical performance based on maker's specifications of the installed equipment at the detailed design stage.

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

120. 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.

121. LESCO has already prohibits use of Polychlorinated Biphenyl (PCBs) based oil in new power transformers. The proposed subproject is the construction of new grid station and LESCO will ensure the procurement of PCB free transformers.

122. Oily residues and fuel and any contaminated soil residues should be captured at source by installing bunds (Refer to the Annex-II) and refuelling and maintenance should take place in dedicated areas away from surface water resources. Contaminated residues and waste oily residues should be disposed at a site agreed with the local authority.

123. 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 pre-empted by routine maintenance. TSG and GSO have a written down procedure to deal with oil spills.

6.6 Enhancement

124. Environmental enhancements are not a major consideration within the subproject site. 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. Other opportunities for enhancements can be assessed prior to construction and proposed enhancements should be discussed with the local population/authorities 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 DGS.

7. INSTITUTIONAL REQUIREMENTS & ENVIRONMENTAL MANAGEMENT PLAN

125. In this section, the mitigation measures that are required, for Tranche-IV(saving) proposed subproject, to reduce residual impact to acceptable levels and achieve the expected outcomes of the project, are discussed. The Environmental Management Plan (EMP) is based on the type, extent and duration of the identified environmental impacts for the proposed subproject. The EMP has been prepared following best practice and by reference to the ADB guidelines.

126. It is important that the recommendations and mitigation measures are carried out according to the spirit of the environmental assessment process and in line with the guidelines. The impact prediction has played a vital role in reconfirming that typical mitigation measures and approaches to achieve the necessary environmental controls based on the feasibility and detailed design assumptions and available alternatives at this stage.

127. The EMP has been compiled based on the available information and shall be reviewed in due course at project inception and through construction in order to feedback and provide updated mitigation requirements for any significant unpredicted impacts. The analysis primarily focuses the key environmental issues likely to arise from subproject implementation, to prescribe mitigation measures to be integrated in the project design, to design monitoring and evaluation schedules to be implemented during subproject construction and operation and to estimate costs required for implementing subproject mitigation measures. The details of EMP are given in the **Table 6.1** for the *Construction of New 132KV GIS Grid Station Punjab University* subproject. The EMP plan must be reviewed when the subproject reaches detailed design 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.

128. Prior to implementation and construction of the subproject the EMP shall be reviewed by the LESCO and amended after detailed designs are complete. Such a review shall be based on reconfirmation and additional information on the assumptions made at the feasibility stage on positioning, alignment, location scale and expected operating conditions of the subproject. For example, in this case if there are any additional transmission lines or extension of the sub-station 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.

129. The IEE and EMP plan must be reviewed by the project management and approved by the Pak-EPA before any construction activity is initiated. This is also

an ADB requirement in order to take account of any subsequent 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 full extent of the environmental requirements for the subproject and the IEE and EMP are 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.

130. LESCO as the implementing agency (IA) bears the overall responsibility for the preparation, implementation, and financing of all tasks set out in this IEE, as well as inter-agency coordination required for the implementation of the Subprojects. As such, it takes care of the preparation/updating and implementation of the IEEs, short RPs and DDRs, and internal monitoring and evaluation activities. Institutionally, LESCO has two functional directorates, namely, Project Management Unit (PMU) and Grid System Construction (GSC).

131. The PMU contains a specially created cell to take care of the safeguards related activities, namely, the Environment and Social Safeguard Section (E&SS), headed by a Deputy Manager (E&SS), and assisted by two Assistant Managers, Environment, and Social Impact, respectively. The Assistant Manager (Environment) is responsible for the preparation/updating, implementation and internal monitoring of the subproject IEE.

132. To support the E&SS, to carry out its responsibilities, Project Implementation Consultant (IC) are hired by PEPCO who also have environmental and social experts to assist LESCO in revising and updating the IEE as and when required, and then in implementation of the EMP and IEE

133. The implementation of EMP will be subjected to both internal and external monitoring. Internal monitoring will be conducted by the environmental expert of E&SS unit PMU, assisted by GSC's field team. The external monitoring responsibilities will be carried out by External Monitoring Consultant (FMC, SMEC) engaged by PMU, PEPCO.

Table 6.1: Environnemental Management Plan – Matrix

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
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 LESCO
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 LESCO with the ES SMEC (Design Consultant)	ES LESCO
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 DGS 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 / approved by PEPA.	ES LESCO with the ES SMEC (Design Consultant)	ES LESCO 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.	LESCO ESU. Locations approved by EPA and LESCO and local waste disposal authorities.	ES LESCO with the ES SMEC (Design Consultant)	ES LESCO with the ES SMEC
5. Temporary drainage and	Include mitigation in preliminary designs	1. Identify locations where drainage or irrigation crossing RoW may be affected by	During designing stage no later than	Locations based on drainage or	ES LESCO with the ES	ES LESCO

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
erosion control	for erosion control and temporary drainage.	works. 2. Include protection works in contract as a payment milestone(s).	pre-qualification or tender negotiations	irrigation crossing RoW near DGS.	SMEC	with the ES SMEC
6. Contract clauses	Ensure requirements and recommendations of environmental assessment are included in the contracts.	Include EMP Matrix in tender documentation and make contractors responsible to implement mitigation measures by reference to EIA/IEE in contract. Include preparation of EMP review and method statement WM plan, TD and EC Plan in contract as a payment milestone(s). Require environmental accident checklist and a list of controlled chemicals / substances to be included in the contractor's work method statement and tender documentation.	During tender preparation. No later than pre-qualification or tender negotiations In bidding documents as evaluation criteria	Noise sensitive locations identified in the IEE/EIA/EMP or as required / approved by PEPA.	ES LESCO with the ES SMEC	ES LESCO 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.	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.	Prepare a thorough drainage management plan to be approved by CSC one month prior to a commencement of construction Proper timetable prepared in consideration with the climatic conditions of the area, the different construction activities mentioned here to be guided.	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 Contractor	ES SMEC and ES LESCO
2. Orientation for Contractor, and Workers	To ensure that the CSC contractor and workers understand and have the capacity to ensure	1. LESCO ESU environmental specialist to monitor and progress all environmental statutory and recommended obligations. 2 Conduct special briefing for managers and /	Induction course for all site agents and above including all relevant LESCO staff / new project staff	All staff members in all categories. Monthly induction and six month refresher course as	LESCO ES, Contractor and ES SMEC	ES LESCO with the ES SMEC .

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
	the environmental requirements and implementation of mitigation measures.	or on-site training for the contractors and workers on the environmental requirement of the project. Record attendance and achievement test for contractors site agents. 3. Agreement on critical areas to be considered and necessary mitigation measures, among all parties who are involved in project activities. 4. Continuous progress review and refresher sessions to be followed.	before commencement of work. At early stages of construction for all construction employees as far as reasonably practicable.	necessary until contractor complies.		
3. Water quality	To prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively. Ensure adverse impacts on water quality caused by construction activities are minimized.	Compile temporary drainage management plan one month before commencement of works. 1. Proper installation of temporary drainage and erosion control before works within 50m of water bodies. 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. 3. Storage of lubricants, fuels and other hydrocarbons in self-contained dedicated enclosures >50m away from water bodies. 4. Proper disposal of solid waste from construction activities. 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. 6. Topsoil stripped material shall not be stored where natural drainage will be disrupted. 7. Borrow sites (if required) should not be	1 month prior to construction And then after 2 month during entire construction	1. 50m from water bodies 2. Relevant locations to be determined in the detailed project design.	1.ES Contractor 2. Contractor has to check water quality and report to LESCO.	ES SMEC and ES LESCO review results

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
		close to sources of drinking water.				
4. Ambient Air quality	To minimize dust effectively and avoid complaints due to the airborne particulate matter released to the atmosphere.	CONTROL ALL DUSTY MATERIALS AT SOURCE. 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). 2. Stockpiled soil and sand shall be slightly wetted before loading, particularly in windy conditions. 3. Fuel-efficient and well-maintained haulage trucks shall be employed to minimize exhaust emissions. 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.	1 month prior to construction and then after 2- month during entire construction	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.	Contractor should maintain acceptable standard. ES SMEC to supervise activities.	LESCO ES / ES SMEC
5. Ground Vibration	To minimize ground vibrations during construction.	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 practi . 4. Percussive piling shall be conducted in daylight hours.	1 month prior to construction.	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.	Contractor should maintain the acceptable standards. ES SMEC to supervise relevant activities.	LESCO ES / SMEC ES

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
		5. Hammer- type percussive pile driving operations shall not be allowed at night time.				
6. Noise	To minimize noise increases during construction.	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 methods.	1 month prior to construction. And the entire construction	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.	Contractor should maintain the acceptable standards. ES SMEC to supervise relevant activities.	LESCO ES / SMEC
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	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 green surface cover to be minimized during site preparation.	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	ES Contractor and ES SMEC	LESCO ES / SMEC ES

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
	creation of access tracks for project vehicles.	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 LESCO 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 LESCO with appropriate trees (other vegetation cover as appropriate) to ensure interception of rainwater and the deceleration of surface run-off.		reclamation, borrow areas etc. 3. Locations of all rivers, streams, culverts, irrigation channels, roads and roads.		
8. Exploitation, Handling, Transportation and Storage of	To minimize disruption and contamination of the surroundings.	(consider also for future trances if civil works) 1. Use only EPA licensed sites for raw materials in order to minimize adverse environmental impacts.	month prior to starting of works. Update monthly	1. List of borrow areas to be prepared with tender stage	ES Contractor and SMEC to agree format	LESCO ES / SMEC ES

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
Construction materials	minimize and or avoid adverse environ-mental impacts arising out of construction material exploitation, handling, transportation and storage by using sources that comply with EPA license conditions	2. Measures to be taken in line with any EPA license conditions, recommendations and approval to be applied to the subproject activities using the licensed source including: Conditions that apply for selecting sites for material exploitation. Conditions that apply to timing and use of roads for material transport. Conditions that apply for maintenance of vehicles used in material transport or construction. Conditions that apply for selection of sites for material storage. Conditions that apply for aggregate production. Conditions that apply for handling hazardous or dangerous materials such as oil, lubricants and toxic chemicals.		contractors method statement and updated one month prior to construction. 2.List of routes of transport of construction material is to be prepared for the contract and agreed one month prior to construction. 3. Map of locations of storage is prepared by the contractor.	of reporting	
9.Decommision and Waste Management	Minimize the impacts from the disposal of construction waste.	1. Waste management plan to be submitted to the CSC and approved by LESCO ESU one month prior to starting of works. WMP shall estimate the amounts and types of construction and decommissioning waste to be generated by the project. 2. Investigate ways and means of reusing/recycling decommissioned material from the project within PEPCO without any residual environmental impact. 3 Identifying potential safe disposal sites close to the project, or those designated sites in the contract. 4 Investigating the environmental conditions of the disposal sites and recommendation of most suitable and safest sites. 5. Piling up of loose material should be done in segregated areas to arrest washing out of soil. Debris shall not be left where it may be	One month prior to starting of works. Update monthly One month prior to starting of works. Update monthly	1.Dumping: A list of temporary stockpiling areas and more permanent dumping areas to be prepared at the contract stage for agreement A list of temporary stockpiling areas and more permanent dumping	1.Contractor 2. SMEC ES and LESCO ESU should supervise and take action to ensure that contractor's complete relevant activities according to EIA / IEE / EMP requirement & NEQS.	LESCO/ ES SMEC

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
		carried by water to downstream flood plains, dams, lagoons or other water bodies. 6. Used oil and lubricants shall be recovered and reused or removed from the site in full compliance with the national and local regulations. 7. Oily wastes must not be burned. Disposal location to be agreed with local authorities/EPA. 8. Waste breaker insulating oil to be recycled, reconditioned, or reused at DISCO's facility. 9. Machinery should be properly maintained to minimize oil spill during the construction. 10. Machinery should be maintained in a dedicated area over drip trays to avoid soil contamination from residual oil spill during maintenance. 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.		areas to be prepared at the contract stage for 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.	1. Identify location of work camps in consultation with local authorities. The location shall be subject to approval by the LESCO. If possible, camps shall not be located near settlements or near drinking water supply intakes. 2. Cutting of trees shall not be permitted and removal of vegetation shall be minimized. 3. Water and sanitary facilities (at least pit latrines) shall be provided for employees. Worker camp and latrine sites to be backfilled and marked upon vacation of the sites. 4. Solid waste and sewage shall be managed according to the national and local regulations. As a rule, solid waste must not be dumped, buried or burned at or near the	UPDATE Once a month	Location Map is prepared by the Contractor.	Contractor	LESCO ESU / CSC

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
		project site, but shall be disposed of to the nearest sanitary landfill or site having complied with the necessary permits of local authority permission. 5. The Contractor shall organize and maintain a waste separation, collection and transport system. 6. The Contractor shall document that all liquid and solid hazardous and non-hazardous waste are separated, collected and disposed of according to the given requirements and regulations. 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. 8 Exposed areas shall be planted with suitable vegetation. 9.LESCO and Construction Supervising Consultant shall inspect and report that the camp has been vacated and restored to pre-project conditions.				
11. Loss of Trees, Vegetation and Fauna . Cover of the Areas for poles 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.	Tree location and condition survey to be completed one month before tender. 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. Clearing 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. At completion all debris and waste shall be	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 / LESCO ESU during detailed design and CSC to update as necessary.	SMEC ES and ES Contractor	LESCO ES / SMEC ES

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
		removed and not burned. 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. 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. 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. Landscaping and road verges to be re-installed on completion. Compensatory planting of trees/shrubs/ornamental plants (at a rate of 3:1) in line with best international practice. After work completion all temporary structures, including office buildings, shelters and toilets shall be removed.				
12. Safety Precautions for the Workers	To ensure safety of workers	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. Providing workers with skull guard or hard hat and hard toe shoes.	Prior to commencement and during construction	Location to be identified by the CSC with contractor.	ES Contractor	ES LESCO/ ES SMEC
13. Traffic Condition	Minimize disturbance of vehicular traffic and pedestrians during haulage of construction materials and equipment.	Submit temporary haul and access routes plan one month prior to start of works. Routes in vicinity of schools and hospitals to be avoided.	Prior to and throughout the construction.	The most important locations to be identified and listed. Relevant plans of the Contractor on traffic arrangements to be made	ES Contractor	LESCO ESU / CSC

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
				available.		
14.Social Impacts	To ensure minimum impacts from construction labour force on public health.	Potential for spread of vector borne and communicable diseases from labour camps shall be avoided (worker awareness orientation and appropriate sanitation should be maintained). Complaints of the people on construction nuisance / damage close to ROW to be considered and responded to promptly. Contractor should make alternative arrangements to avoid local community impacts. Restoration of Damaged public utilities	Complaints of public to be solved as soon as possible	All subprojects all tranches	ES Contractor ES LESCO	ES LESCO
15. Institutional Strengthening and Capacity Building	To ensure that LESCO officials are trained to understand and to appreciate EMP	Capacity building activities were taken by Environmental Officer in Tranche 1. Environmental Management Unit (EMU) was setup with in LESCO under Director Operations in Tranche 1. Development of strengthening plan for the EMU should be taken up with resources.	Initiate preconstruction and continue beyond project completion.	Awareness training for all management and senior staff in LESCO at senior engineer and above in PMU and related units.	LESCO ESU	LESCO & ADB
OPERATIONAL STAGE						
1. Air Quality	Minimize air quality impacts	No significant Impacts Tranche 1.Monitor designs and plans for all future tranches.	Operational phase	all subprojects in future tranches	ES LESCO	LESCO ESU
2.Noise	Minimize noise impacts	No significant Impacts Tranche 1V. Acoustic designs checking and plan for all future tranches.	Operational phase	all subprojects in future tranches	ES LESCO	LESCO ESU
3. Waste disposal	Minimize improper waste disposal	Continue waste management arrangements in operational phase of all subprojects and LESCO activities.	Operational phase	all subprojects in future tranches	ES LESCO	LESCO ESU
4. 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 LESCO	LESCO ESU
5. soil erosion	loss of productive land	No significant Impacts in Tranche 1V. Review designs checking and plan for all future tranches.	Operational phase	all subprojects in future tranches	ES LESCO	LESCO ESU

Environmental Concern	Objectives	Mitigation Measures recommended	Timing to implement MM	Locations to implement MM	Responsibility to implement MM	Monitoring
6. Water quality	Minimize water quality impacts	No significant Impacts in Tranche 1V. Review designs checking and plan for all future tranches.	Operational phase	all subprojects in future tranches	ES LESCO	LESCO ESU
7. 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 LESCO	LESCO ESU
8. 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 LESCO	LESCO ESU

Note: DDS=Detailed design stage. Based on IEE report to be revised at DDS, RAP, SIA and other engineering considerations may change. IEE= Initial Environmental Examination. EMP= Environmental Management Action Plan = Environmental Management Plan, EPA= Environmental Protection Agency, ESIC=Environmental and Social Implementation Cell DGS= Distribution Grid Station.

134. In order to facilitate the implementation of the EMP, during the planning for the construction phase the LESCO must prepare the future contractors to cooperate with all stakeholders in the mitigation of impacts. Furthermore the contractor must be primed through the contract documentation and ready to implement all the mitigation measures. LESCO 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.

135. 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 for the performance indicators. A tentative estimation of the associated costs for the monitoring is given with the plan. The EMP has been prepared following best practice and the ADB guidelines.

136. The EMP was prepared taking into account the limited capacity of LESCO to conduct environmental assessment of the subproject, LESCO'S Organizational Set-up for EMP Planning, Implementation and Monitoring is shown in **Figure 6.1**. LESCO has appointed one (1) Deputy Manager Environment, one (1) assistant environmental manager and one (1) assistant social impact manager with support staff. LESCO, Environmental and Social Unit (ESU) are fully functional. However, an environmental manager will be required. Proposed Structure of ESU is shown in **Figure 6.1a**. It is envisaged that experience in this field should therefore develop in the near future. It is envisaged that experience in this field should therefore develop in the near future. However it is also strongly recommended that for subprojects in future Tranches that the LESCO should be prepared to engage more support where necessary (e.g. senior environmental specialist with at least 3 years' experience in environmental management 1 year site experience in environmental monitoring and auditing) to guide the subsequent formal assessment and submission process under the PEPA, 1997 and monitor compliance with the EMP. As of August 2007, the LESCO has established Environment& social cell to developed in-house environmental and social capability. The cell is work under Chief engineer Development PMU. One Deputy Manager and Two Assistant Managers are working in the cell.

137. The environmental staff members has a good level of awareness and will be responsible for addressing environmental concerns for sub-projects potentially involving of distribution lines and DGS. Whereas some of their work may in future be delegated to consultants they will need more training and resources if they are effectively provide quality control and oversight for the EMP implementation. They

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 to create post of Manager (Environment) experienced or trained in EMP auditing, environmentally responsible procurement, air, water and noise pollution management and ecological impact mitigation. It is recommended that an environmental specialist consultant with 07 years' experience be made available to all the DISCOS to cover these aspects full time for at least the first six months of the PDEMFF project and that on a call off basis with local support those services are retained for the life of the PDEMFF loan. The newly appointed environmental manager can then shadow the environmental specialist to improve awareness and hopefully provide independent quality control and oversight for the EMP implementation for the first 12 months.

Figure 6.1: LESCO'S Organizational Set-up for EMP Planning, Implementation and Monitoring

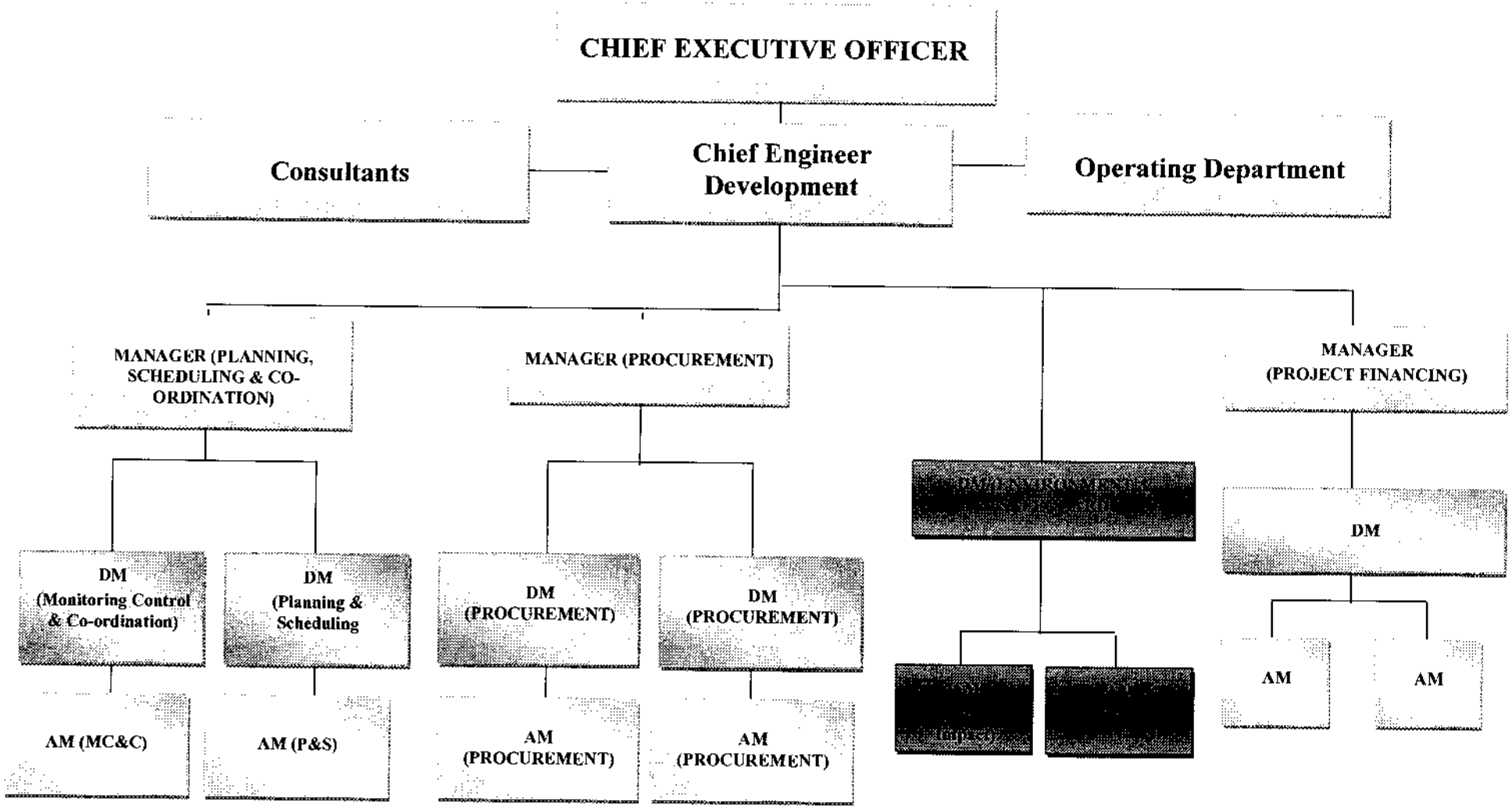
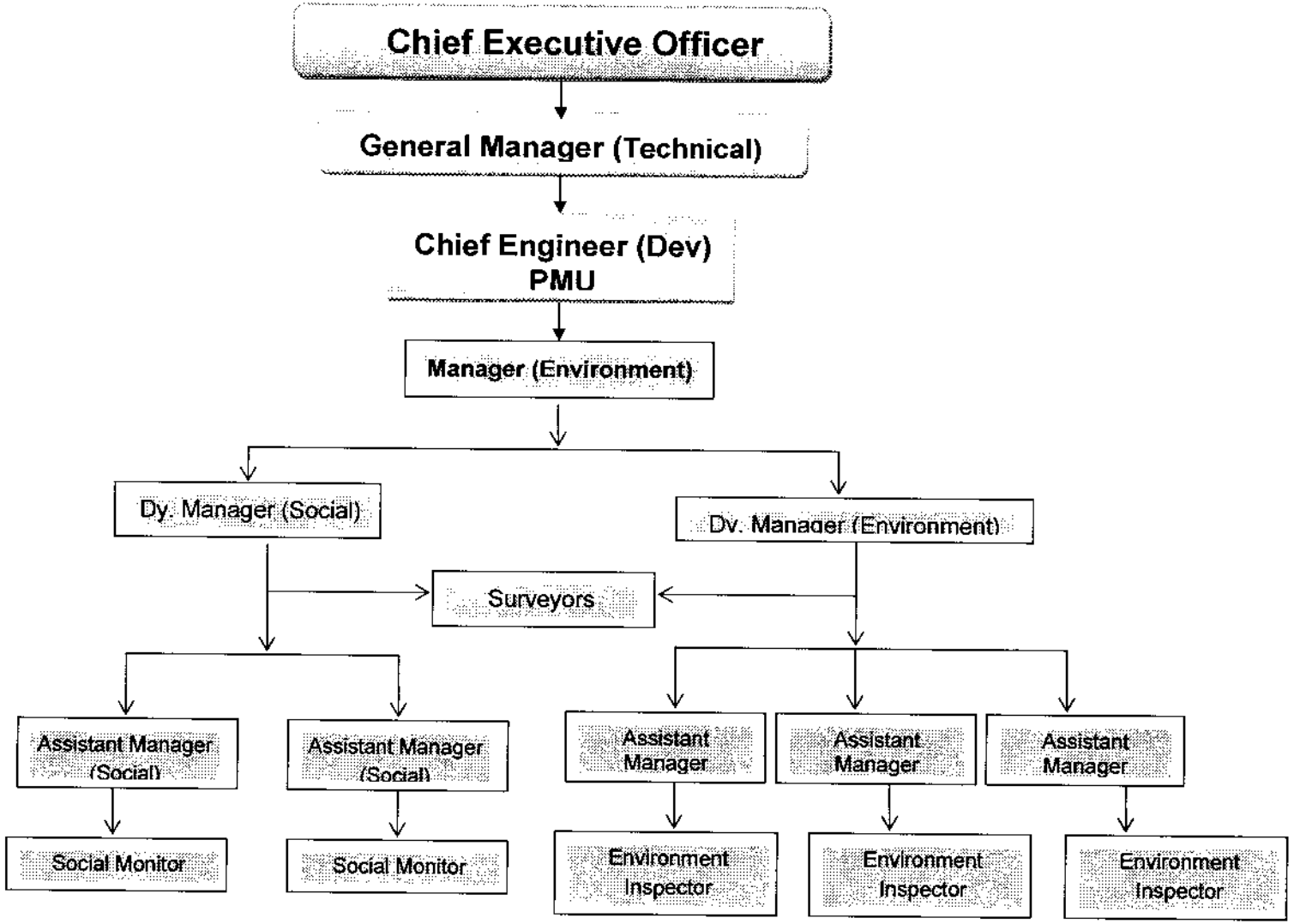


Figure 6.1a: Proposed Organizational Set-up of ESU for EMP Planning, Implementation and Monitoring



138. In order to achieve good compliance with environmental assessment principles the environmental staff for the project implementation team must be actively involved, prior to the outset of the implementation design stage, to ensure compliance with the statutory obligations under the PEPA, 1997. It is also recommended that LESCO Board allow direct reporting to Board level from the in-house ESU. ESU requires resources for LESCO own sub-projects then LESCO should hire Manager for environment & safeguard through the relevant 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 ESU to address all environmental aspects in the detailed design and contracting stages.

139. Overall implementation of the EMP will become LESCO's responsibility. The LESCO 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. Other parties to be involved in implementing the EMP are as follows:

- **Contractors:** Responsible for carrying out the contractual obligations, Prepare SEMP, Engage Environmental personnel, conduct training implementing all EMP measures required to mitigate environmental impacts during construction; and
- **Other government agencies:** Such as regional EPA and 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 level.

140. Considering that other government agencies that need to be involved in implementing the EMP, training or harmonization workshops should be conducted for all ESUs in LESCO every six months or twice each year, for the first 2 years (and annually thereafter) to share the monitoring report on the implementation of the EMP in LESCO and to share lessons learned in the implementation and to achieve a consistent approach decide on remedial actions, if unexpected environmental impacts occur.

141. The monitoring plan (**Table 6.2**) is designed and based on the project cycle. During the design stage, 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. Monitoring activities during project operation will focus on recording environmental performance and proposing remedial actions to address unexpected impacts.

142. 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 become part of 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 costed separately in the tender documentation and that payment milestones are linked to environmental performance, *Vis a Vis* carrying out the EMP.

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

Table 6.2: Monitoring Plan for Performance Indicators

Environmental Concern	Performance Indicator (PI)	Frequency to Monitor	Timing to Check PI	Locations to Implement PI	Responsible to Implement PI	Cost of Implementation	Responsibility PI Supervision	Cost of Supervision
DESIGN / PRE - CONSTRUCTION STAGE								
1. Review of Environmental Monitoring Action Plan (EMAP).	Environmental Management Action Plan (EMAP) is reviewed	During detailed design (later monthly by Contractor to cover any unidentified impacts)	By completion of detailed design.	All project alignment	Contractor	Initially DISCO's Cell / later Contractor cost	E&SS, LESCO / ADB*	E&SS staff cost.
2. Social Impacts and Resettlement.	Inventory of losses, Property acquisition, compensation & resettlement completed to RP requirements	Completed prior to commencement of construction	Before removal of houses and structures.	APs according to RP & LAFC.	DISCO'S Cell	DISCO'S Cell staff cost	E&SS, LESCO / ADB*	E&SS staff cost.
3. Project Disclosure.	Design changes notified	During detailed design by Contractor to cover any access roads and alignment changes, additional Villages.	Completion of detailed design.	All project alignment.	Contractor	Contractor cost	E&SS, LESCO / ADB*	E&SS staff cost.
4. Environmentally Responsible Procurement. (ERP).	Contract follows ADB Guidelines on ERP. Contractual clauses include implementation of of environmental	Once, before Contract is signed.	Before Contract is signed.	Method Statements include resources for mitigation measures.	DISCO'S Project Cell.	Contractor cost	E&SS, LESCO / ADB*	DISCO'S Cell staff cost.

Environmental Concern	Performance Indicator (PI)	Frequency to Monitor	Timing to Check PI	Locations to Implement PI	Responsible to Implement PI	Cost of Implementation	Responsibility PI Supervision	Cost of Supervision
	mitigation measures tied with contract agreement.							
5. Waste Disposal.	Disposal options for all waste transformer oil, residual contaminated soils, scrap metal agreed with DISCO'S and local authority.	Monthly or as required in waste management 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. After agreement with local authority, designate disposal sites in the contract and cost unit disposal rates accordingly.	Prior to detailed design stage no later than pre-qualification or tender negotiations Include in contract.	Locations approved by local waste disposal authorities.	DISCO'S cell with the design consultant.	E&SS	E&SS, LESCO / ADB*	DISCO'S Cell staff cost.
6. Noise and Air Quality Mitigation in design.	Design changes included in EMP & EMAP approved by MOEST.	During detailed design by Contractor.	Completion of detailed design.	As defined in EMP (supplementary) & EMAP.	DISCO'S Cell / Contractor	Contractor cost	E&SS, LESCO / ADB*	DISCO'S Cell staff cost.

Environmental Concern	Performance Indicator (PI)	Frequency to Monitor	Timing to Check PI	Locations to Implement PI	Responsible to Implement PI	Cost of Implementation	Responsibility PI Supervision	Cost of Supervision
7. Hydrological Impacts.	Temporary Drainage Management plan.	During detailed design by Contractor and monthly to cover any unidentified impacts	One month before commencement of construction	Considered locations to be as identified in the Detailed Drainage Report.	Contractor	Contractor cost	E&SS, LESCO / ADB*	DISCO'S Cell staff cost.
8. Temporary drainage and erosion control.	Erosion Control and Temporary Drainage completed.	During detailed design updated by Contractor monthly to cover any unidentified impacts.	One month before construction commences.	All stream and river crossings and where slopes indicate erosion will be a problem.	Contractor.	Contractor cost	E&SS, LESCO / ADB*	DISCO'S Cell staff cost.
9. Planning construction camps.	Use of land agreed with LESCO Authority and Residents of surrounding areas	During detailed design updated by Contractor monthly to cover any unidentified impacts.	One month before construction commences.	Locations agreed DISCO'S cell in consultation with community and the Contractor.	Contractor DISCO'S Cell facilitates.	Contractor cost	E&SS, LESCO / ADB*	DISCO'S Cell staff cost.
10. Traffic Condition.	Temporary Pedestrian and Traffic Management Plan agreed.	During detailed design updated by Contractor monthly to cover any unidentified impacts.	One month before construction commences.	Locations agreed with DISCO'S cell in consultation with community and the Contractor.	Contractor	Contractor cost	E&SS, LESCO / ADB*	DISCO'S Cell staff cost.
11. Institutional strengthening and capacity building.	Train DISCO'S Cell officials.	Once and ongoing	As soon as practicable No later than one month before Contract award.	Throughout the project	DISCO'S Project Cell.	DISCO'S Cell staff cost	E&SS, LESCO / ADB*	ADB cost of IES & support for 1 month **US$25,000**
CONSTRUCTION STAGE								
1. Orientation for Contractor, and Workers.	Contractor agreed to provide training to professional staff	Once Ongoing	Before contract is signed Before	All BOT staff members in all categories. monthly induction	Contractor with E&SS assistance and record	Contractor cost	GSC / E&SS, LESCO.	DISCO'S Cell staff cost.

Environmental Concern	Performance Indicator (PI)	Frequency to Monitor	Timing to Check PI	Locations to Implement PI	Responsible to Implement PI	Cost of Implementation	Responsibility PI Supervision	Cost of Supervision
	and workers.							
	Special briefing and training for Contractor completed.	Ongoing	construction areas are opened up Every six months	and six month refresher course	details.			
	Periodic progress review sessions.							
2. Plans to control environmental impacts.	Drainage Management plan.	Deliverable in final form to DISCO'S cell one month before construction commences for any given stretch.	One month before construction commences.	All of DISCO'S alignment.	Contractor	Contractor cost	GSC / E&SS, LESCO.	DISCO'S Cell staff cost.
	Erosion Control & Temp. Drainage plan							
	Temp. Pedestrian & Traffic Management plan.							
	Emergency Response Plan							
	Materials Management plan.							
	Waste Management plan.							
	Noise and Dust Control plan.							
	Safety Plan.							
	Agreed schedule of costs for environmental mitigation. {N.B. Forest Clearance							

Environmental Concern	Performance Indicator (PI)	Frequency to Monitor	Timing to Check PI	Locations to Implement PI	Responsible to Implement PI	Cost of Implementation	Responsibility PI Supervision	Cost of Supervision
	and Compensatory Planting plan is prepared by DISCO'S cell}.							
3. Water quality.	Meaningful water quality monitoring up and downstream during construction within 100m of rivers. Rapid reporting and feedback by DISCO'S.	Once (line item when opening up construction near water bodies).	During detailed design by Contractor and update to cover any unidentified impacts.	Locations to be provided with the detailed designs including all bridges during construction within 100m of rivers	Independent experienced laboratory.	Contractor cost	GSC / E&SS, LESCO.	DISCO'S Cell staff cost.
4. Water Resources.	Availability of water acceptable to community and no complaints.	Monthly	Prior to submission of progress reports.	All local water supply resources and rivers.	Contractor	Contractor cost	GSC / E&SS, LESCO.	DISCO'S Cell staff cost.
5. Spoil disposal and construction waste disposal.	Use of land agreed with LESCO Authority. Waste Management Plan implemented. No open burning.	Monthly (line item when opening up construction).	Prior to construction. Update monthly.	All DISCO'S alignment.	Contractor	Contractor cost	GSC / E&SS, LESCO.	DISCO'S Cell staff cost.
6. Noise.	Noise mitigation measures implemented in line with guidelines for noise reduction from	Monthly (line item when opening up construction).	Maximum allowable noise levels are 70dB (A)L_{EQ} at sensitive receptors	All DISCO'S alignment.	Contractor should maintain the accepted standards	Contractor cost	GSC / E&SS, LESCO.	DISCO'S Cell staff cost.

Environmental Concern	Performance Indicator (PI)	Frequency to Monitor	Timing to Check PI	Locations to Implement PI	Responsible to Implement PI	Cost of Implementation	Responsibility PI Supervision	Cost of Supervision
	ISO/TR11688-1:1995(E)							
7. Air quality.	Dust control plan implemented.	Monthly (line item when opening up construction).	Prior to construction. Update monthly.	All DISCO'S alignment.	Contractor	Contractor cost	GSC / E&SS, LESCO.	DISCO'S Cell staff cost.
8. Soil Contamination.	Contractor's workforce to be instructed and trained in handling of chemicals.	Monthly (line item when opening up construction).	Prior to construction. Update monthly.	All DISCO'S alignment.	Contractor	Contractor cost	GSC / E&SS, LESCO.	DISCO'S Cell staff cost.
9. Work Camp Location and Operation.	Use of land agreed with LESCO Authority.	Monthly (line item when opening up construction).	Prior to construction. Update monthly.	All DISCO'S alignment.	Contractor	Contractor cost	GSC / E&SS, LESCO.	DISCO'S Cell staff cost.
	Waste Management Plan implemented.							
	No open burning.							
10. Safety Precautions for Workers.	Emergency Response Plan / Safety Plan implemented.	Once (update monthly as necessary)	One month before construction and update quarterly.	All DISCO'S alignment.	Contractor.	Contractor cost	GSC / E&SS, LESCO.	DISCO'S Cell staff cost.
11. Social Impacts.	Local labor is used as workforce.	Monthly (line item when opening up construction).	During construction. Update monthly.	All DISCO'S alignment.	Contractor	Contractor cost	GSC / E&SS, LESCO.	DISCO'S Cell staff cost.
	Local educated people for office work.							
	Complaints on construction nuisance damages close to ROW are							

Environmental Concern	Performance Indicator (PI)	Frequency to Monitor	Timing to Check PI	Locations to Implement PI	Responsible to Implement PI	Cost of Implementation	Responsibility PI Supervision	Cost of Supervision
	responded to promptly by the Contractor. Close liaison established with locals for the purposes to monitor complaints.							
12. Enhancements	Contractor has included for some enhancements in detailed designs Including planting of trees in addition to bioengineering such as in median	Once (update monthly as necessary)	One month before construction and update quarterly.	All DISCO'S alignment.	Contractor.	Contractor cost	*DISCO'S* / (DISCO'S Cell to actively supervise and enforce.	DISCO'S Cell staff cost
OPERATIONAL STAGE								
1. Air Quality.	Roadworthiness of vehicles Monitor NO_2 and PM10 as indicators.	Roadworthiness of vehicles on DISCO'S daily use during operations Yearly intervals for 3 years after opening for reassurance.	During operation.	All DISCO'S alignment.	Contractor	Contractor cost	GSC, GSO / E&SS, LESCO.	DISCO'S Cell staff cost.
2. Crops and vegetation.	Follow up on Tree Clearance and Compensatory Planting Plan. Records on	Quarterly	Throughout project Each of three years after initial planting.	All DISCO'S alignment.	Contractor	E&SS	GSC, GSO / E&SS, LESCO.	DISCO'S Cell staff cost.

Environmental Concern	Performance Indicator (PI)	Frequency to Monitor	Timing to Check PI	Locations to Implement PI	Responsible to Implement PI	Cost of Implementation	Responsibility PI Supervision	Cost of Supervision
	survival of planted trees. The compensatory planting maintained Audited report by E&SS for onsite and off-site compensatory planting.		Continuous for three years after project completion For four years after initial clearance of the forest.					

Summary of Estimated Costs for EMP Implementation

Activities	*Description*	*Estimated Cost*	
		Pak Rs	US $
Monitoring activities	As detailed under EMP	**8382768**	**80,000**
Mitigation measures	As prescribed under EMP and IEE	**31,43538**	**30,000**
Capacity building Program	Training for Staff & Management	**22,00476**	**21,000**
Transportation	Transportation for field visits	**18,86122**	**18,000**
Contingency	contingency	**7,33492**	**7,000**
Total		**1,63,46396**	**1,56,000**

1US$=104.78461Rs (17-02-2017)

8. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

8.1 Approach to Public Consultation

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

8.2 Public Consultation Process

145. 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 land owners, labourers, shopkeepers etc.

146. 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 TL that may be affected by the proposed subproject. The level of engagement varied from stakeholder to stakeholder with some registering no major comment but it is noted that none registered any outright opposition to subproject.

147. 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.

148. The environmental assessment process under the PEPA, 1997 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 IEE the consultation process was performed to satisfy the ADB requirements. The summary of consultation and people consulted are listed in the table of public consultation.

8.3 Results of Public Consultation

149. The consultations identified some potential environmental and social impacts and perceptions of the affected communities. The community generally supports the construction of the DGS. No land acquisition and resettlement is involved in this subproject. However, compensation will be paid to the concerned parties/owners of land where the loss of some trees and for damage to crops is expected if any.

On the basis of the consultations so far, it appears that the project will have no insurmountable environmental and social impacts but LESCO 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 affected persons (if any) as far as is reasonably practicable.

Table 8.1: Summary of Public Consultation (August, 2016)

Sr. No.	*Participant Name*	*Participant Profession*	*Issues raised / Concerns expressed / Suggestions & Requests*	*Proposed Measure*	*Action Taken / Proposed*	*Contact #*
1	**Mr. Muhammad Saleem**	Motor Cycle Repair Work Shop	stack holder has no concern about the construction of G/S	Construction work should be completed in time. At the earliest	LESCO should complete all work timely.	**03244873931**
2	**MsSadia**	Resident of KatchiAbadi	All the stack holder desired for early construction	-	LESCO should complete all work timely.	-
3	**Ms.Sana**	P.U Employee	No concern raised.	-	-	-
4	**Shaukat Chaukidar**	P.U Employee	stack holder has no concern about the construction of G/S	-	-	**03218859771**
5	**Aslam Naib Qasad**	P.U Employee	stack holder has no concern about the construction of G/S	-	-	-
6	**Shamalla ,Arif Ali**	Worker at P.U	No reservation on subproject	-	LESCO should employ Skilled and unskilled labor from the area.	-
7	**Muhammad Yasin**	Security Grad	community has no issue	-	LESCO should bound the contractor to take care of privacy and safety issues in the area.	**03134474812**

8	**Shafique**	Tuck Shop	All the stack holder desired for early completion	-	-	**03328472392**
9	**Muhammad Waqar**	Junior Clerk Dispensary	community has no issue	-	LESCO should employ Skilled and unskilled labor from the area.	**03014412973**
10	ShahidHussain	Photo copy Shop	community has no issue	-	-	**03027536324**

8.4 Grievance Redressal Mechanism

150. 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.

151. 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.

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

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

153. 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.

154. 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.

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

156. 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.

157. 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.

158. 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.

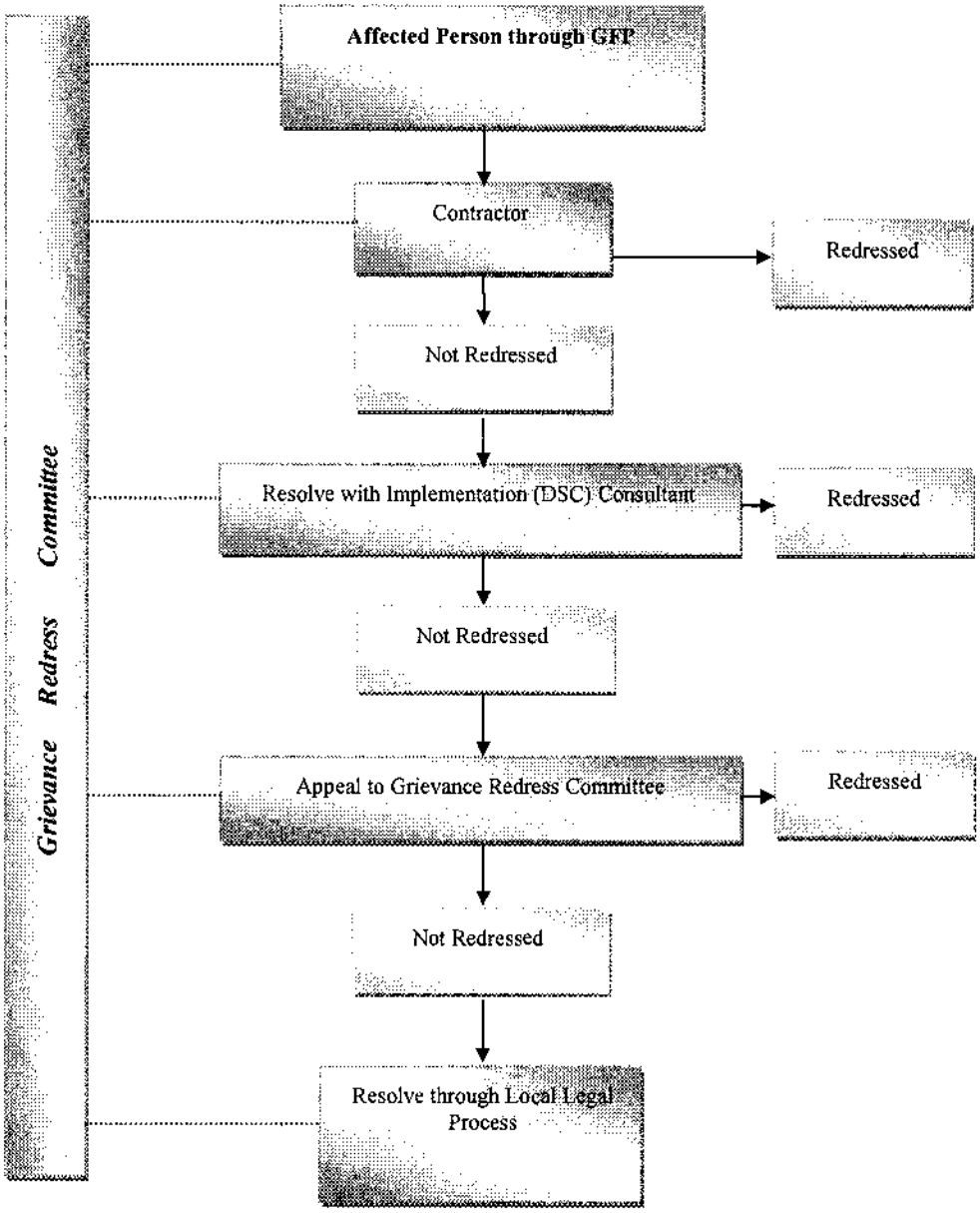


Figure 7.1 Grievance Redress Mechanism

9. FINDINGS RECOMMENDATIONS AND CONCLUSIONS

9.1 Findings and Recommendations

159. This study was carried out at the planning stage of the project. Primary and secondary data 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 subproject, and recommended suitable mitigation measures. This study recommends that some further follow up studies are undertaken during project processing in order to meet the ADB requirements.

160. There are some further considerations for the planning stages such as obtaining clearance for the project under the PEPA, 1997 but environmental impacts from the power enhancements will mostly take place during the construction stage. There are also some noise impacts and waste management issues for the operational stage that must be addressed in the detailed design and through environmentally responsible procurement. At the detailed design stage the number of and exact locations for transmission tower enhancements may change subject to detailed surveys but 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.

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

162. No land acquisition, compensation and resettlement are involved. However, some trees will be compensated to the concerned parties, if needed. 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 proposed subproject and minimize adverse impacts and maximize benefits. A social impact assessment and Due Diligence Reports (DDRs) has been completed in tandem with this IEE for the whole subproject. The study has:

(i) Examined and assess 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 subproject 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.

163. Baseline monitoring activities should be carried out during project detailed design stage to establish the baseline of parameters for checking during the construction stage. The 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.

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

9.2 Conclusion

165. The construction of the sub project **Tranche–IV(saving)** is a feasible and sustainable option from the power transmission, engineering, environmental, and socioeconomic points of view. Implementation of the EMP is required and the environmental impacts associated with the subproject need to be properly mitigated, and the existing institutional arrangements are available. Additional human and financial resources will be required by LESCO to complete the designs and incorporate the recommendations effectively and efficiently in the contract documents, linked to payment milestones. The proposed mitigation and management plans are practicable but require additional resources.

166. This IEE, including the EMP, should be used as a basis for an environmental compliance program and be included as an Appendix to the contract. The EMP shall be reviewed at the detailed design stage. In addition, any subsequent conditions issued by provincial 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 subproject should be properly carried out and reported at least twice per year as part of the project performance report.

Annexures

ANNEXURE-I
Traffic Management Plan

TRAFFIC MANAGEMENT PLAN

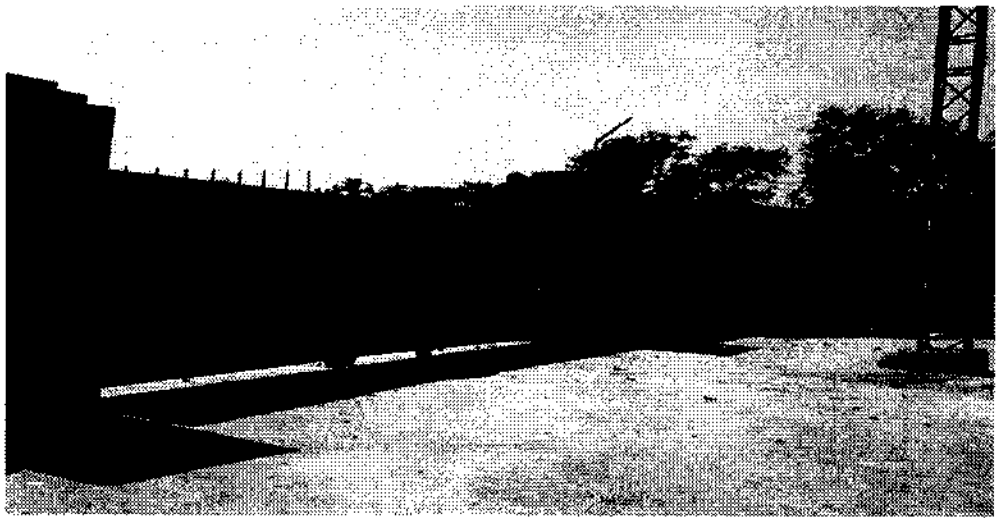
Aspect	Measures to be taken	Implementation	Responsibility
Route Diversions	Plan and designate entry and exit points for the project sites which will be required by heavy vehicles during construction phase.	Work planning phase	LESCO
	Allocate temporary alternative route considering usual traffic volumes and road carrying capacities and feasibility of general public with consultation and approval of City Traffic Police LAHORE	Work planning phase	LESCO
	Conditions of roads are to be checked prior to selecting routes for both general public and construction vehicles.	Work planning phase	Contractor
	Provide a separate clear path for emergency care vehicles like ambulances and fire brigades	Work planning phase	Contractor
Work zone demarcation	Ensure proper fencing where storage, campsites and other facilities are located to avoid unauthorized access.	Throughout project	Contractor
	Cordon of the work zone by reflector cones at least 50m before the actual working site to alert all people passing by.	Throughout project	Contractor
	Allocate appropriate parking areas for the use of employees including contractors and for heavy machineries.	Throughout project	Contractor
	Number of vehicles will be checked that enter and leave the area and unauthorized vehicles will not be allowed to enter in work zone.	Throughout project	Contractor
Signage	Display sign boards and banners about traffic diversions at places on detour routes.	Initiating phase	LESCO/Contractor
	Ensure use of Traffic Control Devices (TCDs) like reflectors, hazard cones and sign boards as required at main roads.	Throughout project	LESCO/Contractor

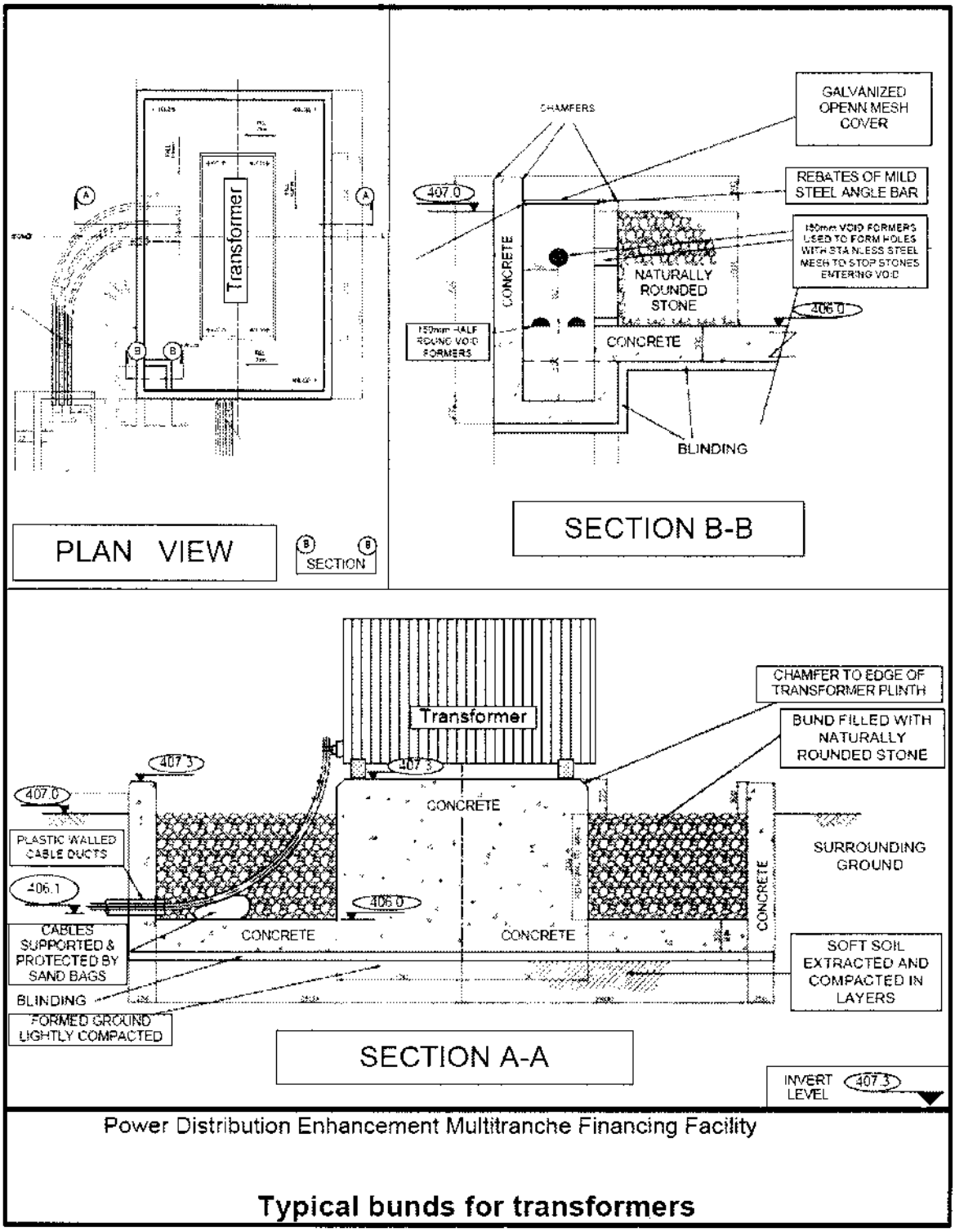
Aspect	Measures to be taken	Implementation	Responsibility
	Construction Vehicles will be installed with revolving hazard lights and hooters for signaling operation when in use	Throughout project	
Speed	Install temporary speed bumps / humps near work zone Areas and specially near residential/ commercial areas with consultation and approval of City Traffic Police Lahore .	Initiating phase	
	Ensure all vehicles in the area maintain speeds up to 30km/hr	Throughout project	
Timings	Undertake construction activities that are audible at any residential/commercial receptor, between the following hours: 7:00am to 6:00pm, Mondays to Fridays. 8:00am to 1:00pm on Saturdays. No time on Sundays or public holidays.	Throughout project	
	Entry of heavy machineries or vehicles and delivery timings on work site will be adjusted such that vehicles do not queue	Throughout project	
	Temporarily stop work or access in work zone during school and office hours between 8:30am to 9:30am and 2:00pm from Monday to Friday	Throughout project	
Foremen / Signaling	Special foremen will be employed to control vehicular movement in and outside the work zone.	Work planning phase	
	Foremen will wear appropriate PPEs and use TCDs to guarantee efficient work zone management.	Throughout project	
	Two-way radios and color flags will be provided to all foremen.	Throughout project	

Annex-II

PHOTOGRAPHS OF 132 kV GIS Punjab University Grid Station Site

Main Gate and boundary wall of Punjab University Grid Station land





Power Distribution Enhancement Multitranche Financing Facility

Typical bunds for transformers

Annex-III

Pollutants	USEPA		WHO		World Bank		Pak NEQS	
	Avg. Time	Standard	Avg. Time	Standard	Avg. Time	Standard	Avg. Time	Standard
SO_2	24 hrs	365 ug/m^3 (140 ppb)	24 hrs	90 g/m^3 (34 ppb)	Annual Mean	100 ug/m^3 (38 ppb)	Annual Mean	80g/m^3
			1hr	350 ug/m^3	24 hrs	500 ug/m^3	24 hrs	120 ug/m^3
CO	8 hrs	35 mg/m^3 (10 ppm)	8 hrs	10 mg/m^3 (8.7 ppm)	-	-	8 hrs	5 mg/m^3
	1 hr	40 mg/m^3					1 hr	10 mg/m^3
NO_2	Annual Mean	100 ug/m^3 (53 ppb)	1 hr	190-320 ug/m^3	Annual Mean	100 ug/m^3 (50 ppb)	Annual Mean	40 ug/m^3
							24 hrs	80 ug/m^3
O_3	1 hr	235 ug/m^3	8 hrs	120 ug/m^3	-	-	1 hr	120 ug/m^3
			1 hr	200 ug/m^3				
TSP	24 hrs	260 ug/m^3	24 hrs	150-230 ug/m^3	Annual Mean	100 ug/m^3	Annual Mean	360 ug/m^3
					24 hrs	500 ug/m^3	24 hrs	500 ug/m^3
PM_{10}	24hrs	150 ug/m^3	-	-	-	-	Annual Mean	120 ug/m^3
							24 hrs	150 ug/m^3
$PM_{2.5}$							Annual Average	15 ug/m^3
							24 hrs	35 ug/m^3
							1 hr	15 ug/m^3

Table1: Comparison of International and Local Noise Standards

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