

EXECUTIVE SUMMARY

INTRODUCTION

This executive summary presents an overview of the main findings of the Environmental Impact Assessment Report for Establishment of “**LPG Storage & Filling Plant**” by **M/S SKB Oil & Gas (SMC - Private) Limited** located at Khasra No. 616, 621, Qitat No. 21, Khatooni No. 128 to 131, Khewat No. 45, Mouza Thalian, Tehsil & District Rawalpindi. The main goal of the Proposed Project is to provide a safe, economic and environment friendly storage and bottling of LPG for LPG suppliers and direct consumers.

Project	LPG Storage & Filling Plant by M/S SKB Oil & Gas (SMC - Private) Limited
Location of the Project	Khasra No. 616, 621, Qitat No. 21, Khatooni No. 128 to 131, Khewat No. 45, Mouza Thalian, Tehsil & District Rawalpindi
Proponent Name	Sultan
Consultant Name	Elite Environmental Solutions (EES) Pvt. Limited
Filling capacity	20+ MT/Day
Storage capacity	(02x50MT)
Total area of plot	68,508sft
Cost of project	Approx. 20 million

PROJECT OBJECTIVES:

The overall aim of the Proposed Project is to provide a safe, economic and environment friendly LPG Storage and Filling Plant in the area.

BENEFITS OF PROPOSED PROJECT:

The proposed project shall yield following benefits:

1. Maintain continuity in supply of LPG gas cylinders to the domestic consumers through distributors and quality of services to the consumers.



2. Ease in availability of filled LPG cylinders.
3. Help to overcome the scarcity of bulk LPG due to huge gap between demand and supply.
4. Discourage deforestation with reduction in use of fire wood and fossil fuels.

BREIF OUTLINE OF THE PROPOSAL

Proposed Project	LPG storage & Filling plant
Name of company	SKB Oil & Gas (SMC - Private) Limited.
Filling capacity	20 MT/Day
Storage capacity	(02x50MT)
Total area of plot	68,508sft / 13 Kanal
Cost of project	Approx. 20 million

MAJOR IMPACTS AND RECOMMENDED MITIGATION MEASURES:

Key impacts related to the construction phase include:

- Construction Noise
- Solid Waste
- Soil Contamination
- Air Pollution
- Community and Workers' Safety

Mitigation measures recommended to be incorporated into the project include running the machines and vehicles on good quality (low-sulfur fuels) in good working order ensuring regular maintenance, tuning and servicing, and providing them with emission control devices, such as mufflers and silencers, etc. Water suppression and covered transportation and storage of the construction materials and slow driving on unpaved roads will control dust emission. Regular testing for leakage detection will also be ensured. Solid waste of construction activities will be

used for flooring, while the remaining solid waste will be managed as per practices in the area. For community safety, irrelevant persons will not be allowed inside. Safety of the workers will be ensured by encouraging workers to use PPEs. **Detailed analysis is given in chapter 5.**

Key impacts related to the operation phase include:

- Noise
- Wastewater
- Solid Waste
- Gas leakage
- Safety, Public Health & Nuisances

Wastewater will be municipal in nature. Solid waste will also be municipal in nature. Safety of the workers is an issue of prime concern in any occupational activity. Municipal wastewater will be handled via Septic Tank. Municipal solid waste will entirely be managed in accordance with the practices in the area. Wet suppression during floor cleaning will suppress dust emission. Noise from the vehicles will be mitigated by regular servicing and tuning. Safety issue will be managed by providing the workers with necessary PPEs (safety helmets, masks, safety shoes, ear plugs, special suiting for various jobs and areas, etc.) and encouraging the workers to use them. Gas detection system will be installed to detect any leakage. An Emergency Response Plan and a firefighting plan will also be in place to deal with all sorts of emergencies. Proper first aid box and all safety measures will be provided to cater any emergency situation (complete gas leakage control plan is given in chapter 3).

PROPOSED ENVIRONMENTAL MONITORING PLANS:

During construction, ambient air quality for CO, NOX, SO₂, PM_{2.5}, PM 10 & SPM, noise level (tests), and Ground Water Quality will be tested using EPA Certified Labs and test report will be submitted to EPA KPK as per NOC Conditions as well as community and workers' safety (visual) need to be monitored. During Operational Phase Ambient air quality for CO, NOX, SO₂,

PM_{2.5}, PM 10 & SPM, noise level (tests), and Ground Water Quality will be tested using EPA Certified Labs and test report will be submitted to EPA Punjab as NOC Conditions.

Plan has been included in Chapter 6

S#	Monitoring Points	Parameters	Frequency
1	Emissions	CO, SO ₂ , NO _x , PM and Rengallmane	Monthly
2	Ambient Air Analysis	CO, SO ₂ , NO _x , PM, O ₃ , VOCs	Quarterly

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

LPG STORAGE AND FILLING PLANT BY M/S SKB OIL & GAS (SMC - PRIVATE) LIMITED DISTRICT RAWALPINDI

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CHAPTER 1: INTRODUCTION

1.1 GENERAL

Liquefied Petroleum Gas (LPG) is a colourless, odourless and environment friendly mixture of hydrocarbons (mainly propane and butane) which is gaseous at normal temperature and pressure, and liquefiable under reduced temperature or moderate pressure. A chemical ethyl mercaptan is added to impart a pungent odour for leak detection. In the country almost 1000 tons/day LPG is being produced domestically contributing less than 1% to the total energy supply mix. Because of its characteristics LPG is fast becoming a fuel of choice in the areas, where natural gas distribution network is not available. Currently out of 27 million households in Pakistan, 6.1 million are connected to natural gas network and the rest are relying on LPG and conventional fuels like coal, firewood, kerosene, dung cake etc. which indicate the strong demand for Liquefied Petroleum Gas (LPG) sector.

Liquefied Petroleum Gas (LPG) is used as fuel for cooking and heating in the northern Pakistan. It is also used as fuel in vehicles particularly taxi and rickshaws. More than 30,000 rickshaws and taxis in Karachi and other parts of the country are run on LPG. The demand of LPG in Karachi is consistent throughout the year and increases during winters in Punjab and Northern Pakistan.

Although demand of LPG is persistent throughout the year, supply of LPG from producers (or extractors) to distributors and marketing companies has been limited due to maintenance and overhauling shutdowns, which often creates shortages. Besides that, LPG producers are also limited in numbers and LPG marketing companies need to have a quota of gas to be allocated by the producer. This factor makes LPG business vulnerable in the hands of LPG producers.

LPG (Liquefied Petroleum Gas) is the generic name for commercial propane and commercial butane. These are hydrocarbon products produced by the oil and gas industries. Commercial Propane predominantly consists of hydrocarbons containing three carbon atoms, mainly propane (C_3H_8). Commercial Butane predominantly consists of hydrocarbons containing four carbon atoms, mainly n- and iso – butanes (C_4H_{10}). They have the special property of becoming liquid at atmospheric temperature if moderately compressed, and reverting to gases when the pressure is sufficiently reduced. Advantage is taken of this property to transport and store these products.

IDENTIFICATION OF THE PROJECT:

This document presents the Environmental Impact Assessment (EIA) report for Establishment of LPG Storage & Filling Plant of M/S SKB Oil & Gas (SMC - Private) Limited at Khasra No. 616, 621, Qitat No. 21, Khatooni No. 128 to 131, Khewat No. 45, Mouza Thalian, Tehsil & District Rawalpindi. The purpose of this study is to identify the environmental baseline i.e. physical, biological and socio-economic/cultural conditions and assess all possible impacts arising during operation phase of the project along with proposing suitable mitigation measures and formulation of Environmental Management Plan (EMP) for implementation of the project in environment friendly manner. The report provides relevant information, as required under the officially approved format, to help the decision makers i.e. EPA before issuing the Environmental Approval.

1.2 IDENTIFICATION OF PROJECT PROPONENTS

Proponent name	Sultan
Address	Building C6, office no, 97, street no. G-11/3, Islamabad
Contact number	0310-4499241

1.3 NATURE OF PROJECT

This project is the Establishment of LPG Storage & Filling plant.

1.3.1 SIZE OF PROJECT

Proposed Project will have a filling capacity of 20MT/Day and one tank with storage capacity of (2x50) MT.

1.3.2 LOCATION OF PROJECT

This project is to be located at Khasra No. 616, 621, Qitat No. 21, Khatooni No. 128 to 131, Khewat No. 45, Mouza Thalian, Tehsil & District Rawalpindi.

1.3.3 AREA OF PROJECT

Total Area of the Project is 68,508sft / 13 kanal.

1.3.4 COST OF THE PROJECT

Cost of project has been estimated at PKR 20 million.

1.4 DETAILS OF CONSULTANTS

For the preparation of the EIA Report of the proposed project, the proponent has hired the services of the environmental consultants; **M/S Elite Environmental Solutions (Pvt.) Limited** Team comprising of Environmental Engineers, Chemical Engineers, environmental experts and environmentalists has worked on this report. Elite Environmental Solutions (EES) is one of the pioneers Environmental Consultancy Companies in Pakistan with an unrivalled reputation for providing expert, tailored services and solutions. Elite Environmental Solutions (EES) provides the environmental services, litigation and consultancy to clients both industry and government. Elite Environmental Solutions (EES) is providing quality services in various environmental sectors i.e.

- Environmental Assessment Reports i.e. IEE/EIA
- Baseline Studies
- Environment Management Plans (EMP)
- Designing of Emission Control Equipment
- Waste Water Treatment Plant (WWTP) Designing
- WWTP Construction Supervision, Commissioning and Operations
- Establishing Bottled Water Plant based on RO or UF
- Lab testing (Drinking Water & Waste Water Analysis, Soil Analysis, Sludge Testing, Petroleum/ Lube Oil Testing, Fertilizer Analysis, Pesticides in Water, Soil, Fertilizer, Coal, Coke Analysis)
- Monitoring and inspection
- Environmental modelling

Contact Details:

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Study team:

The following table lists the names of experts involved in the making of EIA report:

Table 1: List of Experts

Name	Profession	Qualification	Professional Experience	Roles
Mr. Muhammad Nawaz	Operational Manager	BE Chemical Engineering	10 Years	• CEO • IEE report Review • Assessment of physical and socioeconomic baseline conditions at the Project Site.
Mr. M Iqbal	Senior Environmentalist	M.Phil. Env. Sci.	7 Years	• Capacity building & training • Conducting and monitoring of health assessment surveys • Environment health risk assessment and management
M.Arslan Tahir	Environmentalist	M.Phil. Env. Sci.	2 Year	• IEE report writing • EIA report writing • Assessment of physical and socioeconomic baseline conditions at the Project Site.
Ms. Hoor Fatima	Environmentalist	BS. Environmental Sciences	2 Year	• IEE report writing • EIA report writing • Impacts assessment and proposed their mitigation measures.
Ms. Amna Shahzadi	Environmental Engineer	BSc. Environmental Engineering	2 Year	• IEE/EMP report writing • EIA report writing • Assessment of physical and socioeconomic baseline conditions at the Project Site. • Impacts assessment and proposed their mitigation measures

1.5 PURPOSE OF REPORT

The development of any Project leads to positive and adverse changes in environment and social settings of the Project Area. The intensity and level of change, however, depends upon the nature of the Project and the baseline environmental conditions of the area. The establishment of

proposed project will cause minor to moderate adverse environmental and social impacts on the surrounding area. Thus, an environmental and social study is mandatory to establish the baseline conditions, evaluate the possible adverse impacts if any, and devise the mitigation measures.

The main objectives of this EIA study are:

- To determine and document the state of the environment of the project area to establish a baseline in order to assess the suitability of the Project in that area.
- To identify pre-construction, construction and operation activities and to assess their impacts on environment.
- Provide assistance to the proponent for planning, designing and implementing the project in a way that would eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in cost effective manner.
- To present Mitigation and Monitoring Plan to smoothly implement the suggested mitigation measures and supervise their efficiency and effectiveness.
- To provide opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.

1.6 DOCUMENT STRUCTURE

The report comprises of following chapters;

Chapter 1: **Introduction** (Briefly presents the project introduction, objectives and need of the Study).

Chapter 2: **Policy, Legal and Administrative Framework** (Comprises the policy, guidelines and statutory obligations concerning EIA study of the project).

Chapter 3: **Project Description** (Presents relevant information about the project and its major components).

Chapter 4: **Description of the Environment** (Establishes baseline conditions for physical, biological and socio-economic conditions of the Project area).

Chapter 5: **Environmental Impacts and Mitigation Measures** (Deals with the potential environmental impacts and mitigation measures, which have been proposed to mitigate the environmental impacts of the Project).

Chapter 6: **Environmental Management Plan** (Outlines institutional structure for the implementation of the Environmental Management Plan).

Chapter 7: **Recommendations and Conclusion** (This chapter gives recommendations for elements of special interests and concludes the whole report).

CHAPTER 2: STATUTORY REQUIREMENTS

2.1 EXISTING LEGISLATION AND LEGAL FRAMEWORK

The Federal Ministry of Environment was responsible authority for policy making on environmental protection in Pakistan but after 18th Amendment in the Constitution, the Provincial Governments have taken over the subject of Environment. This EIA study has been carried out in the light of the policy guidelines of the Preparation of IEE/EIA Reports under the procedures and practices formulated by the Pak EPA and adopted by the Punjab Environmental Protection Agency (EPA).

INSTITUTIONAL SETUP

ENVIRONMENTAL PROTECTION COUNCILS

The Punjab Environmental Protection Council (PEPC) is the apex decision-making body of Punjab. It has been developed under the provision of Punjab Environmental Protection Act 1997. It is headed by Chief Minister of Punjab with other members.

2.4 RELEVANT LEGAL / INSTITUTIONAL FRAMEWORK

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO) that was replaced by the PEPA, 1997, through an Act of Parliament. According to the 18th Amendment in Constitution, the PEPA 1997 has been confined to Federal Area and provinces have been allowed to formulate their own environmental legislation in the subject of environment.

Provincial Environment Protection Departments are also working on the formulation and enforcement of environmental statutes and by-laws. The Pak EPA has issued several policies guidelines and adopted measures for streamlining the environmental assessment. Though, the need for environmental screening and assessment has received some weight during the recent past, strict implementation of the PEQS is still a dream to be realized. The applicable laws for the environmental study of the Project are briefly described below:

2.5 PAKISTAN ENVIRONMENTAL PROTECTION ORDER (PEPO) 1983

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO) 1983. It was the first legislation promulgated for the protection of environment. According to PEPO, 1983 it was necessary to carry out IEE / EIA for all development projects, but there were no IEE / EIA regulations under that ordinance.

2.6 PUNJAB ENVIRONMENTAL PROTECTION ACT, 1997

Under section 12 (4) of PEPA, 1997 *“The Provincial Agency shall communicate its approval or otherwise within a period of four months from the date the initial environmental examination or environmental impact assessment is filed complete in all respects in accordance with the prescribed procedure, failing which the Initial Environmental Examination or, as the case may be, the Environmental Impact Assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations”*.

As per definition given in the Punjab Environmental Protection Act 1997, Environmental Impact Assessment (EIA) means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory, and compensatory measures, formulation of environmental management & training plans & monitoring arrangements, and framing of recommendations and such other components as may be prescribed. The provision of Section 12 has been incorporated “as it is” in the new Punjab Environmental Protection Act, 1997.

2.7 NATIONAL ENVIRONMENTAL POLICY, 2005

The National Environmental Policy (2005) provides a framework for addressing the environmental issues (particularly pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of bio diversity, desertification etc.) confronting Pakistan.

2.8 REVIEW OF IEE / IEE REGULATIONS, 2022

The Punjab EPA has issued Review of the Punjab Environmental Assessment Rules 2022, to review the Initial Environmental Examination (IEE) / Environment Impact Assessment (EIA) reports. Categorization of the projects for IEE and EIA is one of the main components of the

Regulations. As these regulations, the Projects have been classified based on expected degree of adverse environmental impacts. Projects type listed in Schedule I are designated as potentially less adverse effect, schedule I projects require an IEE and projects given in schedule II require EIA to be conducted.

2.9 GUIDELINES FOR THE PREPARATION OF IEE/EIA REPORTS

The PEPA has also framed Guidelines for the Preparation of IEE / EIA of projects in various developmental sectors. These Guidelines are ideal for preparing the IEE or EIA report but line-to-line preparation not necessary because Guidelines are not part of PEPA and EPA Punjab has not any notification for adoption or follow these Guidelines.

However, this EIA report has been prepared in following the Guidelines.

2.10 PAKISTAN PENAL CODE, 1860

Noise pollution has been covered in section 268, which defines and recognizes noise as a public nuisance. "A person is guilty of a public nuisance who does any act or is guilty of an illegal omission which causes any common injury, danger of annoyance to the public or the people in general who dwell or occupy property in the vicinity, or which must necessarily cause injury, obstruction, danger or annoyance to persons who may have occasion to use any public right".

2.11 THE LAND ACQUISITION ACT, 1894

The Land Acquisition Act (1894) deals with the acquisition of private properties for public purposes. There are 55 sections in this Act mainly dealing with area notification, surveys, acquisition, compensation, apportionment awards, disputes resolution, penalties and exemptions.

2.12 LABOR LAWS

Construction and operational activities during the course of construction may affect occupational health of workers. Employers are required to abide by labor laws in respect of their own employees and to ensure that contractors to follow the relevant labor laws and rules relating to safety of the workforce and creating a healthy working environment.

CHAPTER 3: PROJECT DESCRIPTION

This section of the study renders a detailed account of the project and its salient features, such as location and various phases. Inputs and discharges relevant to different phases of the project, such as electricity & material have also been examined as a response to possible environmental concerns.

3.1 TYPE AND CATEGORY OF PROJECT

As per Review of Punjab Environmental Assessment Rules 2022, the project of Construction of LPG storage & Filling Plant by SKB Oil & Gas (SMC - Private) Limited falls in the A (5) category of mentioned in Schedule II.

3.2 OBJECTIVE OF THE PROJECT

The objective of the project is to construct and operate LPG Storage and Filling Plant in an environment friendly manner.

The objectives of the proposed Project are as following;

- Storage and filling of LPG in cylinders with ensuring safe conditions
- To provide LPG 24 hours to provide best services to customers
- To provide LPG in adequate price as compared to market
- To provide the employment to the people
- To change the social life style of the workers
- To upgrade the socio-economic condition of the area

3.3 ALTERNATIVES

An open land under undisputed ownership is selected for the Establishment of storage and filling plant. Selected site is an unproductive land and is going to be brought into commercial use which will be beneficial for the locals as they will get jobs. The site is well located in regard to the following:

- Easy road access to the market
- No settlements at a safe distance
- No watercourse within a safe distance

- No ecologically sensitive or declared protected area in safe radius

3.3.1 Technology Alternative

LPG is well positioned to assist developing countries in the transition to modern fuels for the following reasons:

1. **Availability:** There is nothing exotic to invent or improve. The transportation system that moves it is in place, the tank to store it is available, and the appliances and equipment that provide heat and power are “on the shelf”.
2. **Infinite shelf Life:** LPG does not deteriorate over time unlike some other liquid fuels that gel, stratify or evaporate and must be protected from weather to prevent deterioration.
3. **High energy density:** Compared to traditional fuels in terms of weight equivalency, LPG has ten times energy.
4. **Environment friendly:** It burns cleanly without smoke or residual ash, thus avoiding the health hazards associated with indoor use of traditional fuels in the event of a leak, LPG doesn't contaminate the soil or aquifers.
5. **LP Gas can be transported, stored, and used virtually anywhere in the world.** It does not require a fixed network and does not deteriorate over time.
6. **LP Gas is very clean burning and has lower greenhouse gas emissions than any other fossil fuel when measured on a total fuel cycle.**
7. **LP Gas is cost-effective, since a high proportion of its energy content is converted into heat.** LP Gas can be up to five times more efficient than traditional fuels, resulting in less energy wastage and better use of energy resources.

The practical, operational and environmental characteristics of all four commercially available fuels are summarized in the following Table

FUEL CHARACTERISTICS				
Fuel Characteristic	Petrol	Diesel	CNG	LPG

Urban Air Pollution	Moderate to low emissions of hydrocarbons (HC) and Oxides of Nitrogen (NOx). Low particle (PM) emissions.	High NOx, low HC emissions. High PM emissions relative to other fuels even with reduced sulphur levels. By far the highest adverse impact on public health.	HC (methane) emissions can be high. Moderate to low NOx. Very low PM.	Low NOx and moderate to low HC emissions. Very low PM.
Global Warming (Greenhouse)	Moderate CO ₂ , low methane (CH ₄) emissions. Some questions re nitrous oxide (N ₂ O) formation in the catalyst.	Lower CO ₂ , low CH ₄ and HC. Airborne PM may increase global warming. High NOx levels may result in elevated N ₂ O emissions.	Potentially lowest CO ₂ of all fuels, but this can be offset by the very high greenhouse impact of methane (CH ₄) emissions from these engines.	Tailpipe CO ₂ levels lie between petrol and diesel. Lifecycle CO ₂ comparable to diesel, lower than petrol and CNG. Negligible CH ₄ emissions.
Engine Noise	Low	High	Low	Low
Application	Lowest cost fuel system, so attractive for cars and light commercials.	Complex high pressure fuel system increases cost, but most fuel	High cost and limited range Preclude use in light duty vehicles and in	Cost, range and on road performance equivalent to petrol

		efficient. Very durable and reliable in heavy duty applications.	areas where there is no pipeline gas. Use effectively limited to places where high pressure natural gas pipeline exists	in light duty vehicles. Engines now available for buses and medium trucks. Not constrained to depot-based operations.
Retail Availability	Nationally Available	Nationally Available	Limited	Nationally Available

LPG has many technology advantages over other fuels, it is a cheaper and green fuel hence it would be a better choice for use.

3.4 LOCATION AND LAYOUT OF PROJECT

3.4 1 Location of the Project

Particulars	Details
location	Khasra No. 616, 621, Qitat No. 21, Khatooni No. 128 to 131, Khewat No. 45, Mouza Thalian, Tehsil & District Rawalpindi
Tehsil	Rawalpindi
District	Rawalpindi
Road connectivity	Rawalpindi Saddar to Thalian Interchange Road
Archaeological or historical site	No archaeological site was found within 2-3km radius

3.5 LAND OWNERSHIP

Land/property documents are attached in Annexure III.

3.6 GOVERNMENT APPROVALS

Following NOCs are obtained and annexed:

- License from OGRA is attached in report
- License from Office of District Coordination Officer.
- License from Office of Assistant Commissioner Rawalpindi.

3.7 LAND USE ON SITE

Only boundary wall is constructed yet. Site is surrounded by open lands and agricultural lands.

3.8 ROAD ACCESS

Rawalpindi Saddar to Thalian Interchange Road is in easy and close access of the proposed project site.

3.9 RELOCATION AND REHABILITATION PLANS

There exists no human settlement within a safe radius of the selected project site to be displaced owing to the commencement of the Proposed Project. No structure of any significance stands at the site to be relocated or dismantled. Land is already under undisputed ownership, and no fresh land is to be occupied; hence, no relocation and rehabilitation is required.

The proponent of the project aims that standard practices and procedures shall be followed for the restoration of areas disturbed during execution of developmental works.

The proponent has taken necessary measures for the restoration of the relevant areas which are distributed during the construction of infrastructure, like hiring the contractor for transfer of demolished waste and pavement of excavated land. The plants removed during construction phase will be replanted especially around the boundary walls of site and in the open spaces.

3.10 DESCRIPTION OF PROJECT

3.10.1 RAW MATERIALS

The major raw material for the plant is LPG which will be transported in tankers to the plant, maintaining safety standards.

3.10.2 FINAL PRODUCT

LPG Cylinders

3.10.3 CAPACITY

The project envisages at construction of storage and filling Plant which will have a filling capacity of 20+MT/Day. Storage capacity will be (2x50) MT.

3.10.4 PROCESS DESCRIPTION

LPG is transported from production installation to the storage and filling plant where LPG is stored in tanks and filled into cylinders for storage and distribution for various purposes. Transfer operation of LPG is very critical, as LPG is a highly inflammable product and the systems are required to be intrinsically safe. The systems also require very comprehensive fire safety arrangements.

3.10.4.1 Filling of Storage Tanks:

LPG tankers will arrive on site and enter through main gate of plant. Tanker will be attached to the bowser point and LPG will be transferred from Mobile tanker to storage tank of capacity 50 MT. Dyke wall of 2'-0" height will be provided with LPG tank. Storage tank will be mounted on RCC foundation. LPG Storage and Bottling plant will be designed as per NFPA-58 and OGRA 13(3) of LPG Production and Distribution Rules 2002. The filling Plant will be supplied with emergency and fire fighting equipments to be used in case of fire emergencies.

3.10.4.2 Transfer of LPG to Filling Plant:

LPG pump is used to transfer LPG from storage tank to transfer station via transfer pipes. Transfer pipes are provided with fire water lines in case of emergency fires.

3.10.4.3 Visual inspection/ Segregation of cylinders:

Before the LPG cylinders are filled, a pre-fill inspection of the cylinders will be undertaken to ensure that the cylinders are safe to fill. The cylinders that are found to be in good condition will be filled, sealed, weighed and taken back to the factory. Cylinders found unfit for filling on visual inspection e.g heavily rusted or heavily dented will be separated during visual inspection. Cylinders having twisted valve spindle, broken/bent foot protection ring would also be segregated.

3.10.4.5 Cylinder Filling:

Valve protection cap will be removed and cylinder is filled at filling Plant. The filling process will take place in the cylinder filling area. The plant's filling stock management system will be fully computerized. This will ensure that every single cylinder will be filled thoroughly and that instances such as over-filling, under-filling, and leakages do not occur.

3.10.4.6 Final Inspection:

Cylinders are visually inspected to examine their sound condition and presence of valve protection.

3.10.4.7 Storage and Delivery of filled Cylinders:

At this stage cylinders are ready for storage and delivery. If required, the fit cylinders can be directly sent to the trucks for loading or the cylinders are sent for stacking in the area earmarked for purpose.

3.11 Schedule of Tank:

Design Code	ASME SEC VIII. DIV 1
Capacity	100 MTons @90%
Shell thickness	20mm
Head thickness	12mm
Head corrosion allowance	2.61mm
Shell corrosion allowance	1.11mm
Inner diameter	3000mm
T/T length	7200mm
Design pressure	250psig
Hydro test pressure	325psig
Operating pressure	150psig
Material	ASTM 516 Gr.70

3.12 SUPPLIES

3.12.1 Water supply

The surplus water during the construction phase of the whole project will be estimated to meet any unforeseen situation. The water demand will be fulfilled from ground water. Water requirement for maintenance of green belts will be done on daily basis by ground water through pumps and pipes to avoid wastage of water. The water requirement for the construction phase will be 2000 gal/day while during operational phase water requirement will be 800 l/day.

3.12.2 Electricity

Source of power will be WAPDA and a diesel fired generator of 50KVa.

3.12.3 Manpower

A total of 8-10 employees including mechanical, electrical, operators, sweepers and other managerial and office staff shall be working at project site.

3.12.4 Fire fighting

The facility will have a comprehensive firefighting system covering all hazardous areas and the other areas of the facility. This ensures that any fire within the plant is quickly surpassed and extinguished. Firefighting and emergency catering facilities will include:

- Manual call point
- Emergency shutdown
- Fire Alarm hooter
- Fire Extinguishers (12kg)
- Trolley mounted fire extinguishers
- Fire monitor
- Fire hydrant

Size of fire water pipelines will be:

- 3" dia main fire water header
- 2" dia distribution fire water pipelines
- 2" dia secondary distribution pipelines

3.12.5 Health & Safety

For health and safety of workers, 4 first Aid Boxes will be available and workers will be provided with following PPEs

Sr. #	PPEs	Qty.
1	Gloves	10 Pairs
2	Shoes	10 Pairs
3	Mask	10 Pairs
4	Anti-fire suits	10 Suits

3.12.6 Gas Detection System

A gas detection system with adequate number of detector heads at different locations shall be provided for the LPG filling Plant. Gas detectors will be provided to detect any leakage. The system should give audible alarm when detecting LPG at a concentration 20% of the lower flammable limit and give direct signal to fire services Communication Centre when detecting LPG at a concentration 40% of the Lower flammable limit. Each detector head should be able to be isolated individually for the purpose of maintenance and testing.

3.13 SAFETY PLAN IN CASE OF LPG LEAKAGE

What are the risks associated with an LPG leak?

LPG contains gas, which, under pressure is highly flammable. There could be two main kinds of health hazards associated with a gas leak –

Hazard#1: Those occurring due to inhalation of the gas

If inhaled, it can displace air, deprive your lungs of oxygen and cause hypoxia leading to suffocation. The gas can also affect your brain and nervous system and cause euphoria (happy feeling), difficulty walking or speaking, dizziness, hallucinations, lack of coordination, nausea and loss of consciousness. Repeated exposure may cause mood swings, depression, seizures, brain hemorrhage and impaired memory. It may also damage your heart by causing irregular heart beat and high blood pressure. It may also reduce blood cells, damage lungs and cause liver and kidney inflammation.

Hazard#2: Those occurring due to explosion of the gas if there is a source of ignition

Explosion from LPG can result in serious burns and can cause multiple injuries and even, death. Blast shock waves can affect the ears, lungs and hollow organs of the gastrointestinal tract of a person is close proximity to the blast site. Apart from that, your lungs may be

damaged and bleed or swell up due to the impact. The explosion may also cause injury from fragments and other objects propelled in air. It also causes displacement of air that can throw victims, against solid objects and cause injury like bone fractures. There may also be hidden brain injury and potential neurological consequences. Even if not injured, some people may experience post-traumatic stress disorder due to the psychological trauma.

What you should do in case of a gas leak

The smallest spark or flame can ignite gas fumes and cause an explosion, so here are the steps you should take:

- When a gas leak is suspected, extinguish all flames, incense sticks, etc.
- Close the LPG regulator and put the safety cap on the cylinder.
- Don't light matches (or a lighter).
- Do not switch on/off any electrical switches or appliances.
- Open the doors and windows to ventilate building.
- Isolate main electrical supply from the outside.
- Alert the staff for use by alarms or siren
- Evacuate everyone from the affected area.

First Aid

- If inhaled, move the person to a place where he/she can breathe some fresh air. Let him/her rest in a position that is comfortable, and if necessary, you can administer artificial respiration.
- If there has been skin contact with the gas, immediately remove the contaminated clothing. Rinse the affected skin with plenty of water for more than 20 minutes and seek medical help.
- In case of eye contact rinse the eye and the eyelid immediately with plenty of water for more than 20 minutes. Remove contact lenses, if any. Continue rinsing and seek medical help.

The fire from a gas explosion can be extinguished with carbon dioxide (CO₂), dry chemical powder or water spray. Using a water jet and aiming water directly at point where gas is escaping from not recommended as the water may freeze. Also, all sources of ignition and flammable objects should be removed from the area. For the safety of people, they should be evacuated from the area as soon as possible.

Precautions

- Always store gas cylinders away from sunlight, heat, sparks and flame.
- Avoid contact with skin and eyes.
- Protect containers and the valves against physical damage.
- LP gas cylinders must be stored in an upright position. The pressure relief valve should be in the vapor space of the cylinder.

What are the general requirements?

- LPG must be stored in adequate location wherein vessels or cylinders are suitably positioned having regard to the relevant codes of practice
- LPG plant must be designed to appropriate standards and be properly installed and commissioned by competent persons
- Plant must be fitted with adequate safety and monitoring control devices and operated by competent persons
- Occupiers must notify the gas supplier of any structural or other changes which might affect the gas installation
- There must be a suitable programme of maintenance and testing by competent persons
- Plant must be identifiable and accessible for maintenance
- Records of maintenance and tests must be kept
- Precautions must be taken to prevent fire and explosion including appropriate protection of storage vessels
- Installations must have appropriate security measures to prevent deliberate interference
- Incidents involving death or hospitalization, fire or explosion or a significant release of LPG must be reported to the Authority and records of such incidents must be kept

3.14 Emissions and effluents

3.14.1 Wastewater

Effluent arising from domestic activities will be treated in septic tanks and then will be discharged to local drain. LPG storage and filling activities give rise to no waste effluent hence no waste water treatment system is required. Municipal wastewater will generate at rate of 600-650l/day.

3.14.2 Air emissions

No air emissions are expected during process. In case of leakage, broken down pipes, LPG could escape which will have certain impacts on workers. For this, Gas detectors will be provided. Further PPEs will also be provided to workers. Generator emissions will be controlled by proper enclosure, maintenance and tuning.

3.14.3 Noise

During operation, loading and unloading will be the cause of noise. Proper tuning of vehicles will mitigate this problem. Moreover, Tree Plantation along the boundary of Proposed Project and Plantation within the unit will further reduce noise, since plants and trees serve as noise absorbers. Construction activities noise will be temporary, and will be mitigated by measures as stated in Chapter-5&6.

3.14.4 SOLID WASTE

Solid waste will be municipal in nature and will be handled by solid waste management contractor as per practices of area. Solid waste will generate at rate of 0.4kg/c-d.

3.15 COST AND MAGNITUDE OF OPERATION

Total project cost is estimated to be PKR 20 Million. Cost breakup is given below:

PLANT COST	
Element	Cost (PKR)
Land	600000
Civil Works	1500000
Electrical Equipment	500000

Firefighting Equipments	1000000
Furniture Fixtures	100000
Storage Tank 5 MT	600000
UI Listed Explosion Proof, LPG Motors with Pump	1000000
	1000000
Pipelines with Pressure release valves	1000000
ROTO Gauges, Pressure Meters Etc.	200000
Gas Detectors	100000
Automatic Shut Down System with Alarm	100000
Construction & Engineering	100000
Other Misc. Assets	2000000
Total	20000000

Activities will include:

1. Applying for and getting all necessary approvals and contracts
2. Construction of boundary wall and other structures
3. Installation/construction of tanks and firefighting equipments
4. Maintenance of machinery and tanks

3.16 SCHEDULE OF IMPLEMENTATION

a. Phase-I (Start-up Phase)

Phase -1 is the start-up phase, which involves construction of boundary wall around the entire site. Most of the NOC's required have been taken and this report has been prepared to obtain NOC from EPA.

b. Phase-II (Main implementation Phase)

In phase II, required machinery will be purchased including LPG storage tanks, filling Points, cylinder filling area, transfer pump, fire pump for firefighting system, etc. during

This phase machinery will be brought on site and installed.

c. Phase-III (Wrap-up Phase)

Phase-III is the wrap-up phase. In this phase, all outstanding activities will be completed, required staff will be recruited, and contracts with suppliers and purchasers will also be signed after which the operational phase finally commenced.

3.16.1 Abandonment Plan:

After completion of life, building will be demolished according to regularity standards. The garbage produced and debris generated by destructing the civil structure will be disposed of at designated sites while metallic and concrete structure may be reused, replaced or sold in the market. Dust/particulate matter to be generated will be minimized by constant sprinkling of water. An environmental management plan will be put in operation for the safe disposal of waste matrix, debris generated and garbage produced after the destruction of assembled structure.

3.17 Vegetation features

Mostly the land is barren so the project will not cause any major adverse impacts on the surrounding. Land selected for the proposed project is barren only some grasses & shrubs are present in scattered quantity. Fertile land is rare in the study area.

CHAPTER 4: DESCRIPTION OF THE ENVIRONMENT

4.1 General

This section describes the existing environmental conditions around the project area. The existing environment around the proposed project site has been studied with respect to Physical, Biological/Ecological and Socio-Economic resources.

4.2 Study Parameters

The existing information to establish a database for the EIA of the project was collected from different government departments; review of previous studies and through the site visits carried out in the project area.

The Social Assessment of the project area was conducted through consultation with the community by interviewing them. Assessment of the area has been carried out distinguishing it into:

4.2.1 Study Area

An area about half a kilometer radius around the project has been considered as influence zone and hence it has been taken as Study Area (SA) to collect the primary data related to physical, ecological and socio-economic environment.

4.2.2 Project Area

The boundary of that specific area where the project has been established is taken as Project Area.

4.3 Physical Environment

The physical environment of the area is described with respect the air shed, watershed, geology, soil characteristics and seismicity. The air shed describe the climatic conditions and quality of air in the microenvironment and macro environment and characterized it in term of level of pollution, viz. watershed describe the hydrology and quality of surface and groundwater as well as water availability. The terrestrial environment is described by its geology, geomorphology, and soil characteristics in term of stability and seismicity.

4.3.1 Topography and Geography

The study area has generally gentle and steep slopes. The study area is situated at an average elevation of 682 meters above mean sea level.

4.3.2 Geology and Soils

The geology of the project area is composed of consists of limestone, shale, sandstone and clay-stone. The soils of study area are mostly gravely and sandy.

4.3.2 Seismicity of the Project Area

According to Building Code of Pakistan, study area has been placed in Zone 3. Therefore, location lies in Moderate Damage Risk Zone in on account of seismic sensitivity.

4.3.3 Climate

The climate here is mild, and generally warm and temperate. The summers here have a good deal of rainfall, while the winters have very little. The average annual temperature in Kotli is 21.9 °C. The average annual rainfall is 976 mm.

a. Temperature and Precipitation

At an average temperature of 31.8 °C, June is the hottest month of the year. January is the coldest month, with temperatures averaging 10.6 °C. Between the driest and wettest months, the difference in precipitation is 182 mm. Throughout the year, temperatures vary by 21.2 °C.

Precipitation is the lowest in November, with an average of 19 mm. Most of the precipitation here falls in July, averaging 201 mm.

Average, minimum, maximum temperatures and precipitation for study area are given in following Table 4.1¹:

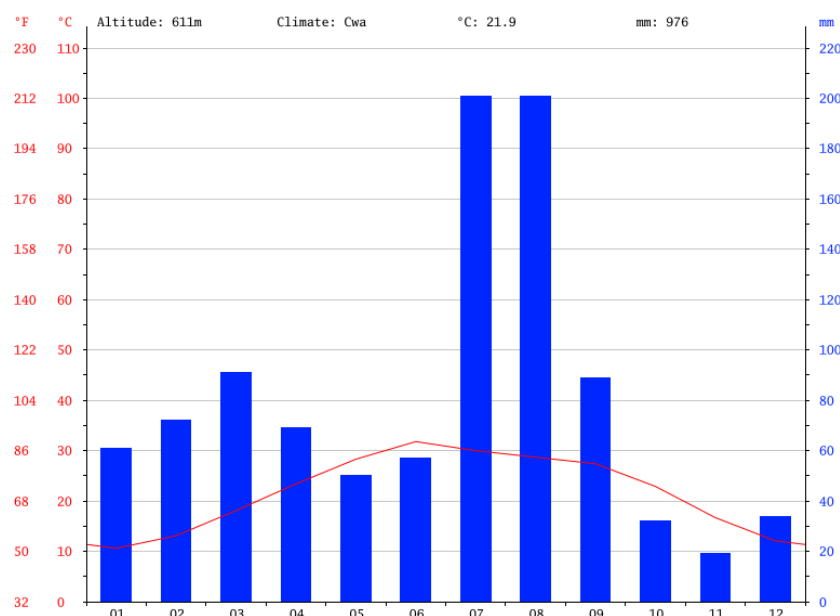
Table 4.1: Temperature and Precipitation

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
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¹ Cited on December 16, 2019 Available on: <https://en.climate-data.org/asia/pakistan/azad-kashmir/kotli-768493/>

Avg. Temp(°C)	10.6	13.1	18.1	23.4	28.3	31.8	30	28.7	27.4	22.9	16.7	12.1
Min. Temp(°C)	4.5	6.8	11.6	16.4	21	24.8	24.9	24	21.4	15.2	8.6	4.9
Max. Temp(°C)	16.7	19.5	24.6	30.4	35.6	38.8	35.2	33.4	33.5	30.7	24.8	19.3
Prec. (mm)	61	72	91	69	50	57	201	201	89	32	19	34

The trends of average minimum and maximum temperature are shown below (Graph 4.1).



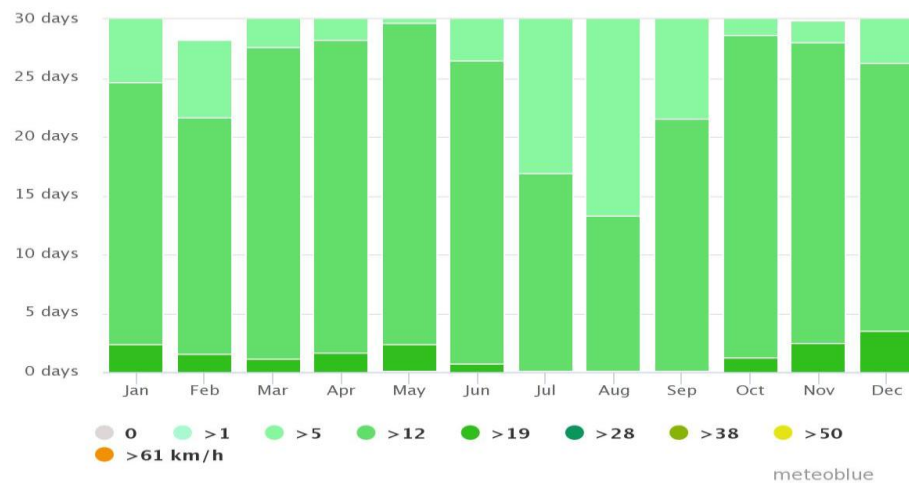
Graph 4.1: Maximum and Minimum Temperature

b. Wind Speed

Wind speed of Study Area varies throughout the year. The graphical representation of maximum, average and minimum wind speed for each month is shown below (Graph 4.3²).

² Cited on December 16, 2019 Available on:

https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/kotli_pakistan_1173055

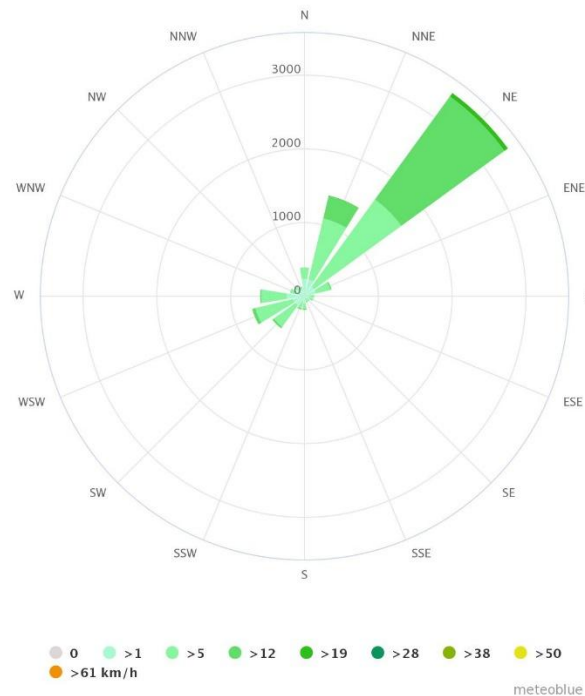


Graph 4.3: Wind Speed

c. Wind Direction

Wind direction of any area shows that from which direction the wind is blowing. For this purpose wind rose diagram is formulated which shows that for how many hours the direction of wind blow from specific direction i.e. from SW to NE etc. the prominent wind direction of district is NS. Wind rose of study area is shown below (Graph 4.4³).

³Cited on December 16, 2019 Available on:
https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/kotli_pakistan_1173055

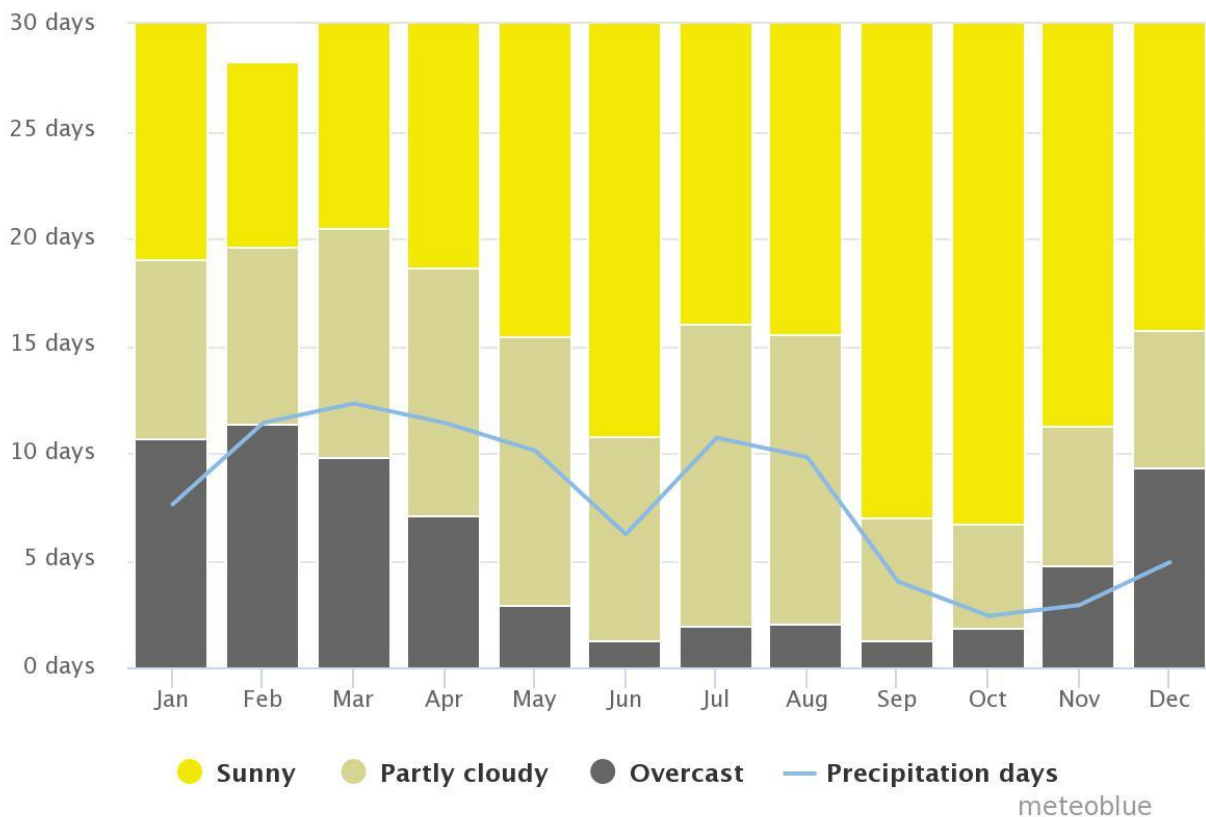


Graph 4.4: Wind Rose Diagram

d. Sunshine

Sunshine of any area shows that how many days are sunny in a month. The sunshine patterns for a specific area vary accordingly. For each month, the number of sunny and cloudy days for study area is shown below (Graph 4.5⁴):

⁴Cited on December 16, 2019 Available on:
https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/kotli_pakistan_1173055



Graph 4.5: Sunshine Patterns

The graph shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast.

4.3.5 Ambient Air Quality

The monitoring of air has been conducted to analyze the ambient air quality of the project area. Equipment used for monitoring was Haz Scanner HIM 6000 Air Quality Monitoring Station. The results of monitoring shows that the major air pollutants i.e. carbon monoxide, sulphur dioxide, nitrogen dioxide and particulate matter are within PEQS.

4.3.6 Noise Level

Noise level was also measured on project site, the noise level recorded at project site was 53 dB which is within PEQS.

4.3.7 Water Quality

Ground water quality testing was carried out to determine its suitability for use. Testing data shows that ground water is suitable for drinking. The results of ground water analysis shows, almost all the parameters are within safe limits of PEQS.

4.4 Ecological Environment

The ecological environment of an area is generally considered sensitive to large-scale developments. Disturbances and imbalances in the ecological environment can adversely affect biodiversity features of an area. The biodiversity of an area generally reflects the abundance and richness of the biological and the ecological resources.

4.4.1 Flora

a. Forest and Trees

As there is no significant flora present site project site. While the study area is rich in variety of its flora The detail of the trees is given below in Table 4.2.

Table 4.2: Common Trees & Plants of Study Area

Sr.#	Scientific Name	Local Name
1	Olia Europeaa	Kao
2	Acacia Modesta	Phulai
3	Deodonia Viscose	Sanatha
4	Dalbergia Sissoo	Sheesham
5	Carissa Spinarium	Granda
6	Pinus Logifolia	Cheel
7	Bombax Cieba	Simal

b. Grasses

The names of common grasses that are found in study area are given in Table 4.3

Table 4.3: Common Grasses of Study Area

Sr.#	Scientific Name	Common Name
1	Desmostachya bipinnata	Dab
2	Bothriochloa Perfuse	Palwar
3	Eualiopsis binata	Bhablar
4	Sachharum bengalensis	Saroot

c. Shrubs and Herbs

The shrubs and herbs provide nutritious supplemental feed to livestock during lean period because they are perennial and have depth root systems. Some of the common shrubs and herbs present in study and project area are Karer, Jand, Aak, Kana and Lana; Botanical names of which are shown below in Table 4.4:

Table 4.4: Major Shrubs and Herbs of Study Area

Sr. No.	Local Name	Botanical Name
1	Karer	Capparis Decidua
2	Jand	Prosopis Cineraria
3	Aak	Calotropis Procer
4	Kana	Sueda Fruiticosa
5	Lana	Saccharum Munja

d. Endangered Floral Species

No such plant species is encountered at study area that is endangered or declared protected under national, provincial or local government definitions as well as international agreements/protocols ratified by Government of Pakistan.

4.4.2 Fauna

The study on terrestrial fauna in the study area is based upon the field investigation and reports of Forest Department. A variety of animals found in study area which are categorized as Mammals, Birds, Reptiles and Amphibians.

a. Mammals

Some of the common Mammals found in study area are leopard, monkey, sheep and deer. Following table gives the Common and Zoological names of Mammals:

Table 4.5: Mammals present in Study Area

Sr. No.	Common Name	Zoological Name
1	Leopard	Panthera pardus
2	Deer	Cervidae
3	Monkey	Rhesus macaque
4.	Sheep	Ovis aries

b. Birds

Native species of birds present in study area are pigeon, sparrow, crow, golden orioles, woodpeckers and black partridges. Common and Zoological names of birds are given in Table 4.6:

Table 4.6: Major Birds present in Study Area

Sr. No.	Common Name	Zoological Name
1	Pigeon	Columbidae
2	Sparrow	Passeridae
3	Crow	Corvus
4	Golden orioles	Oriolus oriolus
5	Woodpeckers	Picidae
6	Black partridges	Melanoperdix niger

c. Reptiles and Amphibians

The native species of reptiles and amphibians observed in Study Area are Snake, Lizard and Frog.

Table 4.7: Reptiles and Amphibians of Study Area

Sr. No.	Common Name	Zoological Name
1	Snake	Serpentes

2	Lizard	Lacertilia
3	Frog	Anura

d. Endangered Faunal Species

The endangered species present in study area is Barking deer which has been declared protected under national, provincial or local government definitions as well as international agreements/protocols ratified by Government of Pakistan.

4.5 Socio-Economic Environment

This section provides an overview of the baseline information relating to the socio-economic environment of the study area. The information collected from the respondents comprised their occupation, civic facilities, educational and health facilities, agricultural status including livestock population.

4.5.1 Demographic Profile

According to the 2017 population census the district has a population of 5,405,633. From 1998 to 2017, the population grew with an estimated average annual growth rate of 1.84 %. Population Statistics of district Lahore is given below in Table 4.8⁵:

Table 4.8: Population Statistics of District

District/Tehsil	Population	
	2017	1998
Rawalpindi Tehsil	3,258,547	1,927,612
Gujar Khan Tehsil	678,503	494,010
Kahuta Tehsil	220,576	155,080
Taxila Tehsil	677,951	371,140
Murree Tehsil	233,471	176,426
Kotli Sattian Tehsil	119,312	81,523
Kallar Sayyedan Tehsil	217,273	158,120

⁵ Cited on December 16, 2019; Available on Pakistan Bureau of Statistics

4.5.2 Infrastructure

There is a network of metalled and unmetalled road in the study area. Project area can be accessed through road Lehtrat-Kotli Sattian Road. Most of the families live there in houses made up of cement and bricks.

4.5.3 Education

There are number of government and private schools, colleges and universities are being functional in the study area which are imparting education to the locals.

4.5.4 Health

The health facilities including various health care centers, hospitals, dispensaries, basic health units, dental clinics and city medical centers are present in the study area.

4.5.5 Civic Facilities

PTCL telephone exchanges are being operating in the study area. Cellular phone service and Electricity is available in the study area. Natural gas is also available in study area.

4.5.6 Language

In study area most people speak Punjabi including Pothohari, Majhi, Pahari, shahpuri, Dhani and Kashmiri. Although Urdu is also the mother tongue of few people but Urdu being a national language is spoken and understood

4.5.7 Common Diseases

In this area, common diseases are Buri-Zahmat Wah, Mokhur, Pharoon, Dhakh, Chang-Pilchi-Tah-Titli, Pa-Un, Ghoto, Tainki and Taku.

4.5.8 Quality of Life Values

People of the area have non-nomadic life style and are living here from times of their ancestors. In the project area the main sources of income are trade and industries. The overall literacy rate of study area is 68.4% and it has been observed by available data. People of the study area get facilitated by necessary facilities of fresh drinking water, education, hospitalization, transportation, telecommunication, electricity and cooking gas as well.

CHAPTER5: POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1 GENERAL

Assessment of impacts depends on the nature and magnitude of the activity being undertaken, as well as the type of environmental control measures that are envisaged as part of the project proposal. The potential impacts from the project area are identified and assessed based on the type and scale of the various activities associated with this project.

Several aspects and potential impacts were identified for each phase (Project Location, Construction and Operation) of the development, with impacts evaluated in terms of their nature, occurrence, possibility and severity potential.

5.2 SCREENING OF POTENTIAL IMPACTS

Several impacts are likely as a result of the construction and operation of the project. Such impacts may be direct, indirect or ultimate. For the purposes of this EIA, these potential impacts (whether direct, indirect or ultimate), are assessed based on their magnitude (short-term or long-term) and effect (positive or negative). Impacts are also classified in three groups: impacts due to project location, impacts as a result of project construction and impacts as a result of project operation.

All the potentially significant environmental impacts from the project are grouped below:

Air Environment

- Impact on ambient air quality

Noise Environment

- Impact on ambient noise

Water Environment

- Impacts on surface and ground water quality

Land Environment

- Impacts on land use

Ecological Impacts

- Impacts on trees/vegetation
- Impacts on forests and wildlife

Socio-Economic Impacts

- Impacts on other infrastructure
- Impacts on employment
- Impacts on public health and safety
- Impacts on cultural resources
- Impacts on aesthetics

5.3 IMPACTS DUE TO PROJECT LOCATION

Proposed project will have both socio-economic and environmental implications as discussed in the sub-sections below.

5.3.1 Relocation of People

Currently, there are no infringements on the project site that may be affected therefore relocation exercises are not required.

5.3.2 Loss of Vegetation

Considering the scale of the project and commonly found flora and fauna within the project influence area, no significant adverse effects are envisaged on the ecology of the area.

5.3.3 Shifting of Utilities

There will not be any shifting of existing utilities such as water supply pipelines, sewers, electrical lines, etc. due to the proposed project.

5.3.4 Impact on Archaeological/Cultural Property

Within the project influence area there are no significant archaeological properties, hence no impact in this area is anticipated.

5.4 IMPACTS DUE TO PROJECT DESIGN

Design of the proposed project can have impacts on the environment if it is not prepared accordingly. It is necessary to consider a sustainable project approach. Sustainability is an important issue to consider in design, not only due to environmental concerns but also due to economic and social matters, promoting architectural quality and economic advantages.

5.5 DESIGN PHASE

At the design phase, no considerable impact would occur on land, soil, topography, ground water, and on people of the area. However, in pre-construction phase a management system should be provided at design level so impacts can be reduced. Design of the building would adhere to all standard technical requirements in order to avoid adverse impacts on environment and human health. All tanks and piping will be done as per standards.

- Storage tanks and fittings are designed as per ASME SEC-VIII. DIV I/NFPA 58.
- All LPG lines are MS/Sch.40/seamless.
- All fire lines are MS/Sch.40.
- Water lines fittings are class 300.
- Plant design is as per MIG Rules 2010.
- Fire fighting equipment as per MIG Rules 2010
- LPG lines are hydro tested at 525PSIG
- Fire water lines are hydro test at 225 PSIG
- LPG Tanks design pressure is 250psi
- LPG piping test pressure is 375psi.

The complete design of said project is made as per requirements of OGRA and they have granted NOC to say company so there will be no such impacts due to design of project. Complete details of tanks are given on map.

5.6 Impacts during Construction Phase

Environmental Aspects	Impacts and Mitigation Measures	
	Impacts	Mitigation Measures
Economy Improvement	• During construction Phase, through the use of locally available materials including cement, building blocks, metals, concrete, ceramic tiles, timber, sand, electrical cables etc, the project will continue towards the growth of	• No mitigation measures required.

	economy by contributing to the gross domestic product.	
Employment Opportunities	With the implementation of the project, there will be employment opportunities for casual workers from the local community. The exact number of workers to be hired will depend on the magnitude of construction activities during construction.	No mitigation measures required.
Air Quality	- During construction phase particulate matter will be the main pollutant which will be generated during the site development activities such as leveling of land, filling activities, transportation of construction material to the project site from various places. - Due to increased vehicular movement increase in NO_x and CO concentrations will be observed at the project site. However, the pollution levels in the ambient air will be negligible and also it is a temporary phenomenon. As most of the construction equipment will be mobile, the emissions are likely to be fugitive and not concentrated on a single source or place. As the impacts will be localized in nature, the areas outside the proposed project boundary are not likely	- Dust emission will be minimized through strict enforcement of onsite speed controls as well as limiting unnecessary traffic within the project site. - The traffic routes on site will be sprinkled with water regularly to reduce the amount of dust generated by construction vehicles. - Construction machinery will be kept away from walkways and at safe places where the chances of human interventions are relatively less.

	to face any significant adverse impacts with respect to ambient air quality.	- Construction machinery will be properly tuned, serviced and monitored on regularly basis. - All vehicles, construction machinery etc will be maintained in good working condition in order to minimize pollutant emissions.
Water Quality	- During construction phase, water will be required only for construction of structures, sprinkling on roads for dust suppression, domestic uses of the construction workers, that too only during day time. - Water will be used mainly for concrete mixing, sanitary and washing purposes. - No high water consuming activity is likely to occur during construction so the water usage during development of proposed project would not reduce the water availability for other activities within the area.	Workers will be trained for water conservation and reuse of water where possible.
Relocation of Utilities	The construction of the project will not relocate the existing public utilities.	No mitigation measures required.
Poverty Alleviation	Construction of the proposed project will generate the employment	No mitigation measures required.

	opportunities. This will be a temporary minor positive impact.	
Solid Waste Generation	During excavation of the site for foundation works and landscaping, solid waste will be generated. The waste will consist of metal cuttings, rejected materials, surplus materials, excavated soil, paper bags, empty cartons, and empty cement bags among other types of wastes.	- Waste generated during construction will be recyclable and will be reused during construction. The left over construction materials at the end of construction will be used in other projects rather than being disposed-off (if required). - Recyclable material will be separated at source which will then be handed over to the waste contractor. - Waste bins will be placed at the construction site for waste materials including plastic, paper, and wood. - The cement bags and other such items will be handed over to contractor.

Noise Pollution	During construction phase, the major sources of noise will be due to operation of construction equipment such as concrete mixers, generators, cranes, pumps, compressors, vibrators etc. The operation of such equipment will generate noise ranging between 70-85 dB. Due to moderate levels of construction activities, the anticipated noise generation during construction phase will be mostly confined to the facility itself and not anticipated to have significant adverse impacts on the surrounding ambient noise levels.	- Unnecessary blowing of horns will be strictly prohibited. - In order to safeguard the construction workers working at noise generating sources, these personnel will be provided with proper personal protective equipment such as earplugs, earmuffs etc. Hence, no significant impact is envisaged due to the operation of the noise generating equipment at the project site, if suitable mitigation measures are adopted. - In order to have less impact on noise levels in the air, the major works will be carried out during day time as far as possible. - Equipment noise will be reduced at source by proper maintenance and repair of construction
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		machinery and equipment
Ecology	The proposed project site is devoid of forest or thick vegetation. Only wild grasses or small bushes which have grown due to non-cultivation of the area will be removed during levelling operations. Hence, there will not be any major impact on the terrestrial ecology of the project site due to construction activities.	- After completion of the construction work, the damaged area due to construction works will be restored. - After the project completion, plants and trees will be planted on the proposed site that will in turn enhance the aesthetic value.
Workers Health, Safety and Environment	The construction activities may pose negative impacts on the health and safety of workers	- The contractor will ensure that the workers and labors are trained in safety procedures for all relevant aspects of construction. - Workers will be provided with proper safety equipment such as helmets, goggles, masks where required. - Formal emergency procedures will be developed. First Aid Kit will be kept available at the site along with list of

		emergency phones to be contacted in case of any emergency. • Warning signs will be displayed in local language where required.
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5.7 IMPACTS DURING OPERATIONAL PHASE

5.7.1 Land and Soil

After the end of the construction phase the area will be restored back to its original state; different ornamental plants and native tree species will be planted. This will improve the overall ecology, aesthetic and landscape of the area whereas; the un-paved roads will be converted to metalled roads. This will have positive and significant impact on the land and soil condition of the area.

Nature of Impact

This impact is considered to be positive, long-term and significant.

5.7.2 Solid Waste Management

Solid waste generated from proposed project will be domestic in nature. Solid waste will be organic in nature and it may produce vector which could transfer diseases to humans and can be the cause of public nuisance.

Nature of Impact

The nature of impact will be direct, medium, long-term and significant.

Mitigation

Following mitigations should be adopted to reduce the issues related to the solid waste:

- Bins will be provided to collect solid waste; these bins will be emptied by sanitary staff. End disposal and solid waste management will be done as per area practices.
- Solid waste should be stored in the covered bins in order to avoid the growth of vectors and rodents as well as to control the odour and to reduce public nuisance
- Solid waste should be collected and transported to the waste disposal site on daily basis

5.7.3 Wastewater

There will not be any industrial activity so no wastewater will be generated, domestic wastewater will be treated by passing through septic tanks and then discharged in municipality drain.

5.7.4 Air pollution

Project only involves storage and filling of cylinders, not any industrial activity so there will be no emissions. Only dust will be generated during floor cleaning that will be controlled by water sprinkling. In case of leakage, broken down pipes, LPG could escape which will have certain impacts on workers. For this, Gas detectors will be provided. Further PPEs will also be provided to workers to cater this situation and ensure safety and health.

Generators will be provided with proper enclosure; proper maintenance and tuning of generator will be ensured to mitigate air emissions due to generator.

5.7.5 Noise and Vibration

Project only involves storage and filling of cylinders, not any industrial activity so there will be no noise generation. Noise will only be generated during transportation, for this only those vehicles will be used that are properly tuned and maintained and are equipped with silencers. Also excessive use of horns will be avoided. Further tree plantation will be done as it acts as noise absorbers.

5.7.6 Traffic management

Proper parking area is provided for traffic management. Traffic management plan will be as follows:

	Traffic Management Plan	
<i>Management Plan</i>	• Heavy vehicles shall only be to enter and leave the site during day hours. • Speed limit will be ensured • LPG Filling will be on proper places within project boundary • Cars will be parked on proper parking area.	
<i>Monitoring</i>	Responsible	Monitoring Duration
	Environmental manager	Weekly basis

5.7.7 Emergency Response

Incidents and accidents may take place unexpectedly during project operations no matter how effective, strong and efficient the mitigation measures for all adverse impacts; especially the safety issues may be adopted. These may include;

- Fire hazard

FIRE HAZARD

During operational phase of the project, fire hazard poses a serious threat. Fire fighting equipment details are mentioned on map.

Mitigation

- Fire extinguishers should be properly maintained and checked periodically.
- Adequate fire hydrant system should be installed.
- Flammable materials should be prohibited in the premises.
- Fire alarm systems should be maintained for detection and warning of fire.
- Pressure gauges should be checked monthly.
- Adequate training of workers on use of fire fighting system to deal with the situation.
- Administration of the unit will make a proper evacuation plans for emergency escape from all halls.
- Emergency call service must be made available.
- Fire fighting team must remain ready at all times.

5.7.8 Safety Concerns

Operation of the project may cause some concerns for safety, public health and nuisances within the project area.

Mitigation:

- Personal Protection Equipment (PPEs) such as ear plugs, safety Helmets, Gloves, Goggles and Masks will be provided to the employees to ensure their safety at work place.
- Workers' awareness and safety wall chart showing safety symbols and other necessary information will be displayed at various places.

- First Aid Box will be kept in every department which will be within the approach in case of any injury or mishap.
- To avoid any chance of fire, a comprehensive fire fighting system will be developed that includes all types of fire Extinguishers, fire hydrants, sand Buckets and fire fighting Vehicles.
- Basic medical and safety training will be held from time to time to minimize the risk of health and safety issues which can result from ignorance (ergonomic hazards in particular) in the project premises.

5.8 Potential Environmental Enhancement Measures

Following are the positive impacts of the Proposed Project that will enhance the overall socio-economic and ecological condition of the Project Area.

5.8.1 Employment/Poverty Alleviation

The employment opportunities in the Project Area will be increased due to the development and operation of the proposed project. During construction and operation of the proposed project unskilled workers will be required as labours, sanitary workers and sweepers as well as for the skilled workers such as; accounts and managers to run the administration office. In totality, the overall economic conditions of the area will be improved.

5.8.2 Increased Business Opportunities

For construction of the proposed building a number of raw-material will be required. Many vendors can supply the required stuff on daily and weekly basis. This will serve as a new business opportunity and it will enhance the socio-economic status of the people direct linked with it.

5.8.3 Tree Plantation

The tree plantation will be carried out along the boundary of the Project Site, and open green spaces as the part of the proposed Project. This will include plantation of ornamental as well as indigenous species of the plants. The plantation will improve the overall ecological conditions of the area. Trees height will be between 3-7 ft. Total number of plants and trees will be approximately 50. Spacing between plants to plant will be 6-8m.

Chapter 6: ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

6.0 GENERAL

This part of the study discusses the Environmental Management Plan and describes institutional arrangements required for its effective implementation. An Environmental Management Plan renders a delivery mechanism to reduce adverse environmental impacts of a project during its execution, enhance project benefits, and introduce standards of good practices to be adopted for all project works.

6.1 PURPOSE OF ENVIRONMENTAL MITIGATION

For the project to be running successfully and compliance with environmental regulations mitigation of impacts caused by the project is required. The purpose of the need of mitigation can be answered by various questions as follows:

1. What is the problem?

When the resources of environment are being used ruthlessly, it results in degradation of the environment to the extent that environment loses its resilience and the carrying capacity reduces the resources are found reduced and the recovery process is too slow or nearly no recovery is possible.

2. When will the problem occur and when should it be addressed?

The problems that would occur fall within the project premises, and near the boundaries of the project location. The impacts would range up to the distance where project related activities are performed or up to the geographical zone where the effects spread.

Impacts would show their presence soon after the project development starts.

3. Where the problem should be addressed?

The problems should be addressed where they are originated. That is at the project location.

4. How the problem should be addressed?

Problems can be addressed by using environmental friendly practices. Such practices can be followed by following mitigation plan.

Table 2: EMP for construction phase

Sr. No.	Environmental aspects	Environmental Impacts of the Activity	Proposed mitigation measures	Responsibility
CONSTRUCTION PHASE				
1	Noise		In order to avoid the nuisance of noise the project maintenance manager shall ensure the all vehicles, equipment, machineries used during construction phase are in good working condition. The working hours of the project construction activities shall be limited to day time only i.e. 08 in the morning till 05 in the evening. Generators, if used during construction phase, shall be kept under canopy to avoid generation of unwanted noise.	Project Manager
2	Water Pollution	Unplanned wastewater disposal may contaminate the surface water channels, surface soil and depending upon the quantity of wastewater generated, it has a potential to	Wastewater generation during construction phase shall be reused again for material making for construction phase and sprinkling of dust on soil. Domestic wastewater will not be there at the site because at site workers will use local/public washrooms	Project Manager

		contaminate the ground water aquifers.		
3	Air Emissions	Generation of dust and particulate matters is an issue that could arise due to construction activities. Gaseous emissions including SO_x, NO_x, CO₂, lead and CO during construction phase. These gases are ozone depleting reagents. Besides, they also pose threat to human health.	The construction materials e.g. soil, clay would be covered appropriately. Instead of open and dry dumping, sprinkling of water in a quantity that reduces the chances of dust generation would be done. The workers would be provided safety gloves, masks and ear buds and wherever necessary goggles to avoid health complications. Good quality fuel shall be used in the machineries, generators to avoid emission. Vehicles, machineries with good conditions which fall on the quality standards shall be used to control the exhaust emission.	Project Manager
4	Solid Waste	Unplanned dumping of solid waste generation during construction phase can lead to blockage of roads, waterways and also create unaesthetic sight of the proposed location.	Solid waste generated during construction phase shall be reused in construction activities rather than dumping. The solid waste during construction phase will consist most of soil, packaging materials, plastic bags, iron rods, and food leftovers. The organic	Project Manager

			portion of solid waste shall be collected by local sanitary workers while other material will be reused in the construction activities.	
5	Health & safety	Unskilled workers may create issues in attaining the overall health environment and safety policy.	Regular onsite and offsite training of the workers shall be conducted. Impromptu meetings and discussions with the site in-charge and daily wages workers will be done to resolve any issues that may create health safety and environmental problems during construction phase.	Project Manager
6	Emergency Response	Accidents and/or emergency breakdown of the equipment/machineries/ vehicles involved may create environmental, health and safety hazards.	This situation can be avoided by regular maintenance of the vehicles for quality assurance. Each equipment will be checked prior to operation to avoid accidents and human health danger due to such accidents.	Project Manager

Table 3: EMP for Operation Phase

Sr. No.	Environmental aspects	Environmental Impacts of the Activity	Proposed mitigation measures	Responsibility
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OPERATIONAL PHASE

1	Noise	In the project of storage, during loading and unloading noise may be generated.	_ Workers should be told and encouraged to use PPE's (ear plugs or ear muffs).	Project Manager
2	Water Pollution	At the project site, there will be no wastewater generation during operational activity; there will be only domestic wastewater.	- There will be no industrial activity so no wastewater will be generated only the domesticated waste water which will be treated by passing through septic tanks and finally discharged in local drain _ Efforts should be made to ensure that water is conserved and that environment-friendly techniques are adopted too.	Project Manager
3	Air Emissions	Source of air pollution during operation phase would only be dust generated	_ Proper ventilation can limit the amount of indoor pollutants. _ Water spraying should be practiced where required. _ Regular monitoring _ No waste should be burnt at the premises. _ Gas detectors will be installed for LPG leakage detection	Project Manager

			_Generators will be properly tuned and maintained and proper enclosure will be provided.	
4	Solid Waste	Solid waste comprise of a domestic waste and waste scrap mainly which would be sold to their respective dealers.	_ No waste should be burnt within the premises _ Small waste storage bins should be installed.	Project Manager
5	Health & safety	Operation of the project may cause some concerns for safety, public health and nuisances within the project area.	_ Providing Personal Protection Equipments (PPEs) such as gloves, masks to the workers. _ Basic medical training should be provided to the specified work staff and basic medical service and supplies to workers.	Project Manager
6	Emergency Response	Fire hazard	_ Fire extinguishers should be properly maintained and checked periodically. _ Prohibiting flammable materials in the premises. _ Maintaining fire alarm systems for detection and warning of fire. _ Adequate training of workers on use of firefighting system to deal with the situation. _ Gas leakage will be controlled by providing gas detection system	Project Manager

			– Safety plan in case of gas leakage will be followed (given in chapter 2)	
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6.2 ENVIRONMENTAL MONITORING PLAN

Environmental monitoring is a vital component of the Environmental Management Plan. It is the mechanism through which the effectiveness of the environmental management Plan in protecting the environment is measured. The feedback provided by the environmental monitoring is instrumental in identifying any problem or lapse in the system under implementation and planning corrective actions.

Table 4: Environmental Monitoring Plan for construction phase

Components	Objective of Monitoring	Parameter to be Monitored	Measurement	Frequency	Location	Responsibility
Noise Levels	To determine the effectiveness of the noise abatement measures on the sound level	Noise level on the site and adjacent area on dB(A) scale	Noise level reading will be taken	Twice during construction	At least two locations on the unit boundary	Environment Officer /manager
Waste Collection, Storage and Disposal	To check the availability of Waste Management System and Implementation	Inspection of Waste Generation, collection, Storage and Disposal at site	Visual inspection	Once daily	Construction site	Environmental officer/manager

The

monitoring of the EMP and the communication and documentation mechanism that will be employed during the operational phase will



be

Soil contamination	To determine the effectiveness of the control measures taken to minimize the spillage of oil and chemicals	Inspection of equipment and vehicles	Visual inspection and availability checks	monthly inspection	all vehicles and equipments in use at construction site	Contractor/Environmental officer
Workers safety	To check and evaluate the effectiveness of the workers' safety plan	Injuries and accidents	Recording injuries	daily	Onsite	HSE officer/contractor
Water conservation	To determine the effectiveness of the Water Conservation Techniques in Practice	leakages, spills and wastages	Visual inspection and record tracking	On monthly basis	at all points of use	Environmental officer/manager

based on the Environmental Management System (EMS) of the project proponents and the certification and legal bindings. The management system of the project proponents will be the same as the certified EMS in place at the company. Approximately 20,000 PKR budget will be reserved for the Environmental Monitoring and measures.



Table 5: Environmental Monitoring Plan for Operation Phase

Components	Objective of Monitoring	Parameter to be Monitored	Measurement	Frequency	Location	Responsibility
Noise level (dB)	To check whether the existing noise control measures are able to bring the sound level within prescribed limits	Noise level near the receptor	Noise Measurement	Annually	At least two locations on the plant boundary	Environment officer
Waste disposal, procedure for waste collection, storage, and disposal	To check the availability of waste management system and implementation	Inspection of waste generation, collection, storage, and disposal will be undertaken at each site of the project activity	Visual inspection	Once daily	Entire unit	Administration Officer

Safety	To check and evaluate the effectiveness of the workers' safety plan and availability and access of first aid facilities	Injuries	Injuries will be recorded	Daily	Entire unit	Administrator
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6.3 INSTITUTIONAL CAPACITY OF THE UNIT

The organizational structure for the Environment Management Plan is outlined below:

6.3.1 PRIMARY RESPONSIBILITIES

The primary responsibility for implementing EMP within the company lies with the owner of project

6.3.2 OPERATION MANAGEMENT & CONTROL

Conducting the operational activities in environmentally sound manner will be the responsibility of the concerned Manager; for which he will be trained.

6.3.3 SUPERVISION & MONITORING

Senior Supervisor will be responsible for all environmental issues and for the implementation of EMP.

6.3.4 COMMUNICATIONS AND DOCUMENTATION

An effective mechanism to store and communicate environmental information during the project is an essential requirement of an EMP.

6.3.4.1 MEETINGS

Two kinds of environmental meetings will take place during the project:

- Kick-off meetings
- Weekly meetings

The purpose of the kick-off meeting will be to present the EMP to project staff and discuss its implementation and to discuss any event of environmental significance that has happened in the under-discussion industry or a similar industrial unit to investigate its root causes and develop its solutions.

The purpose of the weekly meetings will be to discuss the conduct of the operation and environmental issues and their management. The proceedings of the meeting will be recorded in the form of a weekly environmental report.

6.3.4.2 CHANGES-RECORD REGISTER

A change-record register will be maintained at the site, in order to document any changes in project design. These changes will be handled through the change management mechanism.

6.4 ENVIRONMENTAL TRAINING

Training is an integral part of a preventive strategy. Environmental and disaster management training will be required to ensure proper implementation of effective environmental management and monitoring plan; and disaster management plan. However, training could be organized by Owner involving relevant staff. As a trainer, competent Consultant can be outsourced. Important training under the spectrum needs to include:

- Training on fire fighting and safety management;
- Training on environmental safeguards and compliance;
- Staff training on environmental monitoring and reporting;
- Training on occupational health and safety measure.

6.5 SUMMARY OF IMPACTS AND THEIR MITIGATION MEASURES

Environmental monitoring is a vital component of the Environmental Management Plan. It is the mechanism through which the effectiveness of the Environmental Management Plan in protecting the environment is measured. The feedback provided by the environmental monitoring is instrumental in identifying any problem or lapse in the system under implementation and planning corrective actions. The main objectives of the environmental monitoring are:

- To provide a mechanism to determine whether the project construction contractors are carrying out the project in conformity with the EMP.
- To identify areas where the impacts of the project are exceeding the criteria of significance and, therefore, require corrective actions.
- To document the actual project impacts on physical, biological, and socio-economic receptors, quantitatively where possible, in order to design better and more effective mitigation measures.

6.6 EQUIPMENT MAINTENANCE DETAILS

Complete inspection and maintenance of tanks, vents and all other auxiliaries will be done by 3rd party as and when required. Maintenance plan for fire fighting equipment is as follows:

Task	Weekly	Monthly	Semi-Annually	Annually
Visual Inspection	✓			
Testing and Inspection			✓	
Check for Leakage		✓		



Recharging				✓
Fire Mains and Nozzles		✓		
Containers/Cylinders			✓	
Control and section valves			✓	

6.7 ENVIRONMENTAL BUDGET

Approximately PKR 30,000 budget will be reserved for the Environmental Monitoring and measures.

6.8 CHANGE MANAGEMENT PLAN

The EIA/IEE recognizes that changes in the operations or the EMP may be required during the operation and therefore a Change Management Plan has been provided to manage such changes. The management of changes is discussed under two separate headings, changes to the EMP and changes to the Operation.

6.9 CHANGING IN PLANNING AND DESIGN

The change management system recognizes three orders of changes.

I. First Order Change

A first order change is one that leads to a significant departure from the project described or the impacts assessed in the EIA/IEE and consequently require a reassessment of the environmental impacts associated with the change. Examples of such change include change in location of the proposed plan.

In such an instance, the environmental impacts of the proposed change will be reassessed, and the results sent to the Punjab EPA for approval.

II. Second Order Change

A second-order change is one that entails project activities not significantly different from those described in the EIA/IEE, and which may result in project impacts whose overall magnitude would be similar to the assessment made in this report. In case of such changes, the environmental impact of the activity will be reassessed, additional mitigation measures specified if necessary, and the changes reported to the Punjab EPA.

III. Third Order Change

A third-order change is one that is of little consequence to the EIA/IEE findings. This type of change does not result in impact levels exceeding those already

assessed in the EIA/IEE; rather these may be made onsite to minimize the impact of an activity. The only action required in this case will be to record the change in the change record register.

6.10 CHANGING IN MONITORING AND MANAGEMENT PRACTICES

The EIA/IEE and the EMP have been developed based on the best possible information available at the time of the EIA/IEE study. However, it is possible that during the construction and operation phase some aspects of the EMP may need to be changed owing to their non-applicability in a certain area of operation or the need for additional mitigation measures based on the findings of environmental monitoring during the construction and operation phase. In such cases following actions shall be taken.

1. A meeting will be held between management and the concerned contractor. During the meeting the proposed deviation from the EMP, planning and designing will be discussed and agreed upon by all parties
2. Based on the discussion during the meeting, a change report will be produced collectively, which will include the original EMP clause/plan or design, the change that has been agreed upon, and the reasons for the change
3. The report will be signed by all the parties and will be filled at the site office. A copy of the report will be sent to Housing Scheme and contractor head offices
4. All relevant project personnel will be informed of the change.

6.11 COMPENSATION IN TERMS OF MONEY

Changes in the EMP can be done up to 3% of the total development cost in case the Monitoring of the environment according to the prescribed plan does not render useful.

CHAPTER 7: ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

7.1 General

This chapter of the EIA provides the Environmental Management Plan (EMP) of the project for its construction and operation phases separately to keep it environment benign as well as the monitoring plan to ensure the compliance of the established EMP.

As per the environmental legislation in Pakistan, the EMP for the operation phase, along with other documents, is to be submitted to the concerned Environmental Protection Agency to obtain confirmation for compliance and Environmental Approval for project operation.

7.2 Purpose and Objectives of the EMP

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified in the EIA.
- Define the responsibilities of the project proponent, contractors and other staff and stakeholders.
- Provide means of effective communication of environmental issues between all the persons associated with the project.
- Identify monitoring parameters in order to ensure the effectiveness of the mitigation measures.
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.

7.3 Management Approach

The organizational roles and responsibilities of the key players are summarized below:

Proponent: The project proponent will take overall responsibility for compliance with the EMP in his hand. Proponent will carry out verification checks to ensure that the contractors are effectively fulfilling their environmental and social responsibilities as mentioned in EIA.

Contractors: The contractors will implement the majority of environmental and social mitigation measures. The contractors are subject to certain liabilities under the environmental laws of the country, and under contract with the proponent.



7.4 Environment Management Plan

It lists all the mitigation measures identified in the EIA and the associated environmental or social aspects in line with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures.

Table 7.1: Environment Management Plan (EMP)

Environmental and social aspects	Mitigation Measures	Responsibility
Construction noise	- Periodic surveys will be conducted for the control of noise level from the construction equipment, operational machinery and vehicles. - Machines and vehicles will be provided with mufflers. - Proper maintenance, oiling and greasing of machines at regular intervals to reduce generation of noise. - Provision of PPEs (ear plugs, ear muffs) to the workers working in high noise areas.	Construction Contractor
Dust emission	- Sprinkling of water on all the exposed sites to suppress the emission of dust. - Covering all the soil piles and construction materials will be transported in closed containers.	Construction Contractor
Vehicle and equipment exhaust	Maintenance of all vehicles and other equipment used during the construction in order to minimize the emission of pollutants.	Construction Contractor
Water conservation plan	- Recording of amount of groundwater that will be extracted for construction activities - Strict monitoring will be in place to have an eye on all water uses so that no	Construction Contractor

	wastage of water takes place and where possible, water would be recycled.	
Wastewater management	Wastewater generated during the construction activities will be collected properly and routed towards CETP (Combined Effluent Treatment Plant) of industrial estate for proper treatment before disposal.	Construction Contractor
Solid Waste	- Identification and quantification of all waste streams - Provision of separate waste bins at various locations for proper collection of different waste streams - Onsite Separation of recyclable waste - Hiring of waste collection contractor for its regularly collection - Recording of all waste generation activities and its management	
Health and safety	- Establishment of SOPs for all the project activities. - Safety audits should be conducted. - All accidents and incidents should be recorded, reported and reclaimed. - Provision of Standardized Personal Protection Equipment (PPEs) such as ear plugs, safety Helmets, Gloves, Goggles, Masks and Gum Shoes to the employees to ensure their safety at work. - Displaying Workers' awareness and safety wall chart showing safety symbols. - Provision of First Aid Box in all departments. - Development of comprehensive firefighting system to avoid any chance	Construction Contractor

	of fire that will includes all types of fire Extinguishers, fire hydrants, sand Buckets and fire fighting Vehicles. • Basic medical and safety training will be held from time to time to minimize the risk of health and safety issues in the industrial premises. • Provision of free medical facilities and services to the employees.	
Soil contamination	• Spills trays will be provided and used at refueling locations. Emergency plan for the spill management will be prepared and inducted to the staff for any incident of spill. Fuels, lubricants and chemicals will be stored in the covered bounded area.	Construction Contractor
Hazardous and non-hazardous solid waste management	• Reuse of construction and demolition waste (bricks, cement, etc.) for flooring. • All hazardous waste will be separately collected and managed from the other waste. • Proper labelling of all containers of hazardous waste. • Municipal waste will be managed using procedures established in the industrial estate. • Record of all waste generated during the construction phase will be recorded.	Construction Contractor & Waste Contractor
Operation Phase		
Noise	• Silencing and proper muffling of operating equipment • Preventive maintenance and regular servicing and tuning of the equipment will be assured. • Workers should be told and encouraged	Operation and Maintenance staff

	to use PPEs (ear plugs or ear muffs) at all times. Tree plantation will be done to reduce noise level.	
Exhaust and Dust emission	- Proper ventilation will limit the amount of indoor pollutants and will assure the supply of clean air at all times to all the workers inside. - Closed operations will keep the emission of air pollutants within PEQS limits. - Provision of PPEs to the workers before entering into the working vicinity. - Practicing water spraying where required. - Regular monitoring of air emission sources. - No open burning of waste within the premises of project site.	Operation and Maintenance staff
Water conservation plan	- Recording the amount of groundwater that will be extracted for operation activities. - Strict monitoring will be in place to have an eye on all water uses so that no wastage of water takes place and where possible, water would be recycled.	Operation and Maintenance staff
Wastewater management	Proper domestic waste water collection will be collected through a network of pipeline and routed towards CETP (Combined Effluent Treatment Plant) of Industrial Estate for its treatment before its final disposal into main drain through a proper drainage channel.	Operation and Maintenance staff
Soil contamination	- Provision of dense greenbelt within the premises of factory. - Maintenance of impervious flooring and	Operation and Maintenance staff

	roof covers in order to avoid land contamination due to accidental spills. Regular maintenance of pumps and flange connections in the pipelines.	
Health and safety	- Establishment of SOPs for all the project activities. - Conducting Safety audits. - Recording and Reporting of all accidents and incidents. - Preventive approach will be preferred to corrective approach. - Provision of Standardized Personal Protection Equipment (PPEs) such as ear plugs, safety Helmets, Gloves, Goggles, Masks and Gum Shoes to the employees to ensure their safety at work place. - Workers' awareness and safety wall chart showing safety symbols will be displayed. - Availability of First Aid Box in every department which will be within easy approach of all in case of any injury or mishap. - Development of a comprehensive firefighting system including all types of fire Extinguishers, fire hydrants, sand Buckets and fire fighting vehicles to avoid any chance of fire - Basic medical and safety training will be held from time to time to minimize the risk of health and safety issues in the industrial premises. - Provision of free medical facilities and services to the employees.	Operation and Maintenance staff
Energy	Energy audit must be conducted.	Operation and

Management	• Energy leakages should be immediately noted, reported and sorted out. Repair and recovery measures should also be adopted. • Attempts shall be made to bring into use the renewable resources to the extent possible and practicable.	Maintenance staff
Decommissioning Phase		
Soil Disturbance	• Scheduling to avoid heavy rainfall periods to the extent practical. • Mulching to stabilize exposed areas.	Operation and Maintenance staff
Solid Waste Generation	• Timely collection and disposal of solid waste. • Recyclable waste should be sell out to the recycle market or any relevant customer.	Operation and Maintenance staff
Health and Safety Issues	• Employees should be provided with personal protective equipment.	Operation and Maintenance staff

7.4.1 Environmental Monitoring Plan

Environmental monitoring is a vital component of the Environmental Management Plan. It is the mechanism through which the effectiveness of the Environmental Management Plan in protecting the environment is measured and assured. The feedback provided by the environmental monitoring is instrumental in identifying any problem or lapse in the system under implementation, and in planning corrective actions. The main objectives of the environmental monitoring during the construction phase of the said textile industry will be:

- To provide a mechanism to determine whether or not the project construction contractors are carrying out the project in conformity with the EMP.
- To identify areas where the impacts of the project are exceeding the criteria of significance and therefore, require corrective actions.
- To document the actual project impacts on physical, biological and socioeconomic receptors, quantitatively where possible, in order to design better and more effective mitigation measures.

Following environmental record should be maintained:

- Periodic inspection reports of the site
- Audit reports
- Incident record of all moderate and major spills. The record will include:
 - ✓ Location of spill
 - ✓ Estimated quantity
 - ✓ Spilled material
 - ✓ Restoration measures
 - ✓ Photographs
- Description of any damage to vegetation, water resource or community asset.
- Corrective measures taken, if any
- Waste Tracking Register that will record entire waste generated during the construction period. This will include quantities of waste disposed, recycled and reused.
- Records of water consumption with use-wise breakdown
- Survey reports; in particular, the following:
 - ✓ Vehicle and equipment noise.
 - ✓ Ambient noise survey reports.
 - ✓ Ambient level of PM
 - ✓ Vendor data—all vendors disturbed by the project and compensation paid
 - ✓ Public infrastructure: Record of all damages and repair work undertaken.
 - ✓ Employment
 - ✓ Total number of unskilled, semi-skilled and skilled jobs offered during Construction.
 - ✓ Name and domicile of the employed staff.
 - ✓ Archeological resources—Record of any findings with photographs.
 - ✓ Project and Community Interface
 - ✓ Record of community complaints and the measures taken to address

them.

- ✓ Number of meetings held in various communities and persons who attended
- ✓ Environmental and social training records

Table 7.2: Roles and Responsibilities for Environmental Monitoring

Aspects	Proponent Responsibilities	Contractors Responsibility	Relevant Documentation
Contracting	Ensure that the monitoring, rehabilitation and rebuilding requirements are included in the contract between the proponent and the construction contractor.	Understand the environmental requirements of the contract.	Contract between the proponent and the contractor
Monitoring plan	Finalize the monitoring plan prior to the commencement of the construction.		Revised monitoring plan
Resources	Ensure the availability of resources for environmental responsibilities; monitoring, rehabilitation and rebuilding.	Ensure the availability of resources for environmental monitoring, rehabilitation and rebuilding and their efficient use without wastage.	Project budget

Environmental staff	Designate an environmental manager for the project.	Appoint officer dedicated to environment.	Job description
Monitoring survey	Undertake the periodic (pre-planned and unplanned) inspection and carry out the field measurement or assign this duty to a concerned person or organization.	Systematically observe and collect the data on the environmental performance.	Inspection and survey reports
Environmental Audit	Conduct periodic audits of the construction site and commence third party audit.	Conduct audits.	Audit reports
Reporting	Ensure that periodic environmental monitoring reports are received.		Periodic reports
Corrective action	Verify that activities are carried out complying with EIA/EMP.	Carry out the corrective actions where required.	Corrective action record
Maintenance of record	Maintain monitoring data and record of all incidents of environmental significance.	Maintain monitoring data and record of all incidents of environmental significance.	Environmental data base

7.5 Communications and Documentation

An effective mechanism to store and communicate environmental information during the project is an essential requirement of an EMP.

Meetings

Two kinds of environmental meetings will take place during the project:

- Kick-off meetings
- Weekly meetings

The purpose of the kick-off meetings will be to present the EMP to project staff and discuss its implementation strategy and policy.

A weekly meeting will be held during operation. The purpose of this meeting will be to discuss the conduct of the operation and environmental issues and their management. The proceedings of the meeting will be recorded in the form of a weekly environmental report.

Changes-Record Register

A change-record register will be maintained at the site, in order to document any change in project/system design; especially those which have direct impact on the industry's emissions, effluents, wastes and resource management. These changes will be handled through the change management mechanism.

Environmental Training

Environmental training will help ensure that the requirements of the EIA and EMP are clearly understood and followed by all project personnel in the course of the project.

Table 7.5: Training Program

Target audience	Trainers	Contents	Schedule
Selected management staff	Contractors	Key finding of mitigation measure	After every five months
All personnel	Contractors	Mitigation measures	Monthly
Technical Staff	Contractors	Waste disposal, vehicle movement restriction and other mitigation measures	After every three month
Other staff	Contractors	Waste disposal, resource conservation and other mitigation workers	Monthly

Institutional Responsibilities

Following functionaries will be involved in the implementation of EMP:

1. S as the project proponent and owners of the EMP
2. Project construction contractor(s) as executors of the EMP during construction phase of the project.
3. Operational & Maintenance (O&M) and the Health, Safety and Environment team of the proposed project as an executor of the EMP during the operational phase of the project.

7.5.2 Monitoring Plan

The monitoring of the EMP and the communication and documentation mechanism that will be employed during the operation phase will be based on the Environmental Management System (EMS) of the project proponent. The management system of the project proponent will be the same as the certified EMS in place at the company.

Table 7.3: Environment Monitoring Plan for Construction Phase

Potential activity and potential impact	Objective of monitoring	Parameter to be monitored	Measurements	Location	Frequency	Responsibility
Disturbance due to noise from construction activity	To determine the effectiveness of the noise abatement measures on the sound level	Noise level near the receptor	Reading will be taken.	At least three locations on the plant boundary and three locations at the receptor end	On three typical working days and one weekend	Environment Officer
Soil contamination	To determine	Procedure in place to	Visual inspection and	Construction site	Weekly inspection	Environment Officer

ion due to leakage of oil and chemicals on the ground	the effectiveness of the control measures taken to minimize the spillage of oil and chemicals	handle the liquids and availability of procedure and equipment for emergency response	availability checks			
Waste collection, storage and disposal	To check the availability of waste management system and implementation	Inspection of waste generation, collection, storage and disposal will be undertaken	Visual inspection	Construction sites and camp sites	Once daily	Environment Officer
Water and other resources' conservation	To determine the effectiveness of the conservation techniques in practice	Leakages, spillages and wastages	Visual inspection and record tracking	At all points of use	On monthly basis	Environment Officer
Workers' safety	To check and evaluate the effectiveness	Injuries and LWI or LTI	Injuries will be recorded	Construction site	Daily	Environment Officer

	s of the workers' safety plan					
Vehicle and equipment exhaust	To confirm the availability of exhaust control devices with the construction vehicles and equipment	Air quality at different points around the vehicles and equipment	Readings will be taken	At least three points around the source and three points at some distance downwind	On three word days	Environment Officer

Table 7.4: Environment Monitoring Plan for Operational Phase

Potential activity and potential impact	Objective of monitoring	Parameter to be monitored	Measurement	Location	Frequency	Responsibility
Disturbance due to noise from operational activity	To determine the effectiveness of the noise abatement measures on the sound level	Noise level near the receptor	Noise Measurement	At least three locations on the plant boundary and three locations at the receptor level	Quarterly	Environment Officer

PM concentration in air	To determine if the PM concentration exceeds the prescribed limits.	Ambient Air parameters	PM	Processing halls and project boundaries.	Monthly	Environment Officer
Procedure for waste collection, storage, sorting and sale	To check if the solid waste can be reduced, reused or recycled at plant before sale	Inspection of waste generation, collection, storage, sorting and sale will be undertaken at entire unit and record will be maintained. Waste Audit	Visual inspection	Entire unit	Once daily	Administration Officer/Waste Manager
Health and safety of the employees and the neighboring community	To determine the effectiveness of the Health & Safety management system in place	All the major and minor incidents and accidents, and injuries or losses will be recorded. Safety Audit	Periodic medical check-up of all the employees and Visual Inspection	All the employee / Entire unit	Monthly or earlier if required	Environmental Officer/SHE Manager
Energy management and conservation	To check the effectiveness of the energy management and conservation	Energy audit	Energy audit	Entire unit	Bi-annually	Environmental Officer

	system in place					
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7.6 Summary of Impacts and their Mitigation Measures

Environmental monitoring is a vital component of the Environmental Management Plan. It is the mechanism through which the effectiveness of the Environmental Management Plan in protecting the environment is measured. The feedback provided by the environmental monitoring is instrumental in identifying any problem or lapse in the system under implementation and planning corrective actions. The main objectives of the environmental monitoring are:

- To provide a mechanism to determine whether the project construction contractors are carrying out the project in conformity with the EMP.
- To identify areas where the impacts of the project are exceeding the criteria of significance and, therefore, require corrective actions.

7.7 Equipment Maintenance Details

- PPE's and other required machinery of latest technology with high efficiency will be purchased by the proponent
- Good technical practice should be implemented during operations.
- Maintenance of equipment will be done twice a year for the smooth operation.
- All the equipment must be kept clean.
- Proper lubrication of moving parts of machines should be according to schedule.
- Make maintenance and inspection schedule.
- Prepare and keep the record of equipment maintenance log.
- Training workshops to staff about SOPs of equipment should be planned and implementation of such practices must be ensured.

7.8 Environmental Budget

The environmental cost has been worked out in Table 6.4:

Table 7.6: Environmental Budget

Sr . #	EMP Parameters	Unit Cost	Before Construction	During Construction	After Construction	Total (m PKR)
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			Times	Cost	Times	Cost	Times	Cost	
1	Environmental Monitoring	0.050	0	0	1	0.050	2	0.050	0.1
2	Social Cost (meeting, visit, tour etc.)	0.03	1	0.03	1	0.03	1	0.03	0.09
3	Environmental Training	0.1	1	0.1	0	0	1	0.1	0.2
4	Tree Plantation Plan	0.0010	0	0	0	0	500	0.0010	0.5
5	Environmental reporting & review	0.3	1	0.3	1	0.3	0	0	0.9
Total									1.79
Contingencies (10%)									0.179
Grand Total									1.9

CHAPTER 8: CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSION

The report presents Environmental Impact Assessment (EIA) of the Proposed Construction of LPG Storage & Filling Plant by SKB Oil & Gas (SMC - Private) Limited.

EIA of Proposed Project is performed according to guidelines of EPA. It includes description of the project, description of the environmental baselines, potential environmental impacts and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the study.

The performed EIA showed all anticipated impacts (both positive and negative), associated with the project. Appropriate mitigation measures as explained in the environmental study shall reduce, if not eliminate, these impacts so that these are within acceptable limits. Moreover, no deterioration, depletion or exploitation of resources is expected to be caused by this project.

Based on overall assessment of the environmental impact of the project, it is concluded that the project is not likely to cause any significant adverse impact on the social, physical and biological environment of the area, provided that suitable mitigation measures as identified in this study are implemented.

It is accordingly recommended that Environmental Approval for the project may be issued by the Environmental Protection Agency, subject to payment of the requisite scrutiny fee by the proponent of the project.

8.2 RECOMMENDATIONS

The Initial Environmental Examination study and survey results are finally evaluated to recommend the following:

- Implementation of EMP must be given top priority.
- Proper PPEs including ear plugs, ear muffs, mufflers, goggles, gloves and shoes etc. should be provided to workers
- Train workers to use PPEs
- Advise workers to follow SOPs.
- Installation of fire extinguishers in the premises and their monitoring must be ensured.
- Equipment maintenance and efficiency must be checked.
- No compromise on public health and environment should be allowed.



- Waste minimization practices should be employed and workers should be encouraged to adopt such methods.
- Wages should be distributed on time.
- Proper tree plantation plan should also be developed in order to make the unit environment friendly.
- Small waste storage bins should be installed at different corner for proper waste collection and discharge.
- Proper dispensary and first aid box should be provided for workers
- Smoking should be avoided within premises of project site and near fuel storage areas.
- The Security Guards shall also be trained to act in case of all possible emergency situations. The fire alarms can be activated to signal evacuation. At the same time, communication shall be made with hospitals, emergency services and police for urgent support.
- The proposed Environmental Management & Monitoring Plan should be implemented.