EXECUTIVE SUMMARY

ES.1 INTRODUCTION

Project is LPG Storage and Filling Plant situated at Khewat # 120, Murabba # 37, Khasra # 4, 5, Ladoo Ana, Main Warburton Road, Tehsil and District Nankana Sahib. LPG Storage will be **(2x50) 100 MT, filling capacity 5MT/Day** as shown on proposed design layout annexed at the end of the report.

ES.2 LOCATION OF PROJECT

LPG Storage & Filling plant is located near Khewat # 120, Murabba # 37, Khasra # 4, 5, Ladoo Ana, Main Warburton Road, Tehsil and District Nankana Sahib.

Plan layout of the project is annexed at the end of the report.

ES.3 PROJECT TITLE

KHALID GAS (PVT) LIMITED
LPG Storage & Filling Plant

ES.4 NAME OF THE PROPONENT

SAJJAD KHALID

Owner / Director

Khalid Gas (Pvt) Limited

R/O House # 284-K Model Town

Lahore.

Brief Activities

Project is for installation of LPG storage and filling plant. The proponent will carry out all necessary acts and activities in relation to the construction and the subsequent

operation including procurement and producers to different vendors. The proponent will take all necessary steps for hiring services of various personal staffs pertaining to project.

ES.5 NAME OF THE ORGANIZATION PREPARING THE REPORT

In keeping view with the regulatory requirement of the country, management engaged **Environmental and Social Technical Services (ESTS)** to undertake an Environmental Impact Assessment (EIA) Report of the project.

ES.6 BRIEF OUTLINE OF THE PROJECT

The project "Khalid Gas (Pvt) Limited" is related to Installation of LPG Storage and Filling Plant. LPG Storage will be **(2x50) 100 MT filling capacity 5MT/Day** as shown on proposed design layout. The proposed developmental activities will mainly involve civil, mechanical and electrical works associated with the installation of the LPG tank and filling plant and thereafter operations of the facilities. The main activities to be carried out in the development of the proposed project include excavations or earth works, installation of the tank and pump and pipe works.

LPG bulk plants for storage of LPG in tanks and convert it into vapor form using electric or steam heated vaporizers and then reducing the pressure to desired level using pressure reducing station for burning in burners for the usage of LPG as burning fuel in industries for various purposes like ceramics, cement, steel, glass, automotive etc. These plants are provided with complete piping, valves, safety equipments, Gas leakage detection system, instrumentation, etc for safe and easy use of the plant.

The project will operate in compliance with Punjab Environmental Quality Standards (PEQS).

- Noise pollution should be controlled or managed properly.
- It should be done by extensive vegetation of trees and plants.

- Vegetation should be done in the surrounding area as it can absorb noise and air pollution.
- All workers should be provided with ear covering and spend glasses during construction phase.
- Medical checkup of all workers should be done after a specific time period (may be quarterly).
- Extensive plantation shall be done to improve/enhance the environmental scenario of the processing unit.

According to the Environment Protection Agency, Government of the Punjab, Lahore the project lie under the category of Schedule II A (5) IEE/ EIA Regulation 2022 requiring Environmental Impact Assessment (EIA). Further, the client is required to fulfill the legal requirements of the Section-12 of the Pakistan Environmental Protection Act 1997.

ES.7 MAJOR IMPACTS

The overall impacts of the project can be considered positive. However, it may pose some minor and moderate negative social and environmental impacts which will require proper mitigation measures during construction phase.

Therefore, the intended measures are directed towards mitigation of the identified adverse impacts. Because of generation of small amount of wastes, there will not be any significant environmental and social impacts of the project facility.

- Likelihood of relatively higher local dust levels from engine exhausts of the vehicles employed for transportation of materials and machinery to the project site.
- Likelihood of higher local levels of drag dust blowing off wheels of the moving vehicles on the unpaved and poorly maintained roadway to the project site.

- Likelihood of backend impacts relating to consumption of natural resources including water for various process and non-process operations.
- Likelihood of impacts relating to generation of sanitation wastewater from toilets and washrooms at the project facilities only if disposal will be improper.
- Likelihood of impacts relating to disorderly stacking of the various building materials.
- Likelihood of various socio-cultural impacts relating to rights of easement, ventilation and opportunities of job and employment. Similarly, there could be frictions with the locals from interaction of the laborers with the local community.
- Likelihood of impacts relating to occupational health, worksite safety and non-insurance of the workers against the risks of on job injury and resultant consequences.

There will be some generation of the ordinary food-based wastes and food residues resulting from consumption of food and eatables by the workers taking their meals at the project site. Additionally, there will be generation of sanitation wastewater from the worksite toilets at the project premises. A brief description of the various likely impacts follows hereunder:

- **Impacts of Land Use Change:** The project land belongs to the Proponent. It is already lying fallow. Therefore, construction of the project would not involve any land use change, (***Activity devoid of any environmental or social impact***).
- **Loss of Livelihood and Structural Damages:** Construction of the project on the available land will not involve any loss of livelihoods of the neighboring residents, landowners or farmers. (***Activity devoid of any environmental or social Impact***).
- **Cutting and Removal of Trees and Crops:** No impacts related to cutting or removal of trees and crops, as the project will be constructed on empty clear plot. (***Aspect / Activity devoid of any adverse environmental or social impacts***).

- **Impeachment of the Easement Rights of the Local Community:** No impacts related to impeachment of the easement rights of the neighbours (such as blockage of sunlight, aeration and ventilation), as the project will be constructed deep inside the earmarked land. (***Aspect/Activity devoid of any adverse environmental or social impacts***).
- **Impacts on Groundwater:** Very minimal and insignificant impacts relating to abstraction and consumption of groundwater. Additionally, small amounts of freshwater will be required for drinking by the staff employed at the facility premises or sanitation needs. (***Aspect/Activity devoid of any adverse environmental or social impacts***)
- **Impacts on Surface Water:** No impacts on the nearby surface water as the construction and the subsequent operation of the project will be devoid of any interaction with the surface water of the area. (***Aspect/Activity devoid of any adverse environmental or social impacts***)
- **Impacts of Inadequate Treatment and Disposal of Wastewaters:** No impacts related to generation, inadequate disposal and treatment of the wastewaters as the project activities will not generate any wastewaters or effluents at all. Except small amount of sanitation wastewater. (***Aspect/Activity devoid of any adverse environmental or social impacts***)
- **Impacts of Inadequate Disposal of the MSW:** No impacts related to generation and disposal of municipal solid wastes (MSW), as there will not be any generation of MSW at the project facility at all. The ordinary food will not produce any adverse environmental impacts because of extremely small amount. (***Aspect/Activity devoid of any adverse environmental or social impacts***)
- **Likelihood of Worksite Risks and Personal Injuries:** Non-observance of the standard procedures and steps for carrying out a particular activity and non-compliance of the precautionary measures (like smoking on worksite, wearing loose cloths and avoiding to put on safety equipment) may render the workers prone to higher chances of worksite and industrial accidents. All workers

performing various handling activities must put on safety equipment. (***Aspect/Activity devoid of any adverse environmental or social impacts***)

- **Likelihood of Land Instability and Land Sliding:** There will be no likelihood of soil instability and land sliding from any of the activities at the project facility. (***Aspect/Activity devoid of any adverse environmental or social impacts***)
- **Impacts on Local Ecology, Biodiversity and the Habitat:** No Impacts as this aspect will be totally irrelevant to the construction of project and because of its geophysical location. There will be no likelihood of damage to the local flora and fauna. (***Aspect/Activity devoid of any adverse environmental or social impacts***)
- **Displacement & Resettlement Issues:** Onsite activities relating to project will not cause displacement of any persons or loss of the workplace or above. (***Aspect/Activity devoid of any adverse environmental or social impacts***)
- **Social and Cultural Issues:** The project will not interact with any of the nearby local communities. (***Aspect/Activity devoid of any adverse environmental or social impacts***)

A detailed account of the genesis of the above-referred adverse impacts, their potentiality to affect the ambient environment and the measures for their mitigations has been presented in this IEE Report. However, it would be suffice here to state that if the project activities at the site are carried out in a sustainable manner and in accordance with recommendations of the EMP and other relevant mitigation measures, as are given in this IEE study; then the majority of these adverse impacts would become insignificant and of no relevance at all.

The major environmental nuisances associated with this project is given below, air pollution and effluent disposal. The different aspects, impacts and nuisances related to such activities are listed below;

Environmental Impacts	Mitigation Measures
Sitting near sensitive receptor	Project site is not located within 500m of any educational institution or health facility or any sensitive receptor Noise wall will be built around the project site LPG Compressor will not be operated from 11 pm- 05 am Proper pad will be prepared for bowzer parking while unloading
Spills during fuel transfer	It will be ensured that the pipe and couplings for the fuel transfer are secured tight and drip pans are put in all likely places where leakage can occur to avoid loss to ground While refueling, drip pans will be used to avoid spillage Impervious surfaces will be well-maintained at all places likely to receive spills
Leakage form storage tanks and facilities	Underground fuel storage tanks will be constructed to modern specifications with secondary containment, impervious linings and leakage monitoring wells in place
Interruption to local traffic	Deliveries will be scheduled at times of light traffic load to avoid congestion.

Environmental Impacts	Mitigation Measures
Washing and servicing	Station will have enough spacing for vehicles to queue up without effecting flow of traffic. Piping from tanks to the dispensers will be above ground to the extent possible. All buried piping routes will be clearly marked on the ground and on drawings available at the station.
	Effective monitoring program for tank integrity checking and leak detection will be put in place. Discharges of wastewater to the sewage network will be made only when compliance with PEQs is ensured Any groundwater extraction will be completely enclosed to prevent the well becoming a pathway to transport of hydrocarbon contamination into the aquifer.

The environmental impacts associated with this project will not have significant negative impacts on the environment. As plant will only operate for filling and storage of LPG

ES.8 RECOMMENDATIONS FOR MITIGATION MEASURES

The report details a set of comprehensive mitigation measures and strategies for avoiding and countering the adverse environmental and social impacts of the project. In addition to the preventive measures for warding off the adverse impacts, corrective measures have also been suggested for all and various project activities at the facility

site to address the adverse impacts .The report containing a set of comprehensive mitigation measures and the strategies for avoiding or addressing the adverse environmental impacts of the project's construction and subsequent operation phases.

The mitigations relating to construction phase of the project included the following:

- Preparation of the tailored checklists for checking propriety of each and every activity in a systematic manner
- Identification of alternate routes in case of temporary blockade of the approach road.
- Isolating the worksite with some dense material.
- Orderly stockpiling of the construction materials.
- Preferring to carrying out noisy activities during daytime hours, and
- Ensuring worksite safety during installation of machinery and equipment, etc

ES.9 PROPOSED MONITORING

Monitoring Program	Monitoring Frequency
AIR: • Monitoring of ambient air quality	• Periodic or continuous if critical
WATER: • pH and total suspended solids • Quality of the drinking water	• Continuous • Periodic or continuous if critical

ES.10 RESTORATION AND REHABILITATION PLAN

All possible precautions will be taken to prevent an untoward incident in terms of life and property losses. On completion of the project, solid waste will be removed from the site in order to maintain aesthetics of the area. All measures will be undertaken for ensuring occupational safety, security and clean environment during the working hours. Vegetation andlandscaping will be done by the proponent after the completion of project.

Restoration

To limit the disturbance to the public caused by excavation and other construction works, restoration will be made a part of the work activities to be performed by the Construction Contractors. Proponent has bound the Construction Contractors to restore the dismantled roads (if any), pavements and brick soling structures in the construction sites as well as the temporary construction sites.

Rehabilitation Plan

Project area is situated along rural road. Following rehabilitation / improvement activities are involved during the execution of work.

- Dismantling and removing existing sites (if any).
- Depth from ground level, including cutting, leveling of ground to correct grade and excavation for siting of machinery etc.
- Cement concrete plain including, placing compacting finishing.

ES.11 ENVIRONMENTAL, SOCIAL & DISASTER MANAGEMENT PLAN (ESDMP)

The environmental management plan (EMP), provides a mechanism for implementing the preventive and the corrective mitigation measures along with list of the authorities and the focal persons responsible for their implementation. The mitigation guidelines

are the result of lengthy deliberations over various issues made with the relevant stakeholders and the regulatory agencies. The primary objective of the EMP is to prevent and attenuate the adverse impacts to an acceptable level by adopting suitable administrative and or technical options.

CHAPTER – 1

INTRODUCTION

1.1 INTRODUCTION

This Report presents Environmental Impact Assessment (EIA) Study for the project Khalid Gas (Pvt) Limited (LPG Storage & Filling Plant). This study has been carried out to estimate the likely environmental and social impacts during operation and identify proper mitigation measures for reducing the adverse impacts on environment.

LPG Storage will be **(2x50) 100 MT and filling capacity will be 5MT/Day** as shown on proposed design layout.

1.2 TERMS OF REFERENCE

To prepare Environmental Impact Assessment (EIA), **Terms of References** are;

(a) To provide the Environmental and Social Baseline conditions of the project area.

(b) To identify adverse Environmental and Social impacts.

(c) To develop an Environmental Management Plan for adverse environmental impacts

(d) To prepare Environmental Examination Report (IEE) as per guidelines 2022

1.3 PURPOSE OF THE REPORT

The main objectives of this Environmental Impact Assessment (EIA) are to identify the baseline environmental, biophysical and socio-economic conditions, to examine project alternatives including alternate sites, and to study the potential impacts along with

formulation of suitable mitigation measures for an environmental friendly implementation of the project site and around the project area. The purpose of the IEE study is to identify the possible beneficial and adverse environmental impacts as presently envisaged and propose the practical mitigation measures to be implemented during construction of the Project to minimize the negative impacts of the unit.

The specific objectives of the Environmental Impact Assessment (EIA) are to:

a. To provide the environmental and social baseline conditions of the project area.

b. Identify adverse environmental and social impacts associated with project and to propose mitigation measures for potential impacts of the project during the construction and operation phases.

c. To develop an Environmental Management Plan (EMP) for adverse environmental impacts and to enhance the capacity building.

1.4 IDENTIFICATION OF PROJECT AND PROPONENT

1.4.1 IDENTIFICATION OF PROJECT

LPG is mixture of flammable hydrocarbon gases that include propane, butane, iso-butane and mixtures of the three LPG gases which is commonly colorless, odorless liquid that readily evaporates into a gas. It is commonly used for fuel in LPG cars and vehicles.

It is a byproduct of natural gas and oil extraction and crude oil refining. Around 60% of LPG stocks in the last years have been separated from raw gas and raw oil during the extraction of natural gas and oil from the earth, and the remaining 40% have been a byproduct when crude oil is refined.

They are located in the most easily accessible location on the major and secondary roads in the cities and towns, and along highways and connecting roads in rural and remote areas.

1.4.2 IDENTIFICATION OF PROJECT PROPONENT

SAJJAD KHALID

Owner / Director

Khalid Gas (Pvt) Limited

R/O House # 284-K Model Town

Lahore.

1.5 DETAILS OF CONSULTANT

Environmental And Social Technical Services (Regd.) has prepared and submitted this Environmental Impact Assessment (EIA) report.

Name of organization	**Environmental and Social Technical Services (ESTS)**
Email	hsb.obaid@gmail.com
Address	215, B-Block, Faisal Town, Lahore Pakistan

List of members preparing IEE Report is annexed.

1.6 BRIEF DESCRIPTION OF NATURE SIZE AND LOCATION OF PROJECT

Project is LPG Storage and Filling Plant situated at Khewat # 120, Murabba # 37, Khasra # 4, 5, Ladoo Ana, Main Warburton Road, Tehsil and District Nankana Sahib. LPG Storage will be **(2x50) 100 MT filling capacity 5MT/Day** as shown on proposed design layout annexed at the end of the report.

Main purpose of the project will be to fill and store LPG cylinders for commercial marketing. Project will also create job opportunities for the local community. About 15 and 5 persons will be recruited in construction and operational stage respectively.

1.7 REPORT STRUCTURE

The Report is structured as follows:

Chapter 1: Introduction of the Project.

Chapter 2: Describes the Legislative and Policy Framework Governing the Project;

Chapter 3: Provides an overall Description of the Project in the light of Master Plan;

Chapter 4: Provides general Environmental baseline conditions of the Project;

Chapter 5: Provides general Social baseline conditions of the Project;

Chapter 6: Assesses the overall Environmental Impact of the Project and Recommends Appropriate Mitigation Measures.

Chapter 7: Environmental Management and Monitoring Program, defines responsibilities of the Project proponent, contractor(s) and other key players; specifies supervision and monitoring mechanisms and parameters.

Chapter 8: Conclusion and Recommendation

CHAPTER – 2

POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This section provides an overview of the policy framework and national legislation that applies to the project. The project is expected to comply with all national legislation relating to environment in Pakistan, and to obtain all the regulatory clearances required.

2.1 NATIONAL POLICY AND ADMINISTRATIVE FRAMEWORK

The Pakistan National Conservation Strategy (NCS) that was approved by the federal cabinet in March 1992 is the principal policy document on environmental issues in the country (EUAD/ IUCN, 1992). The NCS outlines the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment. The core areas that are relevant in the context of the project are pollution prevention and abatement, restoration of rangelands, increasing energy efficiency, conserving biodiversity, supporting forestry and plantations, and the preservation of cultural heritage.

Two organizations, the Pakistan Environmental Protection Council (PEPC) and the Pakistan Environmental Protection Agency (Pak-EPA), are primarily responsible for administering the provisions of the Pakistan Environmental Protection Act, promulgated by the Government of Pakistan in 1997. The PEPC oversees the functioning of the Pak-EPA. Its members include representatives of the government, industry, non-governmental organizations, and the private sector. The Pak-EPA is required to ensure compliance with the PEQS and establish monitoring and evaluation systems. As the primary implementing agency in the hierarchy, it is responsible for

identifying the need for, as well as initiating legislation whenever necessary. The Pak-EPA is also authorized to delegate powers to its provincial counterparts, the provincial EPAs (environmental protection agencies). One of the functions delegated by the Pak-EPA to provincial EPAs is the review and approval of environmental assessment reports of projects undertaken in their respective jurisdictions.

2.1.1 Pakistan Environmental Protection Act, 1997

The Pakistan Environmental Protection Act, 1997 (1997 Act) empowers the Pak-EPA to:

- Delegate powers, including those of environmental assessment, to the provincial EPAs.
- Identify categories of projects to which the IEE/EIA provision will apply.
- Develop guidelines for conducting initial environmental examinations (IEE) and EIAs procedures for the submission, review and approval of the same.
- Develop environmental emission standards for parameters such as air, water and noise.
- Enforce the provisions of the Act through environmental protection orders and environmental tribunals headed by magistrates with wide-ranging powers, including the right to fine violators of the Act.

Under the provisions of the 1997 Act, the Pak-EPA has empowered four provincial EPAs to manage the environmental concerns of their respective provinces. The provincial EPAs can frame environmental regulations tailored to the requirements of their province, provided these regulations meet or exceed the minimum standards set by the Pak-EPA. Provincial EPAs are required to review and approve EIAs of all development projects undertaken in their respective provinces, including those projects implemented by federal agencies.

- **Regulations for Environmental Assessment**

Under Section 12 (and subsequent amendment) of the 1997 Act, a project falling under any category specified in Schedule I (SRO 339 (10/2000), requires the proponent to file an IEE with the federal agency concerned (the Pak-EPA). Projects falling under any category specified in Schedule II require the proponent to file an EIA with the federal agency. Within ten working days of the IEE or EIA having been deposited, the federal agency will confirm that the document submitted is complete for the purpose of review. During this time, should the federal agency require the proponent to submit any additional information, it will return the IEE or EIA to the proponent for revision, clearly listing those aspects that need further discussion. Subsequently, the federal agency shall make every effort to complete an IEE review within 45 days and an EIA review within 90 days of filing.

Recognizing that the Pak-EPA has delegated powers to the provincial EPAs to enforce the provisions of the 1997 Act, an EIA must be submitted to one of the relevant Provincial EPA based on the location of the project.

At the time of application, the project proponent is also required to pay a specified fee to the EPAs concerned.

- **Guidelines for Environmental Assessment**

The Pak-EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental management of different types of development projects. The guidelines that are relevant to the project are listed below, followed by comments on their relevance to the project:

Guidelines for the Preparation and Review of Environmental Reports, Pakistan Environmental Protection Agency, 1997

The guidelines on the preparation and review of environmental reports target the project proponents, and specify:

- The nature of the information to be included in environmental reports
- The minimum qualifications of the IEE/EIA conductors appointed
- The need to incorporate suitable mitigation measures at every stage of project implementation
- The need to specify monitoring procedures.

The terms of reference for the reports are to be prepared by the project proponents themselves. The report must contain baseline data on the project area, a detailed assessment thereof, and mitigation measures.

- Guidelines for Public Consultation, Pakistan Environmental Protection Agency, May 1997

These guidelines deal with possible approaches to public consultation and techniques for designing an effective program of consultation that reaches out to all major stakeholders and ensures that their concerns are incorporated in any impact assessment study.

- Sectoral Guidelines: Pakistan Environmental Assessment Procedures, Pakistan Environmental Protection Agency, October 1997
- The guidelines for 'Manufacturing plant' are structured to assist in identifying key environmental issues related to Manufacturing Plant, as well as the various mitigation measures and alternatives that should be considered and applied accordingly.

2.1.2 Punjab Environmental Quality Standards, 2000

The Punjab Environmental Quality Standards (PEQS), 2000 specify the following standards:

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged into inland waters, sewage treatment facilities, and the sea (three separate sets of numbers)
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources
- Maximum allowable concentration of pollutants (two parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles.
- Maximum allowable noise levels from vehicles.

These standards also apply to the gaseous emissions and liquid effluents generated by generator, process waste etc. The standards for vehicles will apply during the construction as well as operation phase of the project. Standards for air quality have not been prescribed as yet.

2.1.3 National Resettlement Policy and Ordinance

There is no such kind of land acquisition or resettlement of Project Affected Persons. Therefore, no further details have been discussed.

The provisions of the Draft Resettlement Policy are consistent with the requirements of the World Bank's OP 4.12 on involuntary resettlement. After becoming law, these provisions will apply when addressing the resettlement issues that arise in the project.

2.2 INTERACTION WITH OTHER AGENCIES

The client is responsible for ensuring that the project complies with the laws and regulations controlling the environmental concerns. This chapter describes the nature of the relationship between the client and line departments concerned.

2.2.1 Federal and Provincial EPAs

The client will be responsible for providing the complete environmental documentation required by the Pak-EPA, and Punjab Environmental Protection Department (EPD) and remain committed to the approved project design. No deviation is permitted during project implementation without the prior and explicit permission of the EPAs concerned.

2.2.2 Provincial Revenue and Other Departments

Since the issue of land acquisition and contacts with Agriculture, Horticulture and Forestry Department are not involved in this project, hence they are not elaborated.

2.2.3 Provincial Governments

The client must ensure that the project meets the criteria of the Punjab provincial government as related to the safe disposal of wastewater, solid waste, and toxic materials. The client will coordinate and monitor environment-related issues.

2.2.4 Local Government and Municipalities

The client will work with local government/administration and municipalities on the resettlement of squatters and removal of encroachments or sources of congestion if any. In such cases, the Client will frame an agreement with the municipality, local government, or other service provider concerned on the resettlement of displaced squatters.

2.3 OTHER ENVIRONMENT-RELATED STATUTES

This section outlines statutes apart from the Pakistan Environmental Protection Act, 1997, which are relevant to the project.

2.3.1 Antiquities Act, 1975

The Antiquities Act relates to the protection, preservation and conservation of archaeological/historical sites and monuments. It prohibits construction (or any other damaging) activity within 200 m of such sites unless prior permission is obtained from the Federal Department of Archaeology and Museums. The Antiquities Act also binds the project proponent to notify the department should anything of archaeological value be excavated during project construction.

2.3.2 Provincial Local Government Ordinances, 2001

These ordinances, issued following the devolution process, establish regulations for land use, the conservation of natural vegetation, air, water, and land pollution, the disposal of solid waste and wastewater effluents, as well as matters related to public health and safety.

2.3.3 Pakistan Penal Code, 1860

The Pakistan Penal Code deals with offences where public or private property and/or human lives are affected due to the intentional or accidental misconduct of an individual or body of people. In the context of environment, the Penal Code empowers the local authorities to control noise, noxious emissions and disposal of effluents. The PEQS enforced by the EPAs supersede the application of this legislation on industries and municipalities. The Penal Code, however, can provide a basis for the client to coordinate its activities with the local authorities to ensure that its construction activities do not become a cause of public nuisance or inconvenience.

CHAPTER – 3

DESCRIPTION OF THE PROJECT

3.1 GENERAL

This Chapter provides an overview of the project including main components, description and other related developmental activities to be carried out. It also provides project justification and its need, phasing and other relevant information etc.

3.2 TYPE AND CATEGORY OF THE PROJECT

According to PAKISTAN ENVIRONMENTAL PROTECTION AGENCY (REVIEW OF IEE AND EIA) REGULATIONS, 2022 "List of projects requiring an EIA" . the project which is under consideration falls under category of **Schedule II** A **(5)** referring to ''**OIL AND GAS EXTRACTION PROJECTS INCLUDING EXPLORATION, PRODUCTION, GATHERING SYSTEMS, SEPARATION AND STORAGE** projects requiring an EIA Report for its environmental approval under section 12 of the Act.

3.3 OBJECTIVES OF THE PROJECT

1. To provide a multipurpose, modern, clean, accessible and efficient energy source.
2. The cleanest fossil fuel available off the national grid limiting the impact of energy use to global warming due to its low CO_2 emissions.
3. To promoting human health by limiting air pollution.
4. To make a modern energy accessible to consumers out of reaches of mains alternatives.
5. Accelerating the development of renewable energy by serving as a clean back up for intermittent renewable such as solar and wind.

The Combustion of LPG has almost no harmful impact on the environment and on human health, making it a clean low carbon alternative to other fossil fuels. It burns completely, efficiently and emits significantly less pollutants than most conventional fuels.

3.4 ALTERNATIVES CONSIDERED REALISTICALLY AND REASONS FOR THEIR REJECTION

This Section describes alternatives to the location for the project. It includes a discussion on the site selection and technological criteria that were required to ensure that project design would meet the desired results, within defined economic, environmental health and safety constraints. In particular it outlines the following project elements:

- The "No-Development Option"
- Alternative locations

3.4.1 Alternate Locations

The location of the project was decided after deliberations for the suitability of the site, considering the following factors:

- Legal status of the available land
- Commercial importance of location
- Availability of utilities
- Easily approachable for prospective customers
- Availability of Sufficient space

So the site is best situated for this project.

3.5 LOCATION & SITE LAYOUT OF THE PROJECT

Project is LPG Storage and Filling Plant situated at Khewat # 120, Murabba # 37, Khasra # 4, 5, Ladoo Ana, Main Warburton Road, Tehsil and District Nankana Sahib.

Plan Layout of the project is annexed at the end of the report.

3.6 ROAD ACCESS

Project is located along Main Warburton Road, Tehsil and District Nankana Sahib.

3.7 VEGETATION FEATURES AT THE SITE

There are only a few bushes / small trees in and around project premises including Eucalyptus Camaldulensis, Beri (shrub).

3.8 SCHEDULE OF IMPLEMENTATION

3.8.1 Project Investment

The basic developmental activities and other project development will be carried out by Proponent.

3.8.2 Contractor's Arrangements

The proponent shall select contractors of such an ability and capacity to conform standards.

3.8.3 Work Force

The Project involves many construction activities like excavation, general amenities, drainage system, and other miscellaneous infrastructure. It is expected that project will involve a large number of professional, technical, skilled, semi-skilled and unskilled manpower directly and indirectly.

The Contractor will be advised to hire the skilled and unskilled labour from the local communities.

3.8.4 Construction Material

Sufficient quantities of building materials will be required for the development. The materials required are enlisted below:

- Earth Material
- Cement
- Steel
- Water

Cement

Cement will be required for all building and structural works. However, cement can be available as per Project requirements.

Steel

Steel will be required for all structural works and it is easily available at local market.

Water Resources

Access to water for construction and campsite purposes will be not expected to be a problem. The chemical content of the available water, however, may limit the use of local surface water, particularly for mixing cement concrete. However, groundwater will be considered to be of acceptable quality for use in concrete works.

The project will be completed in one phase as under:

- Site preparation and construction works (Fixing of storage tanks and other construction will take 06 months);
- Commercial operation – 2 months.

3.9 INVOLVEMENT OF LABOR DURING CONSTRUCTION

During construction of sheds, fixing and installation of machinery, approximately 15 labors will be involved directly.

3.10 JOB OPPORTUNITIES

Unit will create employment opportunities for local community. Initially planned to hire 5 local persons and more people will find better and new sources of employment and income.

3.11 DESCRIPTION OF THE PROJECT

Project is LPG Storage and Filling Plant situated at Khewat # 120, Murabba # 37, Khasra # 4, 5, Ladoo Ana, Main Warburton Road, Tehsil and District Nankana Sahib. LPG Storage will be **(2x50) 100 MT and filling capacity will be 5 MT/Day** as shown on proposed design layout annexed at the end of the report.

The project is related to LPG (Storage and Filling Plant). The proposed development activities will mainly involve civil, mechanical and electrical works associated with

the installation of the LPG tank and filling point and thereafter operations of the facilities. The main activities to be carried out in the development of the proposed project include excavations or earth works, installation of the tank and pump and pipe works.

LPG is mixture of flammable hydrocarbon gases that include propane, butane, iso-butane and mixtures of the three LPG gases which is commonly colorless, odorless liquid that readily evaporates into a gas. It is commonly used for fuel in LPG cars and vehicles.

It is a byproduct of natural gas and oil extraction and crude oil refining. Around 60% of LPG stocks in the last years have been separated from raw gas and raw oil during the extraction of natural gas and oil from the earth, and the remaining 40% have been a byproduct when crude oil is refined.

LPG bulk plants for storage of LPG in tanks and convert it to vapor form using electric or steam heated vaporizers and then reducing the pressure to desired level using pressure reducing station for burning in burners for use of LPG as burning fuel in industries for various purposes like ceramics, cement, steel, glass, automotive etc. These plants are provided with complete piping, valves, safety equipments, Gas leak detection system, instrumentation, etc for safe and easy use of the plant.

3.12 WATER/ WASTE WATER AND SOLID WASTE GENERATION

Less amount of waste water from washrooms or from kitchen will be primarily treated in septic tank. Waste water will not have any hazardous chemicals in it and it will not be injurious to health.

As far as solid waste generation is concerned, solid waste will be consisting of kitchen waste or packing material, it will be sold to local market on competitive rates.

3.13 SOPs FOR LPG FILLING & DECANTING

1. All staff should have the necessary skills and knowledge to carry out their job safely and shall receive appropriate information, instruction and training.
2. The safe workplace atmospheres should be constructed primarily of non-flammable materials.
3. The filling plant shall have all suitable equipment available to allow the safe filling of gas cylinders.
4. No smoking in the cylinder filling area.
5. All decanting must take place outdoors in open area
6. Turn off all electrical equipment (such as mobile phones, pagers, radios, etc.).
7. The emergency shutdown (ESDs) will be installed in strategic locations to enable quick power cut off from the operations in case of an emergency
8. Gases should be used and stored only in a well-ventilated area.
9. Never store gases for longer than one year without use. Always screw on an appropriate gas cap on cylinders that are not in use.
10. Protect cylinders from corrosion due to weather or chemicals.
11. Gases should be stored in the order in which they are received and will be used.
12. Personnel handling LPG must wear:
    - Approved thermal protective gloves;
    - Long sleeved shirts and long trousers made from natural materials (non- synthetic);
    - Safety eye wear; and
    - Appropriate closed-in footwear.
13. All staff supplied with protective clothing and safety equipments have a responsibility to themselves and their fellow workers to use this equipment correctly and to keep it in an operative condition.
14. A competent operator must remain in attendance at the cylinder filling point during the entire decanting operation.

15. A clear means of egress in more than one direction and not less than one meter wide shall be maintained from the filling point clear of the area where cylinders are being filled or stored.
16. Liquid withdrawal cylinders must always stand upright.
17. A forklift cylinder may stand upright or lay in a horizontal position, provided that the safety relief valve is always exposed to the vapour space of the cylinder. That is, the safety relief valve is in the uppermost position.
18. To allow for the discharge of any static electricity, the cylinder being filled should not be standing on any insulating material, such as plastic, rubber etc. The operator must touch both the supply cylinder and the cylinder being filled with bare hands before commencing decanting to earth down and remove any static electricity on the operator's body.
19. Forklift cylinders and the filling equipment shall be arranged so that only one cylinder can be filled at a time.
20. The cylinder being filled must be inspected before filling to ensure it complies with guidelines.
21. Forklift cylinders greater than 50 litres water capacity must not be filled by decanting.
22. Cylinders must never be filled above the maximum standard filling level (80%) as this decreases the vapour space and may cause liquid LPG to discharge from the safety relief valve – without warning – during transportation or storage of the cylinder.
23. Forklift cylinders are not to be transported in enclosed vehicles Note: Enclosed vehicles include enclosed trucks, taxis, buses, and other public transport, private or business vehicles of any kind (whether windows are open or not) where the cylinder is not substantially located in open air.
24. A dry powder fire extinguisher having a rating of at least 2A 60B (E) (9 kg) shall be located in a prominent and readily accessible position during the filling operation.

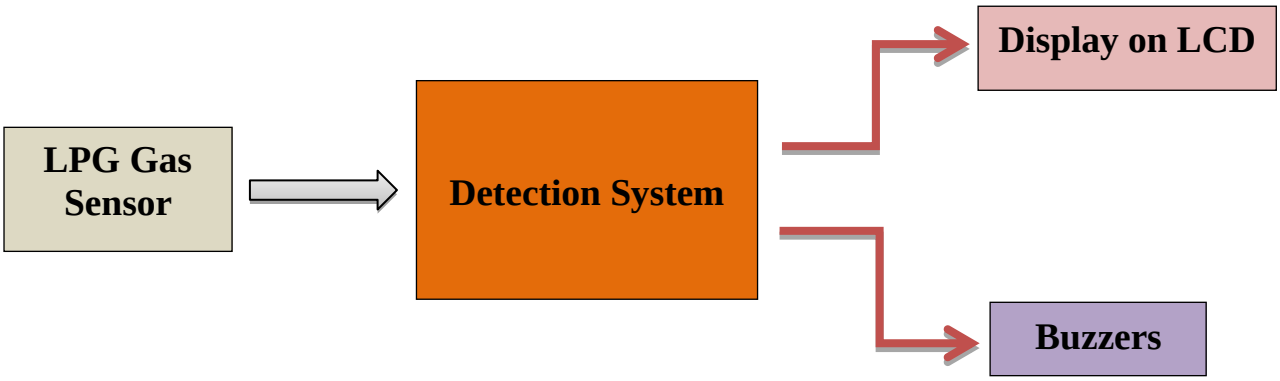
3.14 PROPOSED LPG GAS LEAKAGE DETECTION SYSTEM

Proposed LPG gas leakage detection system will be to enhance machine safety in a LPG Plant. As LPG Plant is the largest process control industry it is also highly prone to major fire and gas disasters. LPG Plant has excessively high amount of pressurized gas stored within a confined area. Therefore, presence of any external source and hazardous gases which can cause heat or fire would lead to a major disaster.

Though a gas and fire detection system was present this is connected to the sensors using large number of wires that run from the control room to various LPG plant areas. But during the fire the wire itself got damaged, so the information did not reach the control room. Therefore this system is developed with the aim of overcoming the restrictions and disadvantages of the existing system.

The proposed system will be designed which will monitor timely gas leakage in any area around the plant using buzzer which is a wireless communication device.

A gas detection system with adequate number of detector feeds at different locations shall be provided for the LPG filling station. 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.



3.15 EMERGENCY RESPONSE PLAN

General

This section describes the emergency response plan regarding to the gas leakages:

1. Emergency Management Overview
2. Incident Notification
3. Initial Responses
4. Emergency Services at Scene of Incident
5. Assessing the Level of Hazard
6. Resolving the Gas Incident

I. Emergency Associates

Emergency associates are describes below:

- The first point of contact will be the on-site emergency services, where present, who will coordinate the management of the incident as necessary. Where there is no on-site emergency service presence the first point of contact will be the competent person appointed by the management.
- The management must contact the HSE in the event of any death or injury to persons under standard principles and regulations.

II. Response to Gas Escapes

Response times should be within 1 hour to 95% of uncontrolled gas escapes, and within 2 hours to controlled gas escapes. Any gas leak must be stopped or made safe within a maximum of 12 hours of it being reported. Management has to assure 24 hour emergency response service to the workers.

III. Initial Response

The first responders to the incident may be the site-based emergency services, similarly competent person appointed by the management. Regardless of who attends the incident first it is essential that the following items are addressed:

- Assess the level of danger to personnel and property
- Organize evacuations, cordons and road closures where necessary
- Ensure communications with the management are established.
- Assist Gas Supplier operatives if they attend site
- Assess any requirement to involve external emergency services

IV. Assessing Level of Hazard

The level of hazard should be assessed by personnel on site in terms of the risks posed. The following incident classification should be used:

- **Level 1 Incident:** A leak that represents an existing or probable hazard to persons or property. Requires immediate repair or continuous action until the condition will be no longer hazardous. Medium pressure leaks are automatically to be deemed Level 1 incidents.
- **Level 2 Incident:** A leak that will be recognized as being non-hazardous at the time of detection, but needs scheduled repair based on probable future hazard.
- **Level 3 Incident:** A leak that will be recognized as being non-hazardous at the time of detection and can be reasonably expected to remain non-hazardous.

V. Resolving the Gas Leak / Incident

Any gas leak must be stopped or made safe within a maximum of 12 hours of it being reported. Resolution of the incident will be as set out after communicating with the management.

VI. Communications

In the event that telephone systems are unavailable, alternative methods of communication available on site must be used. Anyhow telephonic system is used mainly.

VII. Risk Assessment Review

After an incident has been resolved the Risk Assessments should be updated, incorporating lessons learnt from the incident.

VIII. Recording Incidents

The proceedings of all incidents should be recorded on the appropriate form and held in central and local records.

3.16 RESTORATION & REHABILITATION PLAN

There will be no matter of rehabilitation as the site is for LPG Plant. During entire construction period, necessary precautions will be taken to ensure that no damage is done to the basic infrastructures, cleaning and restoration will be carried out during and immediately after each phase of construction and it will be the responsibility of each team in their respective area. After completion; all construction matrix, debris and garbage will be removed off immediately from the site within the minimum possible time under safe conditions. Any minor spill ever of these materials will be cleared adequately. The land, if and where near vicinity will be made neat and clean.

Contractor will work to identify and evaluate the most cost-effective solution to suit site-specific conditions.

He will provide representation with responsible clean-up goals appropriate to future reuse, then plan and implement remedies in the field.

He will recognize the importance of maintaining rigorous health and safety procedures, utilizing appropriate personnel protective equipment, and maintaining safety equipment to monitor the work as it progresses.

His field personnel / labourers will be aware of Emergency Response & trained and participate in an approved medical monitoring program.

Areas of expertise of contractor will include:

Restoration in the Natural Environment

Identification and implementation of a wide variety of solutions, such as:

- Passive permeable reactive barrier for contaminated groundwater
- Benefits as an alternative to a traditional clay cap for landfill closure (if any)

- Excavation and treatment of soil contaminated with arsenic, lead, construction wastes
- Chemical oxidation and enhanced bioremediation of petroleum-contaminated soil and groundwater
- Source treatment and enhanced monitored natural attenuation of contaminated groundwater

The Built Environment

Providing hazardous materials clean-up, decontamination and decommissioning in the built environment, including specialized experience in the following areas:

- Underground storage tanks of water in each houses and contaminated soils
- Asbestos-containing materials and lead-based paint (if any)
- Biological decontamination (e.g., anthrax and other pathogens)

Remediation Systems

Contractor will specify and select remedial equipment and instrumentation as well as evaluate, monitor, maintain, and report installed system performance over time.

Restoration

To limit the disturbance to the public caused by excavation and other construction works, restoration will be made a part of the work activities to be performed by the Construction Contractors. Proponent bound the Construction Contractors to restore the dismantled roads (if any), pavements and brick soling structures in the construction sites as well as the temporary construction sites.

Rehabilitation Plan

Following rehabilitation / improvement activities are involved during the execution of work.

- Dismantling and removing existing sites (if any).

- Depth from ground level, including cutting, leveling of ground to correct grade and excavation for siting of machinery etc.
- Cement concrete plain including, placing compacting finishing.

Restoration

Another factor is to restore nature / landscape of the land some steps are to be taken by the proponent.

There are no explicit alternatives considered for the restoration plan although it has been through a process of iteration taking into account background consultation with the Environmental Protection Department.

These steps are to be taken into account in restoration. The integration of key research areas has resulted in:

Identification of first year species re-instatement being the blueprint for long-term species re-instatement

Observation of cryptic soil impedance and extremely high plant loss in the standard 'topsoil over overburden' profile during the 2nd summer following restoration, but higher plant re-instatement and better ecosystem dynamics in the long term.

Rehabilitation Plan

Project area is purchased by proponent.

Following rehabilitation / improvement activities are involved during the execution of work and after constructional phase.

Restoration practices involve:

	Restoration to be done	Responsibility	Frequency
Road and Pavements	To not to damage any road and maintain existing roads and pathways	Proponent	During entire period of operation and even after that.
Archeological Building and Structures	Proponent is not bound to damage any existing archeological structure / building at any stage of the project	Proponent	During entire period of operation and even after that.
Existing Crops and Vegetation Cover	In case of any damage to crops compensation will be made	Proponent	During entire period of operation and even after that.
Existing tube well / pumps sites	Not to be damaged. In case of damage, compensation will be paid or alternate site be proposed later on.	Proponent	During entire period of operation and even after that.
Existing trees	No damage to trees will be done at any step.	Proponent	During entire period of operation and even after that.

Heaps of Collected Solid Waste / Debris	To be covered with plastic sheets.	Proponent	During operation
Carriage of Solid Waste along main roads	To be covered with plastic sheets.	Proponent	During operation

3.17 GOVERNMENT APPROVALS

NOC from District Police Officer Nankana Sahib, District Traffic Officer Nankana Sahib, LESCO Nankana Sahib, PTCL Nankana Sahib, Deputy Manager Operation Division Nankana Sahib, Civil Defence Officer Nankana Sahib, District Emergency Officer Nankana Sahib, Divisional Forest Officer Sheikhupura / Nankana Sahib are obtained and annexed at the end of the report.

CHAPTER – 4

DESCRIPTION OF ENVIRONMENT

4.1 GENERAL

This section describes the baseline conditions, which cover the existing physical, ecological, and socio-economic environment of the Project Area. Information on these aspects has been derived from the desk study of available data, field visits to the project area as well as information obtained through visits to the Government departments and other agencies.

Information regarding physical environment is collected within project area. While incase of biological and social environment, efforts were made to collect the information in 0.5 km around the project area and even upto 1 km incase of any direct or indirect impacts were envisaged.

4.2 PHYSICAL ENVIRONMENT

4.2.1 Geology

The land of Pakistan provides a fascinating exhibition of geological evolution. It is a bonanza of different lithospheric plates, which have been accreted together in such a way that has a rare parallel in the world with respect to its structure, relief, rock types and landscape. It has an assemblage of rocks, which probably has a complete succession of rocks ranging from the deep mantle of the earth to rock of the upper lithosphere.

4.2.2 Land Use

Major portion of the Punjab Province falls in the Indus Plain, which geologically

originated in Late Pleistocene period by deposition of sediments from the Himalayas into abyssal sea. In early days the sediments were carried by two river systems, viz., Indus and Ganges. Later in the geological history, the Ganges River changed its course from westward to eastward.

The Indus River and its five major tributaries, viz., Jhelum, Chenab, Ravi, Bias and Sutlej, carved the deposits of the early river systems. These river systems are spread in the Punjab Plains like fingers of a hand, consequently dividing the whole province into four masses of lands called Doabas (meaning the lands between two rivers). Nankana Sahab District lies between Chenab & Ravi known as Sandal bar.

The soils generally range from loamy sand to clay loam. The lands are extensively cultivated under irrigation from canal systems off-taking from various rivers. Groundwater is also extensively exploited for irrigation purposes by installing deep and shallow tubewells.

The site area lies between plus minus 150 metres height above sea level. About 30 % of the project area is uncultivated while remaining 70 % is being cultivated by irrigation water as well as ground water through tubewells. The main crops being cultivated in the district include wheat, sugar cane, cotton, rice, maize, etc.

4.2.3 Water Resources

i) Surface Water

The social and economic life of the province mainly revolves around Indus Basin plain as it generates about 90% of the Punjab's total agricultural income

The Indus Plain does not have a well-defined natural drainage. The introduction of irrigation system therefore resulted in surface and subsurface drainage problems resulting in water logging and salinity, which has continued to aggravate over the

period. This has adversely affected the socio-economic conditions of the large rural population by impairing agricultural production and also creating health hazards. Massive efforts have been undertaken since 1960 to overcome this problem by implementing a large number of surface and sub-surface drainage projects.

In spite of these efforts, water logging has not been completely eradicated. Consequently, pockets of wetlands resulting from the water logging are encountered in plains of Punjab.

ii) Ground Water

The ground water resources are available in abundance in the Project Area. Ground Water Table (GWT) exists at a depth of about 50 to 60 ft below natural Ground Level (NSL). To meet the agriculture and drinking requirements, number of tubwells has been installed all over the tract.

4.2.4 Climate

i) Temperature

In the Project area, January is the coldest month with mean daily minimum temperature 4.1^{o}C and the June is the hottest month with mean daily maximum temperature of 40.5 ^{o}C and 48 ^{o}C a maximum daily temperature. However, in the Project area summer is very hot and winter is very cold. Temperature variations are tremendously high in the Project Area.

ii) Wind

The wind direction in winter months is north-west and in summer south-east with average yearly speed varying from 0.5 to 1.1 knots.

iii) Rainfall

Out of the eight climatic zones of Pakistan, Nankana Sahab district is located in hot arid climatic zone, associated with 125 – 255 mm rains. 100% of the site falls in this zone.

Broadly, there are four well marked seasons in Pakistan. These are:

1. Cold season (December to March)
2. Hot season (April to June)
3. Monsoon season (July to September)
4. Post-Monsoon season (October and November)

4.2.5 Ambient Air Quality and Noise Level

Information on ambient air quality in rural areas is totally missing. This is mainly because air pollution is primarily a hazard for urban areas where the increasing number of industries and vehicles is increasingly concentrating the pollutants in air and also prevents them from being dispersed. As far as rural areas are concerned the air quality has not been a problem, except near sources of noxious and large emissions, such as industries. Therefore, no attention has been given in that direction.

4.3 BIOLOGICAL RESOURCES

4.3.1 General

Once rich in natural vegetation the land use pattern of the Indus Basin and other areas has greatly been modified for want of land for cultivation. This has changed the pattern of flora wherever irrigation was possible.

The total geographic area of Nankana Sahab District is 2,960 km^2 (1,140 sq mi)

No wild life sanctuaries, forest areas etc. are located in or near this site.

4.3.2 Tropical Thorn Forest

Most of this region has been cleared for cultivation. Remnants of the original flora are almost vanished for need of fuel wood, grazing, timber, and felling by charcoal burners. The Project area falls in this vegetation zone. About 20% of the project area has still original flora existing over it.

4.3.3 Flora

After clearing the Tropical Thorn Forests, using canal water irrigation, better areas were cultivated.

Main tree species grown are: *Dalbergia sissoo (shisham), Morus alba (Mulberry), Acacia nilotica (kikar), Populus Spp*. (Poplar), and *Eucalyptus camaldulensis (sufaida).*

Indigenous flora includes *Prosopis cineraria, Tamarix aphylla, Capparis aphylla* and *Salvadora oleoides* with undergrowth of *Chenopodium album,* and *Cannabis sativum*.

4.3.4 Fauna

Due to thickly populated project area, wildlife except wild boar jackal, porcupine, wild cat and hare have vanished. Mammals and reptiles are seen at very rare places. With the development of site, these will no significant effect on them.

4.3.5 National Parks, Reserved Forest Wild Life Sanctuaries

In the Project Area or in its close vicinity or even upto 5 km from Project site, no national park, reserved forest and wild sanctuaries were observed.

4.3.6 Migratory Birds

As no major water body exist in close vicinity of the Project Area, so no migratory birds were observed in the area.

4.3.7 Endangered Species

No floral and faunal endangered species were observed in the Project.

CHAPTER – 5

SOCIAL BASELINE CONDITIONS

5.1 SOCIAL AND CULTURAL ENVIRONMENT

5.1.1 Administrative Setting

District Nankana Sahib was established on July, 2005. Previously it was a sub-division of Sheikhupura District. District Nankana Sahib comprised of the following 4 Tehsils till December, 2008.

- Nankana Sahib
- Shah Kot
- Sangla Hill
- Safdarabad

Note: Tehsil Safdarabad has been made part of District Sheikhupura w.e.f 01-12-2008.

Source: https://www.punjab.gov.pk/nankana

5.1.2 Settlement Pattern

The settlement pattern of the Project area and its vicinity is all rural. No urban settlement exists in the close vicinity of the Project site. This was one of the major reasons to choose the Project site in this location that it is far away from urban developments.

5.2 QUALITY OF LIFE IN THE STUDY AREA

An effort was made to collect the socio-economic information through structured questionnaires relating to the demographic features of the population resided in the study area. The demographic features include the information on ethnicity/tribes, size of households, gender composition, and literacy status of the population in the project area.

5.2.1 Family Size

In the project area, the population is living in an extended, joint and nuclear family system. An extended family system refers to the house where parents and grand parents are living together in a house, while joint family system includes the house where, parents, brothers, sisters, sons, daughters are living together. The nuclear family includes only a single family, i.e. husband, wife & kids.

5.2.2 Education Status

Literacy is not just attaining the skills of reading and writing but providing people with the skills to learn, protect and empower themselves in society and effectively contribute in decision making at various levels. The general disparity in education exists in low-income communities. **Table 5.2.**

The overall literacy rate of the selected population was 56.20 percent. Illiterate people are 43.80 percent and rest of them is literate ranging to primary to masters as given below:

Summary Results of Key Indicators - District Nankana Sahib

Results are in per cent, unless otherwise stated

TOPIC	Indicator No.			INDICATOR	MICS 2007–08		MICS 2003–04	
	MDG	Global MICS	Punjab MICS 2007–08		District	Punjab	District (a)	Punjab
LITERACY AND EDUCATION								
	8		44	Literacy rate 10+ years	55	59	50	54
Literacy			45	Adult literacy rate 15+ years	50	56	48	52
		60	46	Adult literacy rate 15–24 years	71	73	68	68
		52	36	Pre-school attendance	16	14	-	-
		54	39	Net intake rate in primary education (5 years)	19	19	-	-
				Net intake rate in primary education (6 years)	36	38	-	-
	6	55	37	Net primary attendance rate (5–9 years)	54	53	56	51
			38	Gross primary attendance rate	100	97	101	88
			43	Net primary school attendance rate:				
				- Government schools	65	56	-	-
				- Private schools	34	43	-	-
Education		56	40	Net middle/ secondary attendance rate	27	29	31	33
	9	61	42	Gender parity index for:				
				- Primary education	0.95	0.96	0.91	0.93
				- Middle/secondary education	0.89	0.94	0.95	0.88
			41	Primary educational facility within 2 km:				
				- Government boys	98	93	-	-
				- Government girls	97	91	-	-
				- Private boys	77	75	-	-
				- Private girls	78	74	-	-

5.2.3 Nature of Occupation

In the study area, the major occupations include business (shops, stores etc.), service (government, private), drivers, labour (skilled & unskilled) etc. The socioeconomic baseline survey results summarized in **Table 5.3** reveal that on overall basis in the study area, 4.41 percent operates business (general stores, shops etc); 10 percent are labourers, etc. 3.86 percent are Govt servants and 14.60 percent are in private service and rest of them are in other professional as tabulated below:

Table 5.3: Percentage of Occupations of Sample Population

Occupation	Percentage
Govt Servant	3.86
Private	14.60
Shop	3.58
Driver	3.31
Laborer	10.74
Student	9.92
House Maid	9.09
House Wife	32.51
Jobless	8.82
Old / Retired	2.75
Business man	0.83

5.2.4 Household Expenditure

The annual expenditure and pattern of expenditure provides an indication for assessing the standard of living of a household. The expenditure on food items includes cereals, pulses, flour, sugar, cooking oil/ghee, milk etc., while the non-food items consist of expenditure on education, medical treatment (if any), clothes etc., electricity and gas etc. In this respect, survey results are depicted in **Table 5.4**.

Table 5.4: Average Annual Food and Non-Food Expenditure per Family

Item	Annual Expenditure		Occasional Expenses last year	Average Annual Bills			Avg. Annual Expend i-ture on Health Rs	Avg. Exp Per family (Rs.)
	Food	Non Food		Electricity	Gas	Communi-cation		
Sample Population	42050	14500	49770	4147	4674	398	3181	6083

5.2.5 Housing Conditions

Housing conditions are also one of the indicators for the assessment of living standard/ household well-being. It was observed during the field survey that 85.0 percent of the sample respondents had their own houses under a status of simple ownership outside the project corridor.

As far as the housing conditions are concerned, it was assessed during the field survey that 4.0 percent are katcha, 32.4 percent katcha+pacca and 69.6 percent are pacca houses in the project district. The details of houses characteristics outside/inside the corridors are given in **Table 5.5.**

Table 5.5: Housing Characteristics in/out the Project Area

Study Area	Housing Conditions		
	Katcha	Pacca	Katcha + Pacca
Living Room	0.0	68.2	31.8
Animal Shed	4.0	-	-
Bathroom	-	0.6	0.4
Latrine (Flush)	-	0.8	0.2

5.2.6 Extent of Credit Utilization

Generally, the credit is obtained to supplement the income to meet routine and some occasional expenditure of the household including investment, social needs and other unforeseen situations. Credit is obtained from formal (banks/institutions) and informal sources (friends, relatives, land owners etc.). Mostly people do not like to get credits from the government saying that the mark up rate is very high.

5.2.7 Physical Infrastructure and basic Amenities

Generally, in the study area, drinking water is available to the population through hand pumps, electric motors or shallow wells. As depicted in **Table 5.6**, it was observed that on the whole, majority of the population has access to drinking water and most of them has facility of electricity. Rest of the amenities is tabulated below:

Table 5.6: Access to Social Infrastructure along the Project Corridor

Study Area	Access to Social Infrastructure			
	Available	**Satisfactory**	**Non Satisfactory**	**No Access**
Electricity	50.6	35.3	13.2	0.9
Sui Gas	12.4	10.9	1.5	75.2
Water Supply	0.9	0.9	0.0	98.3
Telephone	50.2	26.8	20.9	2.1
Sewerage/Drainage	1.7	0.0	0.0	98.3
Health Unit	49.6	34.0	16.0	0.4
School	50.6	42.1	7.2	0.0

5.3 PROJECT AFFECTED PERSONS

There is no Project Affected Person.

5.4 CULTURAL, RELIGIOUS AND OTHER STRUCTURES

No cultural structures are located inside the project area. No graveyard was located within the Project boundary.

5.5 HISTORICAL AND ARCHEOLOGICAL SITES

No site of historical and archeological importance was observed within the Project as well as study area.

5.6 SOCIOECONOMIC DEVELOPMENT

Emloyment	60	Unemployment rate (15+ years)	6.1	6.8	-	-
	61	Family member working outside village/ town	12	12	3.8	9.6
	74	Percent of households who own three or more possessions	93	89	63	56
	75	Percent of household members who use at least one utility	94	94	91	83
Housing and Assets	73	Household characteristics:				
		- Finished floor (pacca)	45	57	-	-
		- Finished roof (pacca)	83	84	-	-
		- Finished wall (pacca)	81	76	-	-
	59	Ownership of assets:				
		- House	86	84	85	86
		- Land	39	34	26	32
		- Livestock	58	51	35	41
	71	Mean household size	6.6	6.5	7.0	6.6
	72	Mean number of persons per room	3.8	3.7	3.9	3.4
Remittances and Zakat	63	Receiving remittances within Pakistan	5.2	5.5	0.7	4.2
	64	Receiving remittances from abroad	2.1	4.1	1.3	4.3
	65	Receiving cash donation	0.9	1.4	3.1	3.8
Social Benefits, Subsidies and Families Support Programmes	66	Safety nets:				
		- Receiving pensions	4.2	6.2		
		- Getting benefits from Government schemes of social protection	22	16	-	-
		- Purchasing goods from government utility stores	4	12	-	-
		How often:				
		- Regularly	16	17	-	-
		- Rarely	71	79	-	-

a = pertains to Sheikhupura district as Nankana Sahib was a tehsil of that district in 2003-04

CHAPTER - 6

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.0 ENVIRONMENTAL PARAMETERS

This section identifies the potential impacts related with operation of the project on the physical, ecological and socioeconomic domains of the environment. Accordingly mitigation measures have also been reported to manage the environment and for sustainable development. The project activities will neither adversely affect the population nor the environment around the project site.

6.1 ENVIRONMENTAL PARAMETERS ASSOCIATED WITH LOCATION OF PROJECT

Environmental problems related to the location of the project are mostly in the areas of physical setting, socioeconomic setting, ecological and special areas the unit is located in District Nankana Sahib. Field survey revealed that impacts of the current project due to its location are insignificant in nature. As discussed earlier that there is no physical setting, socioeconomic, ecological and special areas around the project area. Transportation of the machinery and equipment as well as raw materials will be responsible for the backend impacts. Because of their very nature, the majority of the frontend are likely to abate with the completion of the project's operation e.g., generation of undue noise, exhaust emissions from consumption of fossil fuel in the machinery and generation of drag dust from enhanced movement of vehicles in connection with various project activities.

6.1.1 Impact Assessment Methodology

A comparative analysis of both the negative and the positive impacts has been carried out with respect to the existing baseline conditions. The said comparison followed a

parametric and a non-parametric scheme i.e., how and to what extent various environmental quality parameters (e.g., relating to soil, air, water, and aesthetics) and non-parametric aspects (economy, social value system, employment, lifestyles, and behavioural patterns) will be influenced by the various project activities within the project's radius of influence.

6.2 PROJECT DESIGN

The design of project has sought to minimize any environmental potential impacts by ensuring that the project should be in accordance to the environmental standards. Local aesthetic value, wind direction, human settlement was also considered during project design.

6.2.1 IMPACTS AND MITIGATION MEASURES DURING CONSTRUCTION PHASE

The discussion following hereinafter relates to the construction phase impacts of the project onto various important environmental parameters.

6.3 LAND RESOURCES

This section explains how the project will affect the land use, soil erosion and contamination, and describes mitigation measures to manage these impacts.

6.3.1 Impact on Land Use and Resources

A. Land Productivity and Use

Open pits containing water will be potential sources of mosquito breeding if left stagnant, and can create health problems.

6.3.2 Mitigation Measures

The mitigation measures, which will be carried out in design stage, construction as well as operation stages for land resources are as under:

A. Land Productivity and Use

a) As far as possible, waste/barren land i.e. areas not under agricultural, residential or forestation use, and natural areas with a high elevation will be used for borrow material.

b) The excavation of earth fill will be limited to an approximate depth of 50 cm. This practice will be applied uniformly across the entire extent of the land unit acquired for borrowing earth material.

B. Soil Contamination

The following practices will be adopted to minimize the risk of soil contamination:

a) The proponent will be required to instruct and train their workforce in the storage and handling of materials potentially causes soil contamination.

b) Solid waste generated during construction and at campsites will be properly treated and safely disposed off only in demarcated waste disposal sites.

Proper solid waste storage will be adopted for the project such as:

a) All garbage or other waste should be securely wrapped in similar material bags.

b) All cans, bottles, or other food containers would be rinsed free of food particles and drained before being placed in collection containers.

c) Collection containers should be kept tightly sealed or covered at all times. Solid waste must not protrude or extend above the top of the container.

C. Primary Collection

The solid waste from the area would be collected by the staff which will be arranged by Proponent. The staff would be made readily available on call.

D. Public Awareness

For a safe and systematic disposal of Solid Waste, the public awareness can play a vital role. Press releases, seminars, social organizations and ground breaking

ceremony can be the major sources of public awareness. All such type of public awareness sources for safe and systematic disposal of solid waste should be used.

6.4 WATER RESOURCES

This section explains how the project will affect the water resources use, contamination of water bodies and groundwater, siltation of surface water resources and alterations in drainage pattern; the section also describes mitigation measures to manage these impacts.

6.4.1 Impact on Water Resources

The surrounding land's drainage system and water resources will be affected by construction and operational activities as follows:

Contamination of Surface and Ground Water Resources

a) During operation stage, disposal of wastewater into natural streams/canal will deteriorate the surface water quality.

b) Seepage of polluted water during monsoon season through garbage areas will deteriorate the groundwater quality during operation stage of the project.

6.4.2 Mitigation Measures

Measures to mitigate the adverse impact on water resources and surface drainage patterns will be incorporated into the project design and are discussed below:

A. Use of Local Water Supplies

a) In the project area, prior to start of construction activities, the availability of water will be assessed to evaluate the impacts on the community resources. A tube well will be installed for the purpose.

b) No existing water resources under the use of community will be exploited by the Contractor for construction purposes without consultation with concerned community.

6.5 AMBIENT AIR QUALITY AND NOISE LEVEL

This section discusses the impact of the construction and operation on the ambient air quality and noise levels in the Project Area. It also describes the mitigation measures to manage these impacts.

6.5.1 Impacts

Ambient Air Quality

Air quality will be affected by the fugitive dust and emissions from the construction machinery during the construction phase. Emissions may be carried over long distances, depending on wind speed and direction, the temperature of the surrounding air, and atmospheric stability.

Noise Level

Noise generated by the construction machinery during the project construction and subsequently by vehicular traffic will be likely to affect the project area particularly the sensitive receptors like schools, hospitals etc. However, no sensitive receptor has been observed within the project area.

6.5.2 Mitigation Measures

The following measures will be implemented to mitigate the impacts on the ambient air quality and noise level:

Ambient Air Quality

a) Vehicles and other construction machinery should be properly tuned and maintained, so as not to emit any smoke.

b) The PEQs applicable to gaseous emissions generated by the construction vehicles, equipment and machinery will be enforced during the construction works.

6.6 BIOLOGICAL ENVIRONMENT

The impact on flora and fauna and corresponding mitigation measures are described in the following paragraphs:

6.6.1 Impacts on Flora and Fauna

(a) Flora

Trees & Shrubs

The only trees which grow near project site include: Kekar (Acacia nilotica (L.) Delile, Neem (Azadirachta indica), Mulberry (Morus alba), Willow (Salix spp),

Shishan (Dalbergia sissoo), Siris (Albizzia procera), Mango (Mangifera indica), Bakain (Melia azadarich)

(b) Fauna

The project is walled and surrounded by open land. Therefore, there will be no adverse effect on their existence as they have already vanished.

6.6.2 Mitigation Measures

(a) Flora

Trees and Shrubs

The plantation program for the vacant sites which are mentioned on the design has been prepared and which will be implemented.

(b) Fauna

As already mentioned, there will be no effect on fauna of the area.

6.7 IMPACT AND THEIR MITIGATION MEASURES DURING OPERATIONAL PHASE

6.71 Fire Hazard & Explosion

Impacts

Hydrocarbons are volatile under certain conditions and their vapours in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise.

It is very important to take public safety into account when locating LPG storage facilities, as the public can be at risk from potential spills, vapour emissions and fires. Risks from these can be minimized through implementation of buffer zones. Different type of developments may be located within specified distance from these facilities, as well as different industries having different number of workers working in them.

Fire is one major hazard in LPG Storage and Filling Plant, due to chances of spills or leakages. Fires can cause loss of life and property. However, at the same time fires have the potential to severely harm the people in the vicinity and affect the environment.

LPG cylinders exposed to fire can be pressurized to the point where the pressure relief valve opens, causing a dangerous jet of burning gas. Cylinders can also explode in the extreme heat of a fire, throwing debris far and wide. A container that has held LPG and is "empty" may still contain LPG in vapour form and is thus potentially dangerous.

6.7.1.1 Accidental Spills / Leakages

Spills from the pipeline, storage tanks and during other transportation can potentially affect the soil, water resources, flora and human being. The greatest hazard in working with LPG is that, it may leak as a gas. If it leaks, it will quickly evaporate and form a relatively large cloud of gas which will drop to the ground, as it is heavier than air. LPG vapours can run for long distances along the ground and can collect in drains or basements. When the gas meets a source of ignition, it can burn or explode.

The vaporization of LPG can cause severe cold burns to the skin similar to frostbite and can also cool equipment so that it may be cold enough to cause cold burns. Although non-toxic, leakage of LPG, for example from valves or pipe connections, can displace air and cause asphyxiation. LPG does contain a powerful odorant so that leaks can be detected easily. The use of LPG cylinders may involve manual handling and the risks associated with this.

Mitigation Measures

Risks involve with the fire and explosions hazard can be reduced by adopting following measures:

- Potential impacts due to fire and explosion will be minimized through use of leak detection system and a fire suppression system consistent with the international guidelines.
- Control Systems and Operational Procedures will be in place to minimize the potential for the fire or explosion and resultant impacts to the operation, population and personnel.
- Standard fire and smoke detection and protection devices such as alarms, fire hoses and hydrants to be provided in all critical areas.

- The facility will possess a detailed emergency and evacuation plan that will be regularly drilled to make sure that the responsible staff remains trained at all times.
- Firefighting equipment such as fire extinguishers and hydrant system will be maintained at strategic locations within the premises.
- Regular inspection and servicing of the extinguishers will be undertaken by a reputable service provider and record of such inspections should be maintained.
- Implementing safety procedures for handling of material.
- Proper grounding to avoid static electricity build up and lightning hazards

Procedures should be in place in case of a fire or a leak, which should include the following actions:

- Evacuating the premises to a safe place well away from the installation
- Activating the fire alarm if available
- Turning off all the LPG appliances if this can be done safely
- Contacting the LPG supplier to make safe during any leak at a cylinder or the associated pipe work
- Contacting a Gas Safe registered gas fitter to make safe any LPG appliance that is leaking or is not working properly
- Opening all the doors and windows where a leak is indoor
- Avoiding switching on or off any electrical equipment as this may cause a spark.

Safety Consideration

- All above-ground tanks for storage must be constructed of steel.
- Tanks are to be placed on steel or concrete supports, and anchored if its elevation is below the flood stage.
- All tanks storing flammable or combustible LPG shall be fitted with an emergency vent in case of exposure of fire.
- The tank's capacity must be labeled on the tank, and a level gauge should be visible to the operator filling the tank.

6.7.2 Air Quality

Impacts

It is anticipated that following are the main sources of the deterioration of air during the LPG storage:

- In terms of air quality, hydrocarbon vapours will normally be released during delivery of gaseous mixture in the tanks.
- Standby generators and worker's transport.
- Use of broken and un-metalled road for transportation means.
- Air emissions other than dust such as flammable hydrocarbon gases that include propane, butane, iso-butane and mixtures of the three LPG gases which is commonly colorless, odorless that readily evaporates into a gas
- Ambient air pollutant concentrations of Hydrocarbons (HC), CO_2, NO_x, SO_x and PM_{10} may also take part to pollute the ambient air.

  Major sources of those emissions are:
  - Exhaust from transport vehicles and standby generators. It is anticipated that this increase will be negligible and at very low scale.
  - Vapors emissions i.e. hydrocarbon (HC) through valves, tank roofs, etc. in the ambient air which may deteriorate air quality.
- In case of accidental fire, release of greenhouse gases in the atmosphere such as CO_2 as well as release of SO_x.
- **Accidental releases into air:** This chemical has a potential to harm human health and the environment around it if released accidentally into the atmosphere.

Mitigation Measures

Preventive measures will be considered by proponent in the design stage to avoid risk of air quality deterioration due to escape of hydrocarbon (HC) in form of fumes and vapors. Those mitigations for exhaust emissions are given below to reduce or keep the emission level within the limits:

- Leak and Gas detection system will be installed in order to detect accidental release of harmful emissions.

- Use of personnel protective equipment (PPE) such as safety goggles, dust mask, mufflers/ear plugs and other stuff.
- Generator and transport vehicles will be serviced regularly and any problem arise will be handled frequently.
- Road maintenance should be accomplished on regular basis.
- Safe driving speed will be advised to the drivers.
- Emission sources will be tested regularly as per requirement of Self-Monitoring & Reporting Regulations.
- Minimizing storage and working losses through installation of internal floating roof and seals.
- Minimizing work losses during filling and emptying through vapor balancing and vapor recovery techniques
- Maintaining the insulation of heavy gasoline storage tanks in good condition in order to maintain the negligible levels of storage loss typically associated with this type of insulation.
- Reducing the generation of dissolved gases by eliminating the pressure drop from the tank fill line.

6.7.3 Noise Impact

Impacts

The sources of noise that have been identified in the storage tank of LPG include the frequent movement of tank for filling and decanting purposes, pumps and operations of standby generators. The amount of noise will depend on the size and the model of the pump to be used.

Due to strict HSE policy and corporate requirements, all vehicles will be maintained and exhaust noise will be kept within the limits.

Noise level if high during operation phase may pose health issues to the workers if not wearing proper PPE's. Regular exposure to high noise may result in hearing impairment or hypertension. However, noise impact during operational phase will be minimum and insignificant. The operation of LPG terminal does not involve any such operation which will pose significant noise impact.

Mitigation Measures

Preferred mitigation measures to avoid or minimize impacts of high noise are given below:

- In the design, pumps will be adjusted to positions where lesser impact of noise is expected.
- Pump operators will wear mufflers/earplugs while operating or working nearby to pumps.
- Pumps will be regularly tested for any engineering fault. Engineering faults or unmaintained pumps generally cause high noise.
- Standby generators will be managed and maintained regularly.
- Truck drivers to be advised for turning off the engines when vehicle is in idle state.
- Truck drivers to be restricted to strict procedures for proper maintenance of vehicles.
- Steps will be taken to reduce the noise at the source level.

6.7.4 Solid Waste Generation

Impacts

In general, there is no source of solid waste due to operation of storage tanks. However, if considered it on broader spectrum, LPG storage and filling operations will increase the number of employees and wastewater generation that will cause indirect generation of solid waste in shape of general domestic waste in area and wastewater sludge waste. Impacts anticipated due to improper management of solid waste and its disposal may cause following impacts:

- The first and major impact which may arise due to unsatisfactory management of solid waste is the percolation of unmanaged leachate that may cause damage to underground water; soil quality may persist for longer time.
- Indirectly groundwater quality deterioration may affect human health. Use of contaminated groundwater may enter the food chain as a source of drinking water and irrigation for poor community.
- A lot of waste such as waste from foodstuffs, empty plastic containers, cartons, papers etc will be generated during the operational phase of the project. The project

is expected to generate large amount of solid waste on daily basis whose composition will be dominated by organic waste.

- Improper solid waste handling and storage will create aesthetic problems and issues. This will discourage motivation of workers and good working environment.
- Accumulation of solid wastes especially sludge and its unplanned removal from storage may cause nuisance in the surrounding area due to its bad smell.
- During the operation phase, if the sites for dumping solid wastes are not properly managed, they may cause contamination of ground water sources.

Mitigation Measures

Preventive measures which need to be adopted for solid waste management are given below:

- Proponent will allocate an area in the facility for the storage of sludge and other waste.
- The capacity will be increased keeping in view the estimated amount of solid waste generated from tank storage areas and other sources.
- Solid waste storage facilities will be properly lined with impervious material.
- Third party contractor will be hired for the disposal of solid waste and required, recyclable waste will be sold out frequently.
- All areas of solid waste storage will be monitored on regular basis.
- Efficient waste management scheme that will prevent the accumulation of uncontrolled waste, as well as an efficient collection system and off-site disposal.
- It is important to designate and maintain collection areas/drums of domestic waste such as plastic, paper, glass etc.

6.7.5 Wastewater Generation

Impacts

Domestic wastewater of the site, mainly include employees bathing and washing drainage water and toilet drainage water. There will also include sewerage and process wastewater. Process wastewater consists mainly of tank bottom draining and contaminated storm water runoff, including water from tank leaks and spills that

collects in hydrocarbon contaminated secondary containment areas. Other possible sources of wastewater include LPG contaminated water from washing of LPG storage tanks, and wastewater from vapor recovery processes.

Contaminated storm water quality and volumes may depend on site-specific considerations including overall housekeeping and spill prevention practices, rainfall, and total runoff area.

Rainwater infiltration, condensation of moisture from tank vapor space, and water present in the product itself prior to delivery may all contribute to the presence of water inside product storage tanks. Water that separates and settles at the tank bottom should be periodically drained from the bottom of the tank, resulting in a waste effluent.

Mitigation Measures

Measures to minimize generation of LPG contaminated storm water runoff primarily include:

- Application of effective spill prevention and control
- Implementation of secondary containment procedures that avoid accidental or intentional releases of contaminated containment hydrocarbons.
- Installation of storm water channels and collection ponds with subsequent treatment through water separators should be properly selected, designed, operated, and maintained.

Measures to prevent the accumulation of tank bottom water include:

- Regular maintenance to locate and repair / replace tank roof, seals, or other sources of water infiltration.
- Use of domes on floating roof tanks to reduce rainwater penetration.

6.7.6 Labour Safety & Occupational Health

Impacts

A planned approach to safety is essential for any facility:

- Ambient noise level is expected to increase slightly due to pumping of LPG.
- Impacts will be of short term and within limited area.
- Accidental spills/leaks if in contact with workers can be hazardous for the workers

life and lead to mortality to some extent.

- In case of accidental fire, it may cause explosion due to high flammability of hydrocarbons and if workers are within the limit, may lead to mortality and severe damage to human life.
- The potential occupational health and safety impacts during operation phase include injuries to workers from routine monitoring and maintenance and deaths and injuries from major disasters e.g. explosions and fire outbreaks. During the operation phase, the workers may come in contact with LPG and suffer from severe cold burns.

Mitigation Measures

In order to tackle above health and safety issues, following methodologies will be beneficial:

- Personal Protective Equipment (PPE's) will be supplied to workers such as helmet, earplugs, safety goggles, hand gloves, safety shoes, gas mask, etc. Workers will be strictly advised to wear PPE's at all time while within the project site and tank storage area.
- Tanks should be inspected frequently. It will help in identifying all spill/leak points.
- In case of an emergency/accident, Emergency Response Plan and Disaster Risk Management Plan shall be followed.

Table: Characteristics of Environmental Impacts

S #	Environmental Impacts	Impact Characteristics			
		Nature	**Duration**	**Reversibility**	**Significance**
1	Fire Hazard & Explosion	Adverse	Short Term	Irreversible	Low Significance (if, Provided measures are effectively implemented)
2	Air Quality	Adverse	Long Term	Irreversible	Low Significance (if, Provided measures are effectively implemented)

3	Noise	Adverse	Long Term	Reversible	Low Significance (if, Provided measures are effectively implemented)
4	Change in Soil Condition	Adverse	Long Term	Irreversible	Low Significance (if, Provided measures are effectively implemented)
5	Ground Water	Adverse	Long Term	Irreversible	Low Significance (if, Provided measures are effectively implemented)
6	Solid Waste	Adverse	Short Term	Reversible	Low Significance (if, Provided measures are effectively implemented)
7	Labour Safety & Occupational Health	Adverse	Long Term	Reversible/ Irreversible	Low Significance (if, Provided measures are effectively implemented)

6.8 SOCIOECONOMIC AND CULTURAL ENVIRONMENT

This section describes the impact of the Project on local communities, construction workers, indigenous and vulnerable people as well as on structures or sites of cultural and religious significance.

6.8.1 Social Impacts

(a) Impacts on Local Communities/Workforce

a) Community will have to face the noise and dust problems during the construction phase and air and noise emissions during operation stage.

b) Pollution of the community resources during construction and operation stages.

(b) Gender Issues

As the project area lies close to the rural areas and rural community, women activities in the field may become affected due to the construction activities.

(c) Indigenous, Vulnerable and Women Headed Households

During field visit of the project, no indigenous group of people was identified. So, no impact on the indigenous people will be envisaged due to the implementation of the project.

(d) Safety Hazards

Occurrence of accidents/incidents during the construction and operation stages may occur to the workers.

(e) Religious, Cultural and Historical Sites

No such site will be adversely affected.

(f) Sensitive Areas, Game Forest Reserves

No such area exists in the vicinity.

6.8.2 Mitigation Measures

(a) Local Communities/Workforce

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

The Proponent will be required to maintain close liaison with the local communities to ensure that any potential conflicts related to common resource utilization for the project purposes are resolved quickly.

Proponent will take care of the local community and sensitivity towards the local customs and traditions will be encouraged.

Effective construction controls by the Proponent to avoid inconvenience to the locals due to noise, smoke and fugitive dust.

(b) Loss of Income

No such problem will be foreseen. Rather income sources will increase.

(c) Gender Issues

The Proponent will have to select the specific timings for the construction activities so as to cause least disturbance to the local population particularly women considering their peak movement hours.

(d) Indigenous, Vulnerable and Women Headed Households

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

(e) Safety Hazards

Training of workers in construction safety procedures, environmental awareness, equipping all construction workers with safety boots, helmets, gloves, and protective masks, and monitoring provided with their proper and sustained usage.

Contractor will ensure the provision of medicines, first aid kits, vehicle, etc. at the site.

A contingency plan will be prepared by the Contractor to handle any abnormal situation like fire, storm, etc.

(f) Relocation of Private/Public Infrastructure

No such issue will arise.

(g) Religious, Cultural and Historical Sites

No such site is located in near vicinity of site.

6.9 RISK ASSESSMENT FOR LIQUEFIED PETROLEUM GAS STORAGE TANK

It follows the specific line of action i.e.:

- Identifying the significant hazards that are present (a hazard is something that has the potential to cause someone harm or ill health).
- Deciding if what you have already done reduces the risk of someone being harmed to an acceptable level, and if not;

- Deciding what further control measures must have taken to reduce the risk to an acceptable level.

	Hazard Identification	Risk Calculation			Risk Reduction	Residual Risk			Laws Applicable
	Hazard	**Likelihood**	**Severity**	**Risk Rate**	**Control measures**	**Likelihood**	**Severity**	**Risk Rate**	
Design Phase	Inaccessibility of the location can be very critical in emergency fire and increase the severity of damage	3	4	12	LPG tank is located in an area which can be accessible from all sides	1	3	3	OGRA Standards under (LPG Storage and Filling Plant) under the section plan layout
Construction Phase	Work at height can cause fall from height	4	5	20	Use of safety harness while working at height	1	5	5	Labour Laws of Pakistan
	Working in confined space can cause Asphyxiation / Asthma	3	4	12	Proper ventilation of the area	2	4	8	Labour laws of Pakistan
	Working with operational tools can cause worker's injury	3	3	9	Provide workers with appropriate PPEs	2	1	2	Labour Laws of Pakistan
Operational Phase	Entry of unauthorized person to the gaseous	4	5	20	Permit to Work (PTW) system is already in	1	5	5	

	storage area can result in major disaster				place for the entry into sensitive places				
	Overfilling of tank can result in spill of LPG plus increase the risk of fire	4	4	16	Intact automatic gauge system to avoid overfilling	1	4	4	(LPG Storage and Filling Plant) Automatically shut off the flow of LPG into the tank when the tank is no more than 95 percent full
	While loading the tank, the spills can contaminate the ground water and soil	4	4	16	Loading area is fully paved, restricted and drained so that all Spills from trucks and equipment would flow quickly to the catch pits and drains.	2	2	4	(LPG Storage and Filling Plant) Loading areas should be paved
	Accidental spillage from the tank can destroy the whole ecosystem of the area by deteriorating the water and soil	1	5	5	Tanks made of special structure to contain the LPG spill and prevent its spread to the adjacent area.	1	2	2	LPG Storage and Filling Plant
	Static charge is the most common phenomenon happens to	4	5	20	Hydrostatic testing will be done every time before filling the	3	2	6	LPG Storage and Filling Plant

	LPG tanks and results in major explosion				tank. Tank will also be having earthling connection in order to dissipate any charge				
Cleaning Phase	Entry of unauthorized or untrained person in a confined space can lead to accident or fire outbreak	4	5	20	Specialized permit to work in confined space will be issued to a registered person who is trained for confined space. No Entry would be allowed without permit	1	5	5	

Likelihood		Severity		Priority
Highly Unlikely	1	Trivial	1	Urgent action (Risk no 15 - 25)
Unlikely	2	Minor Injury	2	High Priority (Risk no 10 – 12)
Possible	3	Over 3 Day injury	3	Medium Priority (Risk no 5 – 9)
Probable	4	Major injury	4	Low Priority (Risk no 2 – 4)
Certain	5	Incapacity or Death	5	Very low priority –No action required (Risk no 1)

6.10 ENVIRONMENTAL AND SOCIAL EMERGENCY CONTINGENCY PLAN

To cater for the environmental and social issues during construction stage, special emergency contingency plan will be prepared by the Contractor at construction and operation stages respectively. The plan will be prepared for the following main items:

a) Availability of ambulance, first aid box, etc. at project site for carriage of workers to the hospital in case of any accident/incident.

b) For firefighting arrangements during construction and operation stages in case of any emergency.

c) Arrangements for leakage of any hazardous emissions/gasses from unit during operation stage.

d) Arrangements to cater for any storm or natural disaster like earthquake, etc.

e) Arrangements for any safety and security risks, etc.

CHAPTER – 7

ENVIRONMENTAL MANAGEMENT & MONITORING PROGRAM

7 GENERAL

This chapter deals with the policy framework for environmental management and monitoring. This also discusses that Client will be responsible for implementing and/ or monitoring the environmental mitigation actions.

7.0 OBJECTIVE OF ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) is the integral part of environmental assessment report. The primary objectives of the EMP are to:

- Define the responsibilities of project proponent, contractors and other role players, and effectively communicate environmental issues among them;
- Facilitate the implementation of the mitigation measures identified in the IEE by providing the technical details of each project impact, and providing an implementation schedule;
- Define a monitoring mechanism and identify monitoring parameters to ensure that all mitigation measures are completely and effectively implemented;
- All environmental safeguards are carried out correctly.
- Adverse impacts on environment are minimized.
- All relevant legislation is complied with
- The project is monitored for environmental impacts

7.1 STRUCTURE OF EMP

The structure of EMP should:

- Propose environmental control methods to be used to prevent or minimize environmental impacts.
- Assign responsibility for each control measures to a specific staff member.
- Identify key monitoring parameters and schedule of monitoring of these parameters identify training requirements at various stages of the development of the project.
- Identify the resources required to implement the EMP and outline relevant expenses arrangements.

7.2 INSTITUTIONAL CAPACITY

The following organizations would be involved in the implementation of the proposed EMP;

- Proponent of the project
- Project Contractor, as the Executor of the EMP during construction stage of the project Environmental Manger / Supervisor to monitor and execute the EMP during construction and operation stage.
- Environmental Protection Agency (EPA) Punjab, as Government Department to review and monitor the implementation of remedial and mitigation measures as given in IEE Report.

7.2.1 Specific Implementation Responsibilities

The implementation of the EMP will be the prime responsibility of the project proponent. He will designate responsibilities and obligations to its selected contractors and Environmental Manager / Supervisor. Specific responsibilities of key role players are illustrated hereunder:

7.2.2 Proponent

Proponent will be responsible for ensuring overall implementation of the EMP during construction as well as operational stages of the project. He will provide the requisite financial resources to the contractor and Environmental Manager / Supervisor to implement the EMP. Key responsibilities of proponent are:

- Coordinate with regulatory agencies of district and EPA
- Communicate with local community and Regulatory Authorities in order to get time to time feedback of the stakeholders on various social and environmental concerns.
- Make sure liaison between the contractor / Environmental Manager / Supervisor and Environmental Consultant to check environmental compliance with EPA requirements.

The Contractor will be responsible for the implementation of all measures necessary to ensure that environmental impacts during construction phase should be minimized. In order to fulfill these requirements, Contractor will carry out the following:

- Implement environmental good practice measures outlined in the mitigation measures.
- Provide, to extent practicable, environmental training to the work force and promote environmental awareness.
- Coordinate with local authorities as appropriate.
- Facilitate consultants during environmental monitoring.

7.2.3 Environmental Manager / Supervisor

The principle responsibilities included:

- To monitor on daily basis whether operational activities are carried out in an environmentally sound and sustainable manner.

- Coordination with provincial and local officials, community groups, government departments, etc. on environmental issues.
- Monitoring of the environmental aspects of project during operation to ensure that the environmental impacts and the mitigation measures proposed in the EMP are implemented.
- Undertake critically important routine and visual monitoring of waste disposal and overall environmental management practices adopted.

7.2.4 Environment Protection Agency

The Role of EPA is on the apex and includes checking:

- Whether requirements of the Environment Approval awarded by the EPA against IEE report are met.
- The implementation of mitigation recommendations as given in IEE Approval for starting actual project operations is obtained from EPA and Orderly review of audit reports prepared internally or by a third party monitor.
- Carry out environmental monitoring on quarterly basis and advise any changes in the structure or implementation method of the EMP.
- Suggest or order any appropriate solutions.

7.2.5 Auditing

The Audit will be carried out internally by the Proponent, Contractor and Environmental Manager / Supervisor. The primary aim of the auditing is to assess compliance and effectiveness of the EMP as well as the alternative environmental and social objectives, and also to assess the effectiveness of corrective actions. Audit will also suggest remedial measures to overcome the environmental and social problems.

The external auditing will be carried out by the EPA, Punjab, in order to check compliance and implementation of EMP. The EPA will check various parameters with reference to various sections of PEPA- 1997 (amended 2012).

7.3 TRAINING SCHEDULES

TRAINING SCHEDULE OF CONSTRUCTION PHASE				
Activity	**Duration**	**Trainer**	**Venue**	**Addressee / Participants**
Work at height	1 Day	Environmental Specialist of Contractor	Onsite	20 Workers of Construction phase.
Emergency drills	1 Day	Environmental Specialist of Contractor	Onsite	20 Workers of Construction phase.
Health and Safety	1 Day	Environmental Specialist of Contractor	Onsite	20 Workers of Construction phase.
Water Sprinkling	1 Day	Environmental Specialist of Contractor	Onsite	20 Workers of Construction phase.
Briefing about EMP of construction phase	1 Day	Environmental Specialist of Contractor	Onsite	20 Workers of Construction phase.

7.4 EQUIPMENT MAINTENANCE DETAILS

Equipment maintenance details are given below:

i. Maintenance of vehicles = Daily basis
ii. Maintenance of firefighting equipment's = Weekly basis
iii. Maintenance of equipment and machinery = Annually
iv. Maintenance of Generator = Weekly basis
v. Maintenance of trees plantation and grassy area = Daily basis

7.5 ENVIRONMENTAL BUDGET

Sr. #	Activity	Budge (PRs)
1.	Personal Protective Equipments	50,000
2.	Water Sprinkling	50,000
3.	Tree Plantation and Grassy area	1,00,000
4.	Fire Fighting Arrangements	1,00,000
5.	Housekeeping	75,000
6.	Training of Workers	50,000
7.	Vehicle Maintenance	75,000
	Total	**5,00,000** **(Five Lac Pak Rupees)**

7.5.1 Mitigation and Impact Assessment

What is the problem	When will problem occur and when it	Where problem should be	How the problem should be

	should be addressed	addressed	addressed
Dust Pollution	During operational phase, it should be addressed during operational phase	During operational activities	Water Sprinkling

The following organizations would be involved in the implementation of the proposed EMP;

- Proponent of the project
- Project Contractor, as the Executor of the EMP during construction stage of the project Environmental Manger / Supervisor to monitor and execute the EMP during construction and operation stage.
- Environmental Protection Agency (EPA) Punjab, as Government Department to review and monitor the implementation of remedial and mitigation measures as given in IEE Report.

7.5.1.0 Mitigation and Impact Assessment

Purpose of Mitigation Measures should include:

- What is the problem i.e. in terms of "major environmental impacts" which may arise by the subject project activity?
- When the problem will occur and when it should be addressed.
- Where the problem should be addressed.
- And how the problem should be addressed.

The major impacts may arise by the subject project are, dust, noise, solid waste, and waste water. Other impacts are of minor importance. These impacts can arise during

operation but precautionary measures have been adopted prior to start the operational activity, during the activity and post activity.

Any impact that would arise due to the subject project activity will be addressed through proper channel and on site. Trainings will be conducted regarding HSE, firefighting, best work practices etc. while other precautionary measures are also adopted to make the project safe and environmental friendly.

Project proponent will be responsible for the implementation of EMP and he has appointed as a Project Manager/Environmental Manager along with site manager to assess any impact that could be arisen during operation of the project. He is responsible to address the problem and to mitigate it.

Whys of achieving Mitigation Measures By adopting proper mitigation measures, any anticipated major or minor environmental impacts could be controlled or mitigated. The detail of impacts and mitigation measures have been discussed previous chapters.

7.5.1.1 And how the problem should be addressed

The major impacts may arise by the subject project are, dust, noise, solid waste, and waste water. Other impacts are of minor importance. These impacts can arise during operation but precautionary measures have been adopted prior to start the operational activity, during the activity and post activity. Any impact that would arise due to the project activity will be addressed through proper channel and on site. Trainings will be conducted regarding HSE, firefighting, best work practices etc. while other precautionary measures are also adopted to make the project safe and environmental friendly.

Project proponent will be responsible for the implementation of EMP and he has appointed as a Project Manager / Environmental Manager along with site manager to assess any impact that could be arisen during operation of the project. He is responsible to address the problem and to mitigate it.

7.5.1.2 Ways of Achieving Mitigation Measures

Adopting proper mitigation measures any anticipated major or minor environmental impact could be controlled or mitigated. The detail of impacts and mitigation measures have been discussed previous chapters. Project proponent of project has been taking appropriate measures to provide pollution free and safe environment during the project activity by implementing improved management. Practices and monitoring techniques suggested in EMP. Management will further take necessary actions to mitigate any residual impacts. Project proponent of Management of unit will adopt such plan that will assure the minimum impact on the environment and health by implementing proper mitigation measures. Design of the building assures the structure stability in a long run. There was no dispute arose at the time of purchase the land and the land is the property of proponent of the project and if in future, There would arise any issue regarding environment degradation, the project proponent will compensate in terms of money as he has assured to achieve PEQS and compliance to other regulations made under PEPA 1997 (Amended 2012).

Plantation will be done within the unit and for this area is reserved. Project proponent will further develop Restoration / reclamation or tree plantation plan to restore the project area. Plantation will be enhanced with native species within the unit, along the boundary wall and along the road side as per direction by EPA Punjab.

7.5.1.3 Improved Monitoring and Management Practices

The aim of improving monitoring is to enhance the environmental performance of the project through its enforcing the PEQs at all stages of activities as well as dealing with an emergency as and when it may occur. The objective of exercising by the management of the unit is to ensure prevention of occurrence of any situation of emergency and incase of development of such a situation, steps required to be taken to manage the situation. The section also contains a set of environmental guidelines for avoiding and or preventing the adverse environmental impacts of the project. The

monitoring will be carried out in accordance with PEQs by the management. The proponent along with management will undertake monitoring of the safety, health and environmental aspect, it will be the best tool for achieving mitigation measures.

7.5.1.4 Compensation in Money Terms

There will be no affecting of the project because the land of project is owned by the proponent. The construction and operational activities at the project site will not damage inflict to any of the private properties, of the neighboring communities. Hence, no need of any sort of compensation. Not applicable in case of current project.

7.5.1.5 Replacement, Relocation and Rehabilitation

The management carrying all responsibility for cleaning and restoration will be carried out during immediately after each phase of construction and will be the responsibility of each team in their respective area of operation, if relocation of any public utility or facility will involve, it should be carried out well ahead the start of construction to avoid disruption of service to the user-community. Once the phase will over, efforts for restoring normalcy and rehabilitation should be initiated under instructions of the appropriate authorities or the project management committee, if any existing. Cleaning and restoration will be carried out during and immediately after each phase of construction and will be the responsibility of each team in their respective area of operation. The following measures will be taken in this regard.

All pin flags, stakes, signs and refuse will be removed.

- All concrete slabs will be broken and shipped to an appropriate site outside the Project.
- Proper Area for disposal.
- Site will be cleaned so that no refuse or wastes are left behind; the waste will be properly disposed off.
- All ditches and sumps will be backfilled.

- Contaminated soil will be removed and be proper disposed off.

7.6 ENVIRONMENTAL MANAGEMENT PLAN

7.6.1 General

Before implementation, every project has to obtain environmental clearance from the appropriate quarters of the Environmental Protection Agency (EPA). The letter of environmental clearance is to be seen as a conditional agreement between the project proponent and the EPD, wherein the project proponent declares that all care would be taken to avoid causing unnecessary damage to the ambient environment while implementing the given project and the EPD accepts it. The Environmental Management Plan (EMP) is vital so that the project proponent may provide a concrete and comprehensive plan and adequate budget for environmental management. This plan should state the procedure and the manner in which the project proponent would carry out the management of environment in the context of the given project.

Keeping in view the objectives, the Environmental Management Plan has been prepared that summarize the adverse environmental impacts of the Project and measures required to mitigate such impacts and to enhance the benefits of the Project. These have been expressed in the light of discussions on various aspects given in relevant Chapter. More specifically the EMP includes the following components:

(a) Environmental Impacts;

(b) Proposed Mitigation and Enhancement Measures;

(c) Organization responsible for implementing the EMP items;

(d) Monitoring requirements and;

(e) Organization responsible for Monitoring.

Environmental protection and enhancement are achieved in various ways. Generally speaking, these aspects need to be addressed right from the embryonic stage, i.e., I) design, specifications and tender/contract documents, ii) pre-construction phase, iii) construction activities and iv) post-completion O&M. Appropriate environmental management measures are required to be exercised in a cascading order by Client at each stage of the project.

In this way it is envisaged that the project will achieve maximum ongoing cost-effectiveness, environmental sustainability and social soundness. All stages of the project would be managed by adopting proposed environmental mitigation measures,

The crucial issues that need addressing at various stages of the project development are given in the subsequent paragraphs.

7.6.2 Design Related Issues

It is envisaged that besides considering the detail design from engineering point of view the contractors will also be reviewing and incorporating the environment related aspects.

7.6.3 Drainage Aspects

It is desirable that the drainage aspects should not only be considered from the angle of protection of building but also be reviewed from environmental standpoint. It should be ensured that appropriate drainage structures of adequate capacities are provided to avoid flooding.

7.6.4 Construction Related Impacts

The environmental and social issues relating to the construction activities and mitigation measures have been discussed in **Chapter 6**.

7.6.5 Operational and Maintenance Activities and Related Impacts

Design and construction related activities will be pursued within a pre-defined time frame. The quantum, magnitude and methodology of such like activities had made many transformational changes due to newly emerging modes of mitigation system.

Table below constitutes of an Environmental Management Plan of the project:

7.6.6 Environmental Management Plan for Construction Phase

Environmental /Social Impact	Proposed Mitigation Measures	Responsibility	Monitoring Plan/Indicator
Air pollution	• Speed and operation of construction vehicles may be controlled • Idling of vehicles may be prohibited • Excavated areas are recommended to spray with water. • It will be suggested to keep check on maintenance of construction plant and equipment. • Sensitize the construction workers. • All bare areas will be landscaped after	Contractor	Amount of dust produced Level of landscaping carried out.

	construction. • Workers will be provided with dust masks if working in sensitive areas.		
Noise Pollution	• Plant equipment is recommended to be maintained. • Construction is recommended to be carried out only during daytime i.e. 08:00 – 17:00 hrs. • Workers will be advised to wear ear muffs if working in noisy section. • Management may ensure that noise from the residents will be kept within reasonable levels	Contractor/ Management	Amount of noise
Traffic density	• Proper signage may put in place to notify neighbors of the activity and presence of heavy vehicles and to direct traffic. • Presence of boards directing patrons to the	Contractor/ Management	Clear well maintained sign boards along the roads.

	site. • Strict adherence to traffic rules		
Ecological considerations (flora & fauna)	• The flora and fauna may restore after construction by landscaping and maintaining the introduced plants.	Management	Natural ecology in areas not in use
Soil erosion and compaction	• Soil conservation structures on the areas prone to soil erosion to reduce impact of erosion may be provided. • There might be designated pathways and driveways for movement within the compound to avoid unnecessary compaction. • All bare areas should be well landscaped after completion.	Contractor	Paved area and landscaped areas.
Solid waste	• Construction debris will be collected by a licensed private contracted waste collection company • Excavation waste is	Management	Presence of well-maintained receptacles and central collection

	recommended to be re-used or backfilled. • Waste generated is recommended to be collected by a privately contracted waste collection company and the contractor should ensure the construction of a central waste collection point with bulk storage facilities. • The site may have waste receptacles with bulk storage facilities at convenient points to prevent littering during occupation.		point.
Security	• Control of secondary businesses is recommended. • Round the clock security for the facility. • Adequate lighting and an alarm system will be installed at strategic points. • Bushes around and	Contractor/ Management	Number of businesses around the site. Level of crime in the area

	within the site will be cleared to avoid hiding areas for thieves.		
First-Aid	• A well-stocked first aid kit shall be maintained by a qualified personnel	Management	Contents of the first aid kit.
Occupational Health & Safety	• Personal Protective Equipment (PPE) will be provided. • Workers shall be trained on personal safety and how to handle equipments and machinery. • A well-stocked first aid kit shall be maintained by a qualified personnel • Report any accidents / incidences and treat and compensate affected workers. • Sufficient and suitable sanitary shall be provided at the project site which should be kept clean.	Contractor/ Management	Workers using Protective Equipment Presence of Well stocked First Aid Box Separate and clean washrooms (Gents & Ladies)
Loss of Vegetation	• Access pedestrian routes will be designated and	Contractor Management	Warning signs on site

	parking zones that are paved. • Marked signs of do not Walk/ Park on the grass will be given. • The flora and fauna shall be restored after construction by landscaping and maintaining the introduced plants.		Landscaped lawns

7.6.7 Environmental Management Plan during Operational Phase

Table below constitutes Environmental Management Plan during Operational Phase of the project:

Environmental/ Social Impact	Proposed Mitigation Measures	Responsibility	Monitoring Plan/Indicator
Noise Pollution	▪ Plant equipment shall be maintained. ▪ Operation shall be carried out only during daytime. ▪ Workers will wear ear muffs when working in noisy section. ▪ Management will ensure that noise from the	Contractor / Management	Amount of noise

	facility's occupant is kept within permissible levels.		
Underground fuel storage and handling	▪ Properly maintained hoses and fittings will be used. ▪ Cement screeds in all the chambers will be made using water proof material. ▪ A monitoring well will be installed next to the tanks to check leaks. ▪ No spills during refilling or when offloading the fuel will be ensured.	Contractor/ Management	Fuel spills Monitoring well
Ecological considerations	▪ The flora and fauna shall be restored after construction by landscaping and maintaining the introduced plants.	Management	Natural ecology in areas
Traffic density	▪ Signage will be put in place to notify neighbors of the activity and presence of heavy vehicles and to direct traffic. ▪ Presence of boards directing patrons to the site will be allocated.	Contractor/ Management	Clear well maintained sign boards along the roads.

	▪ Adherence to traffic rules will be followed.		
Solid waste	▪ Solid waste generated on site will be minimized. ▪ Waste shall be recycled especially office papers. ▪ Debris shall be collected by a licensed private contracted waste collection company. ▪ Waste generated shall be collected by a privately contracted waste collection company and the contractor should ensure the main central waste collection point along with bulk storage facilities. ▪ The site will have waste receptacles with bulk storage facilities at convenient points to prevent littering during occupation.	Contractor/ Management	Amount of waste at site Presence of well-maintained receptacles and central collection point.
First aid	▪ A well-stocked first aid kit shall be maintained by a qualified personnel	Management	Contents of the first aid kit.

Security	▪ Secondary businesses are recommended to be controlled. ▪ The clock security for the facility will be under control. ▪ Adequate lighting and an alarm system will be installed at strategic points. ▪ Bushes around and within the site shall be cleared to avoid hiding areas for thieves.	Management	Number of businesses around the site. Level of crime in the area.
Production of Compressed Air	▪ Powder fire extinguisher will be provided ▪ Regular inspection of safety valves by qualified personnel will be kept	Management	Explosions Fire Outbreak
Fire Preparedness	▪ Firefighting drills will be carried out regularly. ▪ Firefighting emergency response plan will be kept. ▪ All firefighting equipment will be ensured regularly maintained, serviced and inspected.	Management	Number of fire drills carried out Proof of inspection on firefighting equipment

	▪ Fire hazard signs and directions will be displayed to emergency exit route to follow and assembly point in case of any fire incidence.		Fire Signs put up in strategic places Availability of firefighting equipment.
Environment Health and Safety	▪ Workers shall be trained on personal safety and disaster preparedness ▪ A well-stocked first aid kit shall be maintained by a qualified personnel ▪ Any accidents / incidences will be reported and treated and the effected worker will be compensated. ▪ Sufficient and suitable sanitary conveniences shall be provided which should be kept clean. ▪ Annual Health and Safety Audits shall be conducted.	Management	Separate washrooms (Gents & Ladies) Copies of Annual Audit
Water	• Unnecessary toilet	Management/	Presence of

Consumption	flushing will be avoided. • Recommended to promptly detect leaking taps and repair them. • Water taps shall be turned off when not in use • Water conserving taps will be installed that turn off immediately when water not in use. • A discharge water meter will be installed in the premises to check on total water use and for billing purposes.	Contractor	water meter Presence of automatic water taps Water bills
Electricity usage	• A meter shall be installed in the premises to check on total kilowatts used and for billing purposes. • Energy conserving bulbs/ tubes shall be used. • Natural lights shall be used for lighting purposes. • Natural ventilation from windows and doors shall be used and Electric Air Conditioner use will be avoided	Management/ Contractor	Presence of an Electricity Meter Electricity bills

	• A standby generator shall be provided in the premises in case of power breakdowns. • Lights will be switched off in the offices area at night		
Cleaning of the Oil Interceptor	▪ Special tool shall be used to do skimming. ▪ Spill control kit will be installed next to the interceptor during skimming.	Management	Contamination of ground and surface water Presence of Oil spills
Washrooms	▪ Sufficient and suitable sanitary conveniences shall be provided. ▪ The washrooms shall be kept clean and in good working conditions. ▪ A water tank shall be provided for the washrooms incase the piped water supply is not available.	Management	Separate washrooms (Gents & Ladies)
Waste Water Disposal	▪ Waste water is recommended to be emptied to the septic tank	Contractor/ Management	Effluent presence on open drains

	via well laid sewage pipes ▪ Inspections for sewer pipe blockages or damages will be conducted and they will be fixed on time ▪ Empty the septic tank whenever its full by a licensed exhauster service damages and fix them		

7.7 SUMMARY OF IMPACTS AND MITIGATION MEASURES:

Environmental Impacts	Mitigation Measures
Sitting near sensitive receptor	Project site is not located within 500m of any educational institution or health facility or any sensitive receptor Noise wall will be built LPG Compressor will not be operated from 11 pm to 05 am
Spills during fuel transfer	Proper pad will be prepared for bowzer parking while unloading It will be ensured that the pipe and couplings for the fuel transfer are secured tight and drip pans are put in all likely places where leakage can

Leakage form storage tanks and facilities	occur to avoid loss to ground While refueling, drip pans will be used to avoid Spillage Impervious surfaces will be well maintained at all places, likely to receive spills Underground fuel storage tanks will be constructed to modern specifications with secondary containment, impervious linings and leakage monitoring wells in place.
Washing and Servicing Interruption to local traffic	Piping from tanks to the dispensers will be above ground to the extent possible. All buried piping routes will be clearly marked on the ground and on drawings available at the station. Effective monitoring program for tank integrity checking and leak detection will be put in place Suitable oil water separator and treatment systems designed to treat maximum operational capacity load to meet the PEQS will be installed Discharges of waste water to the sewage network will be made only when compliance with PEQS is ensured Any groundwater extraction will be completely enclosed to prevent the well becoming a pathway to transport of hydrocarbon contamination into the aquifer Deliveries will be scheduled at times of light

	traffic load to avoid congestion. Station will have enough spacing for vehicles to queue up without effecting flow of traffic

7.8 ENVIRONMENTAL MONITORING PLAN

Environmental Component	Project Stage	Parameters	Special Guidance	Standards	MONITORING			Institutional Responsibility
					Location	Frequency	Duration	
Air	Pre-Construction	PM_{10} SO_2 NO_X, CO, HC,O_3	Monitoring at pollution source	PEQs	Project site	Quarterly	Continuous 24 hours/or for 1 full working day	Contractor through approved monitoring agency
	Construction Stage	PM_{10} SO_2 NO_X, CO, HC,O_3	High volume sampler to be located	PEQs	Project site	Quarterly	Continuous 24 hours or for 1 full working day	Contractor through approved monitoring agency
		PM_{10}	High volume sampler to be located	PEQs	Project Site	Quarterly	Continuous 24 hours/or for 1 full working day	Contractor through approved monitoring agency

Environmental Component	Project Stage	Parameters	Special Guidance	Standards	MONITORING			Institutional Responsibility
					Location	Frequency	Duration	
	Operation Stage	PM_{10} SO_2 NO_2, CO, HO	Monitoring at pollution source	PEQs	Project site	Quarterly	Continuous 24 hours	Proponent
Water Quality	Pre-Construction	pH, BOD, COD, TDS, TSS, DO, Oil & Grease, Pb, Chlorides, zinc, cadmium, total coliforms, and faecal coliforms	Grab sample collected from source and analyze as per Standard Methods for Examination of Water and Wastewater	PEQs	Project site	Quarterly	-	Contractor through approved monitoring agency

Environmental Component	Project Stage	Parameters	Special Guidance	Standards	MONITORING			Institutional Responsibility
					Location	Frequency	Duration	
	Construction stage	pH, BOD, COD, TDS, TSS, DO, Oil & Grease, Pb, Chlorides, zinc, cadmium, total coliforms, and faecal coliforms	Grab sample collected from source and analyze as per Standard Methods for Examination of Water and Wastewater	PEQs	Project Site	Quarterly	-	Contractor through approved monitoring agency

Environmental Component	Project Stage	Parameters	Special Guidance	Standards	MONITORING			Institutional Responsibility
					Location	Frequency	Duration	
	Operation stage	pH, BOD, COD, TDS, TSS, DO, Oil & Grease, Pb, Chlorides, zinc, cadmium, total coliforms, and faecal coliforms	Grab sample collected from source and analyze as per Standard Methods for Examination of Water and Wastewater	PEQs	Project site	End of summer before the onset of monsoon every year.	-	Proponent

Environmental Component	Project Stage	Parameters	Special Guidance	Standards	MONITORING			Institutional Responsibility
					Location	Frequency	Duration	
Noise Levels	Pre-Construction	Noise levels on dB(A) scale	Equivalent noise levels using an integrated noise level meter kept at suitable distances	PEQs	Project site	Quarterly	-	Contractor through approved monitoring agency
	Construction Stage	Noise levels on dB(A) scale	Equivalent noise levels using an integrated noise level meter	PEQs	Project site	Quarterly	-	Contractor through approved monitoring agency

Environmental Component	Project Stage	Parameters	Special Guidance	Standards	MONITORING			Institutional Responsibility
					Location	Frequency	Duration	
	Operation Stage	Noise levels on dB(A) scale	Equivalent noise levels using an integrated noise level meter kept at suitable distance	PEQs	Project site	Once every year.	-	Proponent

7.9 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

i) Design and Planning Stage

ENVIRONMENTAL GUIDELINES	
Design Aspects (1) Project's Design and Layout should: a) Have architectural features, to the extent possible, in conformity to general landscape of the area. b) Be in consonance with local climatic, environmental, and meteorological conditions. c) Prefer local construction materials to the maximum extent possible. d) Incorporate proper ventilation of the structures and provide for sunshine, air movement, and maximum usage of the daylight. e) Provide adequate space for movement of the workers around process machinery and installations. f) Make provisions for collection, treatment, and disposal of process wastes (solid wastes) in an environmentally sound manner by providing a well-designed process wastes handling system of appropriate capacity. g) Provide adequate structural safeguards for avoiding contact of storm water with raw materials etc. through collection, diversion, and removal of storm water runoff away from production unit and stores. h) Provide adequate arrangements for community toilets for the	• Proponent • Project Consultant / • Architect/ Design Constantan / • Project Engineer

workers at convenient locations. i) Provide construction of septic tank system for collection, treatment and disposal of toilet wastewater all during the project's construction phase. j) Provide for availability of safe drinking water for the workers at convenient locations in the project premises both during construction and the operation phase.	

i) Construction Stage

ENVIRONMENTAL GUIDELINES	
Air Quality Concerns (1) The dust producing activities (operating the machinery, loading/offloading the material) are preferably carried out at evening hours to minimize exposure of the persons working onsite and in the vicinity to high levels of dust emissions. (2) All the machinery and equipment that run on fuel oil and the vehicles engaged in connection with project construction be adequately tuned up and well serviced to avoid emission of smoke and the particulate in their exhausts. (3) Only new and unadulterated fuels and lubricants be used in the machinery and vehicles. Spent oils be avoided. (4) Operation of the fuel powered machinery and equipment be avoided in windy conditions to prevent spread of the exhaust fumes. (5) All loose materials (e.g., send, soil) be kept covered with canvas/plastic sheets while staked onsite or while being	• Consultant • Architect/ Design Consultant / • Project Engineer

ENVIRONMENTAL GUIDELINES	
transported on a carriage vehicle to avoid their flying off with air currents or vehicular movement. If sheeting is not possible, then their top layer/surface layer be lightly sprinkled with water. (6) All vehicle drivers be instructed to lower down the speed particularly on the earthen and narrow rural roads and at road bends to reduce blowing of the drag dust. (7) The active constructional areas be obscure and isolated from the exterior by vertical shields / blinds, where necessary to avoid entry of particulate dust from them into the environment.	
Water and Wastewater (1) The No water for constructional needs be drawn from a shared community water source (e.g., a canal, a community well) except with consent of the community to avoid any chances of friction with the community. (2) No wastewater be disposed of onto land, into a drain, into a watercourse, or used for irrigating the crop field unless it has been appropriately treated to conform to the untended usage. (3) All effluents and wastewaters be compulsorily subjected to treatment before their final release into the environment. (4) Throwing of the liquids / chemicals / paints / effluents into nearby water bodies or onto land be avoided. (5) Washing the machinery, vehicles, construction implements into nearby surface waters be avoided. (6) All the freshwater and the wastewater pipelines be buried (or	• Consultant • Architect/ Design Consultant / • Project Engineer

ENVIRONMENTAL GUIDELINES	
well secured if open) to avoid their accidental or mischievous damage by vehicles, animals, and or miscreants. (7) Rainfall containment structures or storm water diverting barriers / channels be provided all around the project structures to avoid direct hit of the storm water to the building / sensitive structures.	
Noise Pollution (1) The noise producing construction machinery be operated preferably during daytime so that quietness of the night is not impeached and nearby community is not disturbed. (2) The night time operation of the construction machinery, welding activities, and movement of the vehicles be avoided to the maximum possible extent. (3) The steel fixing, fabrication, welding, and loading / unloading activities be preferably carried out at the daytime hours. (4) All the machinery, equipment, generators, and the vehicles, which are a source of noise, be kept well maintained. Consider fitting a silencer to reduce noise generation, wherever required.	• Consultant • Architect/ Design Consultant / • Project Engineer
Public Utilities (1) The excavation and digging activities be carried out only after ascertaining that no gas, oil, or public utility lines are passing through or underneath the area to be excavated refer to local utilities layout map)	• Consultant • Architect / Design Consultant / • Project

ENVIRONMENTAL GUIDELINES	
(2) A standard operating procedure be devised for dealing with accidental damage to utilities along with an immediate restoration plan well ahead of undertaking the excavations. (3) If relocation of any public utility or facility (e.g. electricity poles) is involved, it should be carried out well ahead in the start of construction to avoid disruption of service to the user-community.	Engineer
Cultural and Archaeological Heritage (1) The discovery of any remnants / relics of historical, cultural, or archaeological importance during excavations or diggings be immediately reported to concerned authority / archaeology department.	• Consultant • Architect/ Design Consultant / • Project Engineer
Social Environment / Worksite Safety (1) All the working staff at the project site be made aware of the risks of personal injuries associated with construction activities and the ways of avoiding them (e.g., wearing helmets, breathing masks, earmuffs, safety goggles, gloves, etc.) (2) A first-aid box be always kept handy at the construction site all during construction and if needed an appropriate medical care unit be setup during construction of the project. (3) The heads/supervisors of the various sections be made aware of the standard operating procedures for dealing with	• Consultant • Architect/ Design Consultant / • Project Engineer

ENVIRONMENTAL GUIDELINES	
emergencies and for appropriate hazard management. (4) Indicative signage and warning boards be affixed at appropriate locations at the premises for information and guidance of the workers / employees. (5) Employing of children as laborers is avoided. (6) Firefighting arrangements are always kept ready at the worksite all during construction. (7) Lighting of matchstick or lighters and the cigarette smoking be strictly prohibited at or the workplaces and particularly near inflammable materials. (8) All ignitable and inflammable materials be separately stored at a safe distance away from any sources fire	

7.10 ENVIONMENTAL TECHNICAL ASSISSTACE AND TRAINING PLAN

In order to raise the level of professional and managerial staff, there is need to upgrade their knowledge in the related areas. HSE/ Project Manager should play a key-role in this respect and arrange the training program. Project Manager will provide training to staff and workers about the best EPA Management practices at the project site and effective implementation of EMP.

CHAPTER – 8

CONSIDERATION OF THE PROJECT ALTERNATIVES

8.1 SIGNIFICANCE OF THE ALTERNATIVES

The consideration of alternatives to a proposed project is one of the key aspects of an Environmental Impact Assessment (EIA). Consideration of alternatives assists the decision makers in the choice of an alternative, which has the least adverse and greatest beneficial environmental, social and economic consequences.

The most pertinent question to assess feasibility and propriety of a developmental project, from environmental impacts perspective, is to ask whether an alternative option would be better than the project proposal. The comparative analysis of the environmental and economic impacts of all the possible alternative question has been objectively and analytically examined in this EIA in the light of the impacts on the physical, biological, ecological, health, and economic environment as well as views and reservations of the stakeholders (proponent and the likely beneficiaries / losers).

8.2 NO PROJECT POSSIBLE ALTERNATIVES TO THE PROJECT REASONS

In the light of the views of the stakeholders and other objective evidence:

- The site Abandonment of the project on financial and technical grounds and maintenance of the existing position (i.e., status quo or no project option).
- Changing the size and operational scope of the proposed project site (Reducing & downsizing; or enhancing & upsizing).
- Shifting the project area to some other locations (site shifting).

- Construction of alternative network of smaller independent units at different locations in a much wider coverage area.

The above-mentioned possible alternatives are discussed below briefly:

8.2.1 Abandonment of the Project (No Project Option)

The first alternative option could be to abandon the project altogether and continue with the existing situation. This option is not supported by objective conditions & population size of the district.

8.2.2 Changing the Scope

The second alternative could be change in the scope of the proposed project, i.e., either reduction and downsizing the size of the projector, the scope of the services or enhancing and upgrading the same. The downsizing or upsizing would include both the area of the project. The physical constraint in upsizing the project is non-availability of additional clear land at the site. On the other hand, downsizing is likely to jeopardize economic viability of the project.

According to the proponent, both these factors have been taken into account while designing the project. As such, the object evidence does not support downsizing. Since additional land is not available at the proposed site, the upsizing option automatically becomes irrelevant, at least for the time being. Therefore, the option of change in the scope of the project is found not feasible.

8.2.3 Relocating the Project

The third possible option could be shifting, either a part or the entire project, to some other location. As mentioned in earlier, due to space constraints the project is being the undertaken at this site primarily because land is available with all the facilities at this proposed site.

Therefore, shifting of the project to some other place in or around the city is not possible because it will be firstly non-feasible and secondly, it will not serve objectives of the projects.

8.3 SUMMARY OF THE PROJECT ALTERNATIVE OPTIONS

Based on the objective analysis, views, and opinions of the stakeholders, as detailed above, various alternative options are found not feasible. Furthermore, the net socio-environmental impacts of the project are positive. Therefore, consideration of the above-discussed alternative option is not relevant to the instant project.

8.4 FINAL SELECTION OF SITE

A critical analysis was made based on the available accessibility with Reference to land availability, accessibility of site, availability of water resources, less damage to existing environment and other environmental problem. Finally selected present site of proposed project is more practicable with respect to economic, social and environmental perspective and future development for proposed LPG Plant.

CHAPTER – 9

STAKEHOLDER'S CONSULTATIONS

9.1 GENERAL

This chapter describes the process and outcome of the consultations held with the relevant stakeholders and the neighboring community over environmental aspects of the proposed project.

Public discussions were held with the inhabitants of the surrounding area. Public consultation was conducted at site to know the point of view of the people. Majority of the people observes strong positive impacts regarding employment, business and structural development due to this proposed project. Audit report findings depict that people perceive overall positive social and economic impacts by the proposed project. Majority of the people are convinced for development in the area and they correlate this progress with the pace of their social mobility. Moreover, management of LPG Plant admitted to adopt all the measures to control any impacts resulting from the subject project.

9.2 WAYS OF PUBLIC CONSULTATION

Public Consultation was done by Scoping sessions, focused group discussion, small group meetings and way side consultations with the relevant stakeholders. Multiple fieldstrips and site visits were arranged. These visits were arranged by the environmental consultant for the collection of baseline data and public consultations to know the point of views of different stakeholders regarding the proposed project. There is no affected community present in the radius of the study area. Team visited the proposed site, had discussions with stakeholders and consulted with the local people to evaluate the project socio-economic impacts.

People provide the massive information about the project and have positive remarks regarding the project development.

9.3 OBJECTIVES AND RATIONALE OF CONSULTATIONS

The primary objective of the stakeholders' consultations was to learn and know the apprehensions, concerns and opinions of the key stakeholders over environmental implications of the project. The consultations sessions also served as a source of first-hand information about expectations of the community and beneficiaries of the project. Dialogue with the stakeholders and recording their concerns at appropriate stages of the project can help to tailor the project in line with stakeholders' aspirations and therefore likely to promote public acceptance of the project and its sub-components.

9.3.1 Summary of Issues Raised by Stakeholders

A summary of the key issues raised by stakeholders and how these are being addressed by project proponent is provided in Table below:

During consultation it was observed that majority of the respondents were in favor of proposed project as the wastewater is disposed off into channel and by reducing the pollution load in wastewater it will be reusable by consumers. The other related issues and concerns raised by general public are discussed. However, during the social survey following concerns of the local community, Government Departments and Environmental Practitioners and experts were noted:

- Nuisance must be controlled at source.
- Latest/State of the art technology must be adopted.
- Locals should be preferred for the job opportunities.
- Wastewater monitoring should be done regularly to comply with PEQS.

• Solid waste should be managed effectively by adopting the standard practices of the area.

• Cleanliness of the area should be ensured.

• An effective EMMP should be designed and enforced with true spirit.

• Health and safety of the workers should be ensured.

• Plantation of indigenous species must be carried out at extensive scale to control odor.

• Proper disposal of sludge should be adopted.

Table 1: Summary of Issues and Commitments by Proponent

Issue	Aspect/Concern raised by Stakeholders	Project Proponent Commitments
Employment Opportunities	Expectations of employment are very high. Job opportunities are less for locals as they generally have less skills and training.	Employment is the main priority of the proposed project. Mostly, local skilled and unskilled labor will be prioritized and also there will be job in executive level. Maximum persons according to the requirement will be employed by Management

Training Opportunities	People are keen to consult with subject industry if the project offers training and upgrading opportunities to enhance their trade or professional skills.	Development of the Training Strategy, including commitment of allocation of budget investment for design, training infrastructure, and delivery.
Health & Safety	LPG tanks are main concern because the road used by the project passes through a number of small communities and different industries and there will be a high volume of transporting raw material or final products.	Development of Transport Management Plan including traffic safety training. Traffic advisory signs will be installed along proposed project site and all nearby specific areas.
Local Economy and Business Development	Local service providers are keen to participate in providing services to transport raw material and expect in order to adjust their businesses to meet specific needs.	The management has main focus that all the material regarding construction and operation will preferred to buy from the local market.
Environmental Issues	Dust and noise impacts, from the construction activities and in operation of mechanically un-fit machines are of concern to other residents.	Implementation of control under the Environmental Management Plan, including on and off site dust and noise monitoring.

	Loss and change of vegetation due to soil degradation.	Thus, the rehabilitation plan has been established.
Water Quality and Quantity	Water quality and quantity and impacts from the wastewater disposal are all key concerns for nearby residents.	Implementation of consultation in relation to water use and development of Environmental Monitoring Program.

9.3.2 Stakeholder's Feedback

In consultation process, the stakeholders were briefed during scoping sessions about the objectives of the project. At the consultation meetings, the stakeholders and village representatives were informed about the project and project requirements. During the consultation meetings, all the stakeholders appreciated the project and expressed full support to the management.

A detailed consultative process was carried in the form of official meetings, letters, and/or telephonic discussions, to consult the stakeholders for the project.

Remarks given by stakeholders during the field survey are listed at the end of the report.

9.3.3 Concerns raised by the public

The positive concerns raised were:

• The project (LPG Plant) would encourage local community for jobs.

• There will be both direct and indirect employment for the people

• New businesses will spring up and old ones will grow as a result of migration of

people (employees) in the area.

• The local economy is likely to grow through backward and forward linkages and income and employment multiplier effects resulting from the project.

• The establishment of LPG Plant in the region will contribute to industrial development

The project will provide LPG for other small industrial Plants e.g., those manufacturing industrial spirits.

• Youth unemployment is high in the area.

9.3.4 Recommendations made by the participants

• Use of child labor on plant should be banned.

• Management should give preference to the local unemployed youths when employing workers for the project.

9.4 IDENTIFICATION OF THE RELEVANT STAKEHOLDERS

The consultation process began with identification of the most pertinent stakeholders. Efforts were made to identify the relevant stakeholders through systematic process based on the nature and degree of their actual and perceived stake in the project.

9.5 CONSULTATION METHODOLOGY

Onsite consultations were held with representatives of the various categories of the stakeholders as were available during field visits of the proposed site for LPG Plant. Additionally, wherever found feasible, general public visit in the vicinity were also conducted to know their views and concerns over the project activities. The majority of these consultations were either one to one meetings or small and focused group discussions.

9.5.1 Outcome of the Consultations

The neighborhood communities did not express any specific or significant concerns. Interestingly, different stakeholders had different perceptions and different concerns about the proposed project. Some of the concerns and apprehensions relating to various aspects of the project are reproduced below:

9.5.2 Design Aspects

The design aspects need to take into account the relevant building codes, byelaws, and the applicable governmental policies.

9.6 CONSTRUCTION ASPECTS

- Delays in construction and completion of the proposed project are likely to result into escalation of construction costs.
- Construction related noise could be troublesome for the community.
- Delays in payments to the contractors, sub-contractors, suppliers and the labour can cause delays in the project implementation.
- Interference by the local regulatory agencies and the municipal authorities are also likely to cause delays in completions.
- Delays in handing over the sites and later changes in the drawings and scope of work result into slow progress of the construction under the proposed project.
- Generations of dust and its deposition on exposed surfaces would require frequent dusting.

9.7 OPERATIONAL ASPECTS

- There could be blackish air emissions laden with harmful particles.
- There could be disruptions and discontinuations in the supply of the machinery / equipment and raw materials for timely completions of project.

9.8 PROPONENT

Possible impacts and mitigation measures related to the proposed project were discussed with the project proponent and management. They assured to take all suggested mitigation measures to control any discrepancy arose by the project and to make the project environmental friendly.

9.9 OTHER DEPARTMENTS AND AGENCIES

For the impact analysis detailed meeting were held with the management of project and local community. Issues were discuss that may affect the environment and also the implementation of the proposed project. All possible mitigation measures were considered and incorporated in the Environmental Management Plan (EMP). Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders in the area. The purpose of such consultations is to obtain the feedback from the relevant persons.

9.10 AFFECTED & WIDER COMMUNITY

There is no affected community present in the radius of the study area. Team has consulted with the inhabitants of different villages. They provided positive remarks regarding the subject project and in the favor of the proposed plant. Stakeholders participation Performa's and socioeconomic questionnaire were get filed by the locals to evaluate the project socio-economic impacts.

CHAPTER – 10

CONCLUSIONS AND RECOMMENDATIONS

10.1 CONCLUSIONS

Based on the preliminary design, environmental and social field surveys and impacts assessment of the proposed project, it may be concluded that although there are some significant negative impacts but would be of short term during the construction stage. However, there are a few negative impacts that would be expected during the operational stage but their intensity can be reduced by taking appropriate measures. The environmental issues related with the project activities are summarized as under:

Environmental Impacts

During operation stage, disposal of waste will become a problem. Therefore, proper mitigation measures may be adopted in the preliminary design including safe and environmental friendly disposal of solid waste.

Physical Impacts

Physical impacts like soil contamination, water contamination, air pollution, high noise level, etc. are of temporary nature during the construction stage. However, during operational stage by adopting abatement technologies such as de-dusting system with bag filters and development of buffer zones and green areas intensity of negative impacts can be minimized.

Biological Impacts

No forest area or wildlife sanctuary exists within the vicinity of the proposed project area, which may be affected by the project. Few reptiles like lizards and snakes and few birds like Mynah and house sparrows will be disturbed by the project activities

and may have to move into nearby areas. This will be a temporary insignificant impact.

Social Impacts

The other social issues like safety of general public and workers, security problems, community accessibility issue, etc. will be of temporary nature.

10.2 RECOMMENDATIONS

Although comprehensive mitigation measures have been suggested in the report to minimize the negative impacts and to enhance the positive impacts of the proposed project, however, major recommended mitigation measures are summarized as under:

1. Dust suppression system should be available on project site for wetting of all the materials to avoid effects of dust such as respiratory diseases.
2. All appropriate environmental management measures detailed in this report, together with any other environment management commitments should be implemented throughout the entire life of the project.
3. Water contamination, air pollution and high noise levels will be controlled with the use of good engineering practices.
4. Environmental Management Plan (EMP) recommended will be implemented in the true spirit.
5. Machinery will be well-maintained for good efficiency.
6. Installed Air Pollution Control Equipment (APC) system which will be equipped with Bag Filter or any other air pollution controlled equipment.
7. First Aid measures, Health & Safety Equipment (PPEs) will be provided to the workers.

8. Safety signs or boards will be placed wherever needed within the premises of the proposed project.

9. Personal Protective Equipment's (PPEs) will be provided and ensured that they are used by the workers during working hours.

10. High temperature zones will be highlighted.

11. Transportation vehicles will be maintained and tuned well.

12. No parameters above Punjab Environmental Quality Standards (PEQS) will be allowed in any case.

13. The parameters of the effluent will be within the permissible limits defined in the PEQS.

14. Any seepage and leakage will be controlled through proper mitigation measures.

15. Regular monitoring and auditing will be taken by the management to ensure the compliance of all the mitigation measures.

16. Proper solid waste management system must be adopted.

17. Safety signs, safety board's etc. must be placed on the project site for safety purpose of workers.

18. Plantation campaign will be initiated.