Philip Morris
(Pakistan) Limited

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Upgradation of Existing Warehouse for Storage of Hazardous Waste at Philip Morris (Pakistan) Limited Sahiwal Factory

July 2024

REF EIA 24/260

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APPENDIX-I: GLOSSARY

Warehouse A warehouse is a building for storing goods. Warehouses are used by manufacturers, importers, exporters, wholesalers, transport businesses, customs, etc. They are usually large plain buildings in industrial parks on the outskirts of cities, towns, or villages.

Hazardous waste Hazardous waste is waste that has substantial or potential threats to public health or the environment. Moreover, hazardous waste is a type of dangerous goods. They usually have one or more of the following hazardous traits: ignitability, reactivity, corrosiveness, toxicity.

Smoke detector A smoke detector is an electronic fire-protection device that automatically senses the presence of smoke, as a key indication of fire, and sounds a warning to building occupants.

Commercial and industrial smoke detectors issue a signal to a fire alarm control panel as part of a building's central fire alarm system. By law all workplaces must have a smoke detection system.

Fire extinguisher A fire extinguisher is an active fire protection device used to extinguish or control small fires, often in emergency situations. It is not intended for use on an out-of-control fire, such as one which has reached the ceiling, endangers the user (i.e., no escape route, smoke, explosion hazard, etc.), or otherwise requires the equipment, personnel, resources and/or expertise of a fire brigade.

Fire hose reels Fire hose reels are located to provide a reasonably accessible and controlled supply of water to combat a potential fire risk. They are ideal for large high risk environments such as schools, hotels, factories etc. They are designed to I.S. EN 671 – part 1. Hose reels can come in lengths of 30m of 19mm and 25mm hose. Hose Reels are available in fixed, swinging, recessed and concealed versions with automatic or manual valves.

APPENDIX-II: ABBREVIATIONS

(Alphabetical Order)

Acronym	Title
BOD	Biochemical Oxygen Demand
CBD	Convention on Biological Diversity
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
EIA	Environmental Impact Assessment
EMC	EMC Pakistan Pvt. Ltd.
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
ERP	Emergency Response Plan
HSE	Health, Safety & Environment
IEE	Initial Environmental Examination
NCS	National Conservation Strategy
NEAP	National Environmental Action Plan
NGO	Non-Governmental Organizations
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides
O3	Ozone
Pb	Lead
PEPA	Punjab Environmental Protection Agency
PEPC	Pakistan Environmental Protection Council
PEQS	Punjab Environmental Quality Standards
PM	Particulate Matter
PM_{10}	Particulate Matter ≤10 microns
PPE	Personal Protective Equipment

SPM	Suspended particular matter
TDS	Total dissolved solids
TORs	Terms of Reference
TSS	Total suspended solids
UNDP	United Nations Development Program

DEFINITIONS

Client /Proponent:	Philip Morris (Pakistan) Limited (PMPKL)
Proposed Project:	Upgradation of Existing Warehouse for Storage of Hazardous Waste at Philip Morris Sahiwal Factory
Environmental Consultant:	EMC Pakistan Pvt. Ltd.
Proposed Site:	Proposed site is located within PMPKL factory, G.T Road, Sahiwal.
Project Location:	Grand Trunk Rd, Sahiwal District, Punjab 57000, Pakistan 30°43'2.27"N 73°16'6.39"E
EPD	Environmental Protection Department (Punjab)
Study	Environmental Impact Assessment (EIA)

APPENDIX-III: LIST OF INDIVIDUALS CONSULTED ALONG WITH THEIR WRITTEN FEEDBACK

Sr. No	Name	Occupation	Village
1.	Zeeshan Ahmed	Labor	Chak 55/5L
2.	Muneeb Awan	Labor	Chak 55/5L
3.	Sohail Ahmed	Shopkeeper	Chak 55/5L
4.	Muhammad Ali	Driver	Chak 55/5L
5.	Muhammad Junaid	Driver	Chak 55/5L
6.	Jamshed Khan	Hotel owner	Chak 55/5L
7.	Muhammad Hassan	Cattle farm	Chak 55/5L
8.	Muhammad Fazal	Private job	Chak 55/5L
9.	Rehmat Ali	Cattle farm	Chak 55/5L
10.	Shah Alam	Labor	Chak 55/5L
11.	Arif Shah	Labor	Chak 56/5L
12.	Muhammad Asif	Labor	Chak 56/5L
13.	Bahadar Ali	Shopkeeper	Chak 56/5L
14.	Baqir Ali	Labor	Chak 56/5L
15.	Hassan Ali	Shopkeeper	Chak 56/5L
16.	Muhammad Jameel	Private job	Chak 56/5L
17.	Fareed Hussain	Private job	Chak 56/5L
18.	Muhammad Younis	Driver	Chak 56/5L
19.	Ijaz Ahmed	Labor	Chak 56/5L
20.	Hashim Khan	Labor	Chak 56/5L

APPENDIX IV: SOURCES OF DATA AND REFERENCE MATERIAL

- Punjab Intermediate Cities Improvement Investment Project IEE for Sahiwal Wastewater Treatment Plant Prepared by Project Management Unit of PICIIP, Government of Punjab, Pakistan
- Upgradation of Battery Charging Area in Philip Morris (Pakistan) Limited (PMPKL), Sahiwal
- Construction of Day Care Center at Philip Morris (Pakistan) Limited (PMPKL), Sahiwal
- Construction of Warehouse at Philip Morris (Pakistan) Limited (PMPKL), Sahiwal
- Construction of sheds Philip Morris (Pakistan) Limited (PMPKL), Sahiwal
- Transforming for a Sustainable future Annual report 2021,Philip Morris (Pakistan) Ltd
- Philip Morris (Pakistan) Limited Business Strategy
- Climate data

URL: *https://en.climate-data.org/*

URL: *https://www.worldweatheronline.com/rawalpindi-weather/punjab/pk.aspx*

APPENDIX V: TERMS OF REFERENCE

Title: Upgradation of Existing Warehouse for Storage of Hazardous Waste at Philip Morris Sahiwal Factory

Location: G.T Road, Qadirabad, Sahiwal

Project Proponent: Philip Morris (Pakistan) Limited (PMPKL)

Project Description:

PMPKL plans to upgrade existing warehouse for the storage of hazardous waste produced during the operations of PMPKL's Sahiwal factory. After the upgradation, the warehouse storing capacity will be increased and PMPKL's Sahiwal factory will able to store hazardous waste produced from the new packing line.

EIA Requirement:

- Section 12 of Punjab Environmental Protection Act, 2012 (amended 2017)
- Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022

Objectives:

To obtain environmental approval as required under Section 12 of Punjab Environmental Protection Act, 2012 (amended 2017)

Scope of EIA:

- Complete description of the project
- Collection, analysis and presentation of baseline data
- Identification of significant environmental issues
- Assessment of direct, indirect impacts on environment
- Mitigation measures to minimize predicted adverse impacts
- Review of the relevant Policies, Legislation and regulations
- Environmental Management and Monitoring plan
- Conclusion & Recommendations

TORs for Individual Specialists:		
Name	**Position**	**TORs**
Ms. Farhat Shaheen	Environmental Specialist & Project Coordinator	• Risk assessment • Technical review
Dr. M. Mohiuddin	Senior Environmentalist	• Technical review
Ayesha Noor	Environmentalist	• Baseline Survey and monitoring • Assistance to senior team members in data collection • Stakeholder consultation
Owais Ahmed	Environmentalist	• Baseline Survey and monitoring • Assistance to senior team members in data collection • Reporting
Mr. Shaukat Iqbal	HSE Advisor	• Health risk assessment

APPENDIX-VI: LIST OF NAMES, QUALIFICATIONS AND ROLES OF TEAM MEMBERS CARRYING OUT THE IEE/EIA STUDY

S.#	Name	Qualification	Role and responsibility
1.	Ms. Farhat Shaheen	MSc. Environmental Sciences BSc(Hons) Biotechnology Certifications: OHSAS 18001-2007 ISO 14001-2004	• Risk assessment • Technical review of report
2.	Dr. M Mohiuddin	PhD Environmental Science	• Technical review
3.	Ayesha Noor	MS Environmental Sciences	• Baseline Survey and monitoring • Assistance to senior team members in data collection • Stakeholder consultation
4.	Owais Ahmed	MS Environmental Sciences	• Baseline Survey and monitoring • Assistance to senior team members in data collection • Reporting
5.	Mr. Shaukat Iqbal	NEBOSH	• Health risk assessment

APPENDIX-VII: APPROVALS FROM CONCERNED DEPARTMENTS

Approval from EPA has been applied.

Other approvals are not required due to following factors:

- Project site is within existing factory
- Project will not affect any existing public infrastructure, utilities, is associated with project activities.

EXECUTIVE SUMMARY

This report presents the findings of the Environmental Impact Assessment (EIA) study conducted for the Upgradation of Existing Warehouse for Storage of Hazardous Waste at Philip Morris Sahiwal Factory. After the upgradation, the warehouse storing capacity will be increased and PMPKL's Sahiwal factory will able to store hazardous waste produced from the new packing line. PMPKL's Sahiwal Factory previously constructed warehouse having area of 220 sq.ft which will be currently upgraded with a proposed extension of 310 sq ft for the storage of hazardous waste. After the upgradation the total area of the hazardous waste warehouse will be 530 sq ft. This upgraded warehouse will be used to temporary store hazardous waste materials such as Oils and chemicals for machine maintenance, Power Batteries, Glass items, Contaminated PPEs, Paints, nicotine waste products and raw material powered waste before handling it to EPA approved waste management contractor.

The EIA study has been conducted in compliance with the requirements of Punjab Environmental Protection Act, 1997 (Amended 2012 & 2017), pertinent rules & regulations and EPD requirements for EIA/IEE. The purpose of EIA is to give environment its due place in the decision-making process by thoroughly evaluating the environmental aspects of the proposed activities. Early identification and characterization of critical environmental impacts allows the regulating bodies (EPD) to form a view about the environmental acceptability of the proposed project and what conditions may apply to mitigate, reduce or compensate the negative impacts.

Project Title:	Upgradation of Existing Warehouse for Storage of Hazardous Waste at Philip Morris Sahiwal Factory
Proponent:	Philip Morris (Pakistan) Limited
Proposed Project:	Upgradation of Existing Warehouse for Storage of Hazardous Waste at Philip Morris Sahiwal Factory
Project Location:	Grand Trunk Rd, Sahiwal, Punjab 57000 30°43'2.27"N 73°16'6.39"E
Environmental Consultant:	EMC Pakistan Pvt. Ltd. Suite 403, Green Trust Tower, Jinnah Avenue, Blue Area, Islamabad. Phones: 051-8744155

Project/Proposal Outline:

Philip Morris (Pakistan) Limited "PMPKL" Sahiwal factory intends to Upgradation of Existing Warehouse for Storage of Hazardous Waste at PMPKL's Sahiwal Factory The project aims to enhance the storage capabilities, ensuring compliance with strict safety and environmental standards while meeting the growing demand.

The primary objectives of the project are as follows:

- Upgrade the existing warehouse for storage of hazardous waste.
- Extend the area of hazardous waste warehouse by 310 sq ft.
- Ensure strict compliance with safety and environmental regulations.
- Implement effective risk mitigation and emergency response plans.

The proposed project site is located in District Sahiwal, the jurisdiction of the area belongs to U.C 24, Tehsil Sahiwal. The project area is approximately 0.65 km away from the Lahore-Multan road while the project area is mostly falls in agriculture land. In the North side of the project area Bari Doab canal is located which is approximately 0.32 km away from the proposed project area. In the 1km radius of the project area Yousaf wala railway line is present in the North side of the project which is 170 m away from the proposed side area.

There is no residential area within 1km radius of the project. The closest settlement is located at 1.05 km i.e., Chak No. 56/5-L, Sahiwal. Another settlement present in the South-East of the project is Chak No. 55/5-L at a distance of 1.7 km. The link road which is connected with Lahore-Multan road is located in the North of the project on a Distance of approximately 1.06km. The surrounding areas near the project are as follows:

North:	Lahore-Multan Road, Bari Doab canal, Yousaf wala Railway Track
South:	Agricultural Land
South west:	Chak No. 56/5-L
East:	Agricultural Land
South-East:	Chak No. 55/5-L
West:	Baba Bhory Shah Shrine

The proposed site can be accessed via Lahore Multan Road (N5). The PMPKL's Sahiwal factory is located at approximately 7.2 km away from the Yousaf wala. There is no residential area within 1km radius of the project. The link road which is connected with Lahore-Multan road is located in the North of the project on a Distance of approximately 1.06km. Figure ES.1 shows location and road accessibility map.

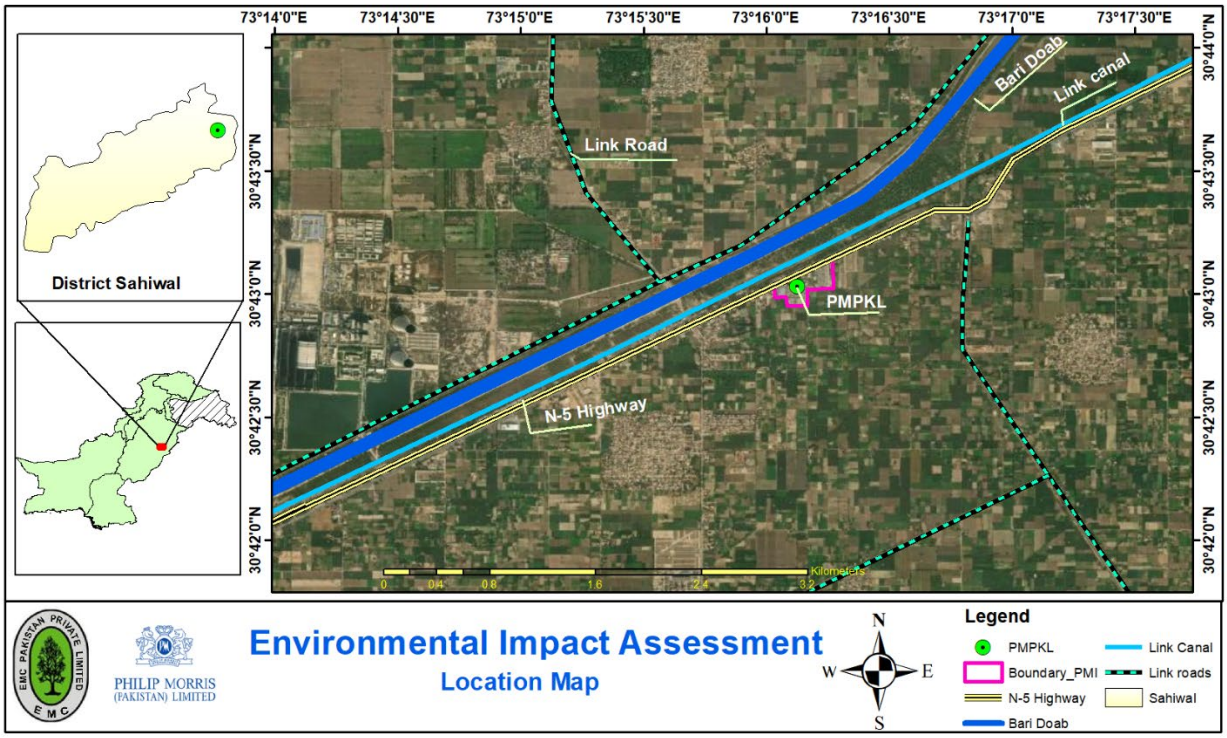

Figure ES. 1: Project Location Map

Major Impacts

Construction of New Warehouse Area at PMPKL's Sahiwal Factory would include following major activities:

Major issues of environmental concern relate to constructional phase:

- Impacts on Physical Environment;
  - Air Quality Deterioration

- Soil Contamination
- Noise emissions
- Generation of Solid Waste
- Water Quality Deterioration

➢ Impacts on the Socio-economic environment;

- Occupational Health and Safety Risks

While during the operational phase few significant impacts are expected as follows;

- Risk of Fire and Explosion
- Generation of Hazardous waste

Recommendations for Mitigation Measures

A series of mitigation and monitoring measures have been included to address the concerns for these measures. Assuming effective implementation of the mitigation measures and monitoring requirements as outlined in the Environmental Management Plan, the adverse environmental and social impacts of the proposed Project activities and operations impacts are likely to be within the acceptable limits. Following mitigation measures will be adopted:

Mitigation Measures (Construction Phase)

- The exposure of construction workers to dust shall be minimized by provision of dust masks and mandating the workers to wear them.
- Water sprinkling on unpaved haul roads and over excavated earth piles shall be practiced on a regular intervals to reduce dust emissions.
- Soil and material piles at the site shall be barricaded to avoid material escape, generation of dust.
- Proper and prior planning, appropriate sequencing and scheduling of all construction activities to avoid days with high wind speeds shall be done, and timely availability of infrastructure supports needed for construction shall be ensured to avoid delays in construction.
- It will be ensured that all construction equipment and vehicles are in good working conditions, properly tuned and maintained to keep emission within the permissible limits and engines tuned off when not in use to reduce pollution.
- Monitoring of air quality at regular intervals shall be conducted during construction phase.
- Fuel oils, lubricants, and chemicals shall be stored in covered dyked areas with impervious lining.
- Vehicles and equipment maintenance shall be taken place at specified site.
- Regular inspections shall be carried out to detect leakages in construction vehicles and equipment.
- Construction vehicles and machinery shall be examined on a regular basis for leakage prevention.
- Chemicals and wastes or any other material which are capable of contaminating the soil shall be transported in covered vehicles.
- Surface shall be dampened before start of excavation to reduce excess noise production.
- Workers shall use ear protection near high noise areas.
- Continuous monitoring of noise near sensitive receptors shall be conducted.
- Low noise producing equipment shall be used
- Potential safe disposal sites close to the project or those designated sites in the contract shall be identified.

- Used oil and lubricants shall be recovered and reused or removed from the site in full compliance with the national and local regulations.
- Oily wastes shall not be burned. Disposal location to be agreed with local authorities/EPA.
- Machinery shall be properly maintained to minimize oil spill during the construction.
- Solid waste shall be disposed at an approved solid waste facility; open burning is illegal and contrary to good environmental practice.
- Landscaping shall be utilized as an integrated component of construction activity. Lubricants, fuels and other hydrocarbons shall be stored in self-contained dedicated enclosures >50m away from water bodies.
- Construction material and spoil stockpiles shall be covered with a suitable material to reduce material loss and sedimentation and avoid stockpiling near to water bodies.
- Topsoil stripped material shall not be stored where natural drainage will be disrupted.
- Borrow sites (if required) should not be close to sources of drinking water.
- Following procedures and protocols shall be implemented to ensure work related hazards are prevent during project implementation:
- HSE Policy
- Work permits/SOPs for critical jobs
- Emergency Response Procedures
- Safety trainings prior to start of critical operations and safe working practices shall be ensured.
- Signs and warnings shall be displayed at relevant places regarding HSE hazards
- Monitoring and supervision of project activities shall also involve assessment of implementation of measures for occupational safety.

Mitigation Measures for Operation Phase

- The floors of hazardous warehouse need to be constructed with non-combustible material, liquid tight and resistant to the stored substances.
- Provision to be made for adequate parking, loading and unloading facilities.
- The hazardous waste generated will be properly classified according to regulatory guidelines, identifying the type, quantity, and associated risks of each waste stream.
- Efforts will be made to minimize waste generation through efficient material management practices, such as just-in-time inventory control and appropriate packaging.
- Hazardous waste will be disposed of in strict compliance with local and national regulations, ensuring that it is transported, treated, and disposed of by licensed waste management professionals.
- Regular monitoring and reporting of hazardous waste generation and disposal will be conducted to track quantities and adherence to regulatory requirements.
- Licensed waste contractors shall be engaged to dispose-off all non-hazardous waste material that cannot be recycled or reused.
- Training shall be provided to personnel for identification, segregation and management of waste.
- The project will prioritize the use of modern, quieter, and vibration-dampening equipment to reduce noise and vibration emissions.
- Noisy activities, such as equipment maintenance or deliveries, may be scheduled during non-sensitive hours to minimize disturbance to nearby residents and businesses.

- Where feasible, noise barriers may be installed to attenuate sound emissions, particularly in areas where noise-sensitive receptors are nearby.
- Vibration dampening measures, such as the use of shock-absorbing materials or isolation systems, may be applied to equipment to reduce vibration impacts.

Proposed Monitoring Plan

Monitoring has been proposed for the project during construction and operation phases of the proposed project. Monitoring will be required for air emission, wastewater, waste management and general operational management for safety. Monitoring plan is given in table below

Table ES 1: Environmental Monitoring Plan (Construction Phase)

Environmental Concern	Parameters to be Monitored	Monitoring Location	Frequency	Responsibility
Dust Pollution	SPM (Suspended Particulate Matter) PM10 PM2.5	Construction site	Once before construction monthly	PMPKL/ Contractor
	Dust clouds	Construction site	Daily	PMPKL/ Contractor
Exhaust emissions	Smoke, COx, NOx, SOx and PM from generators and other equipment	All exhausts/stacks	- Prior to start of work - Monthly	PMPKL/ Contractor
Noise level	Continuous Noise level Leq dB(A) monitoring	Construction site	Monthly	PMPKL/ Contractor
Solid Waste Management	Record and logging of daily hazardous and non-hazardous waste quantity	Construction site	Daily	PMPKL/ Contractor
Occupational Health and Safety	HSE compliance	Construction site	Daily	PMPKL/ Contractor

Table ES 2: Environmental Monitoring Plan (Operational Phase)

Environmental Concern	Parameters to be Monitored	Monitoring Location	Frequency	Responsibility
Waste Management	Record of waste type and quantity disposed.	Warehouse	Weekly	PMPKL/ Contractor

Thus this EIA study concludes that potential impact from the project are mainly confined to construction phase which will need to be carefully executed. The EIA report may be approved with the condition that provisions of EMP will be implemented and necessary measures would be adopted to reduce the severity of impacts.

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1. INTRODUCTION

Philip Morris (Pakistan) Pvt Limited (PMPKL) Sahiwal Factory plans to upgrade the existing warehouse for storage of hazardous waste to accommodate the hazardous waste produced due to ongoing operations of the company. The existing warehouse is covering area of 220 sqft and PMPKL's Sahiwal factory plans to upgrade the warehouse approximately 310 sqft thus covering a total area of 530 sqft for the storage of the hazardous waste. The upgraded warehouse will be used to temporarily store hazardous waste materials such as oils and chemicals for machine maintenance, power batteries, glass items, contaminated PPE, paints, nicotine waste products, and raw material powder waste before being handed over to EPA approved waste management contractor.

1.1. Purpose of Report

This report presents the finding of Environmental Impact Assessment (EIA) study conducted for the proposed Upgradation of Existing Warehouse for Storage of Hazardous Waste at Philip Morris Sahiwal Factory.

The EIA study has been conducted in compliance with the requirements of Punjab Environmental Protection Act, 1997 (Amended 2012 & 2017), pertinent rules & regulations and EPD requirements for EIA/IEE. The purpose of EIA is to give environment its due place in the decision-making process by thoroughly evaluating the environmental aspects of the proposed activities. Early identification and characterization of critical environmental impacts allows the regulating bodies (EPD) to form a view about the environmental acceptability of the proposed project and what conditions may apply to mitigate, reduce or compensate the negative impacts.

1.2. Identification of Project and Proponent

Project Title: Upgradation of Existing Warehouse for Storage of Hazardous Waste at Philip Morris Sahiwal Factory
Location: District Sahiwal

1.2.1. Project Proponent

PHILIP MORRIS (PAKISTAN) LIMITED
Address: Grand Trunk Rd, Sahiwal, Sahiwal District, Punjab.
Web: www.pmi.com
Focal Persons: Muhammad Shaban
Ph: +923336917197
Email: muhammad.shaban@pmi.com

1.2.2. Environmental Consultant

EMC Pakistan Pvt. Ltd.

Suite 403, Green Trust Tower, Jinnah Avenue,
Blue Area, Islamabad.
Phones: 051-8744155
Email: mail@emc.com.pk

1.3. Proponent's Brief Profile

Philip Morris (Pakistan) Limited ("PMPKL"), a public limited company primarily in business of manufacturing and sale of tobacco products in local market and tobacco export. PMPKL is listed on the Pakistan Stock Exchange and is an affiliate of Philip Morris International ("PMI"), a leading international tobacco company, listed on the New York Stock Exchange with its Operational Headquarters in Lausanne and Corporate

Headquarters in Stamford, Connecticut[1]. PMPKL supports a wide range of charitable projects in communities where it operates. These projects are providing economic opportunity, empowering women, and access to education[2].

1.4. Corporate Social Responsibility

Sustainability is included PMPKL's corporate strategy and is a guiding principle. PMPKL is committed towards building a sustainable and inclusive future for stakeholders and communities. PMPKL provides tailor-made support to local communities in its operational areas. Environmental protection, and community development are a core part of PMPKL's social investment strategy. PMPKL also actively supported in the disaster relief activities in Pakistan.

PMPKL's Manager Corporate Communication oversees CSR initiatives in the operational areas of Sahiwal. Simultaneously, the Sustainability department at PMPKL's factory in Sahiwal actively engages in resource conservation activities, conducts plantation drives, and implements community awareness programs.

An overview of CSR activities by PMPKL are as under:

- **Green Energy Generation**

Staying true to PMI's vision to achieve net zero carbon neutrality in direct operations by 2025, PMPKL has undertaken several important projects to improve its energy efficiency and green energy usage across all operations. Under the initiative, PMPKL has reduced its energy consumption by approximately 46% since 2018. In 2022, PMPKL consumed 149,808 kWh less electricity with approximately the same production volume compared to 2021. This was achieved by eliminating transformation, transportation and consumption losses on the utility equipment, auxiliaries, and production machines. In 2022, PMPKL's Sahiwal factory generated 13% of its total yearly electricity demand from solar energy.

- **Installation of Water Coolers with Filters and Hand Washing Stations in Public Schools**

PMPKL installed water coolers with filters and hand washing facilities in 5 different local schools in Sahiwal in collaboration with the education department. The scope was to extend and increase the availability of Water, Sanitation and Hygiene (WASH) structures in local Sahiwal communities to mitigate/prevent health risks issues related to inadequate potable water provision.

[1] https://www.pmi.com/who-we-are/who-we-are-overview
[2] https://www.pmi.com/markets/pakistan/en/about-us/overview


- **Disaster Relief Tranche 1-**

In 2022, Pakistan saw extreme levels of devastation across the nation as floods engulfed a large part of the land, including farms and households. Food insecurity reached emergency levels in some areas, causing potentially disastrous long-term effects on communities already suffering from a myriad of issues, especially malnutrition among children. The floods affected tens of millions of people, requiring emergency food assistance, and facing further economic distress. In the first tranche of its efforts to provide relief, PMPKL distributed nutritional packs, tents, mosquito nets and repellents to disaster-affected families across Badin, Sanghar and Larkana. PMPKL joined forces with Pak Mission Society to reach a total of 350 families and more than 2,000 people affected by the disastrous floods.






- **Disaster Relief Tranche-2**

For the second part of its relief efforts, PMPKL undertook the responsibility to provide dry food items to 22,000 flood affected families, accounting for more than 130,000 people facing a national-level disaster. This initiative was carried out in collaboration with the Rural Support Programmes Network.




- **Wastewater Treatment Plant at PMPKL's Sahiwal Factory**

PMPKL conducted a detailed water-risk assessment by using various sets of publicly available data to identify the main water-related challenges that the factory is subjected to, as well as those shared by local stakeholders. Over the years, PMPKL has implemented several initiatives to improve water efficiency and reduce water losses in its operations. PMPKL, at its manufacturing site, reduced the water consumption by 45% in terms of water consumption per Million Cigarettes (Mio/Cig) produced from 2018 as a baseline. PMPKL's Sahiwal factory is now operating with ZERO effluent discharge and utilising treated water in different routine activities. PMPKL continuously works to improve processes, invest in novel technologies, and raise awareness among employees. The Drive 4 Zero program plays a crucial role in improving performance. PMPKL aims to take a holistic approach to water stewardship that considers our operations and the communities affected throughout. The current waste-water treatment plant installed at PMPKL's factory in Sahiwal has total capacity of 165 m^3/day and process 115 m^3/day of process water and 50 m^3/day of the domestic water.

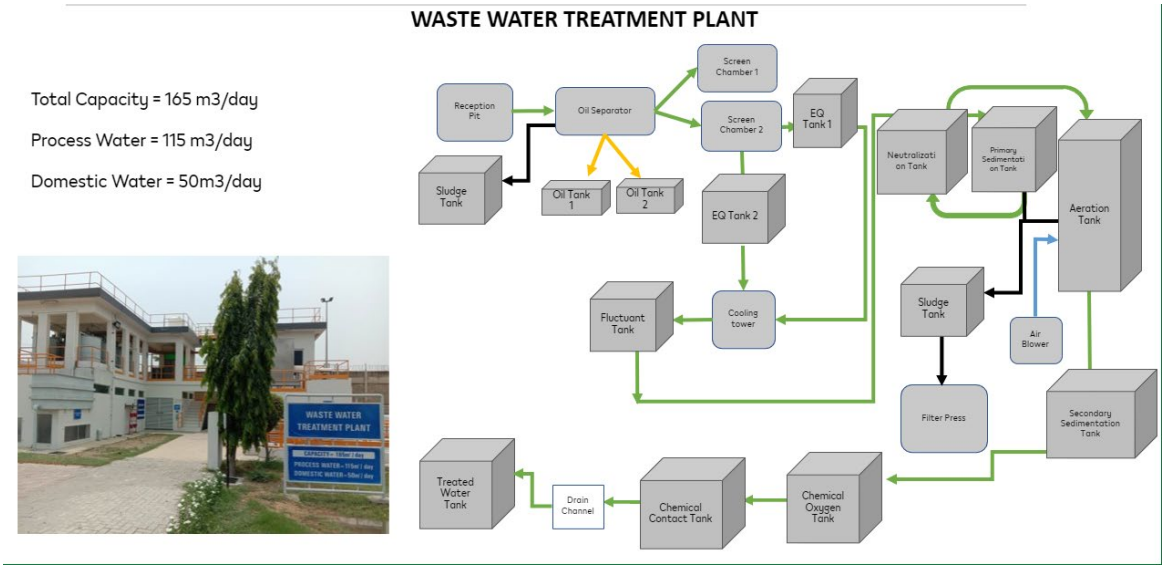
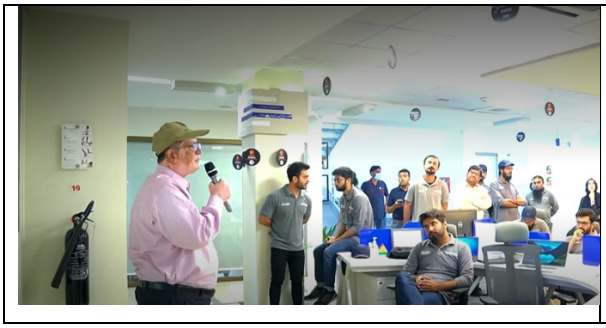


Figure 1.1: Wastewater Treatment Plant at PMPKL's Sahiwal Factory

- **Plant Saplings Distribution**
  PMPKL donated 100,000 plant saplings at OKARA Cantt to indirectly increase rain potential, reduce evaporation from soil, and increase water catchment by soil.

- **World Clean-Up Day in Sahiwal City**
  PMPKL celebrated the World Clean-Up Day by organizing a clean-up drive, along with a 100-tree plantation activity and awareness sessions. More than 250 volunteers helped collect over 90 kg of trash from a local hotspot, which was then transported for adequate disposal. Approximately 400 people were educated on the critical nature of climate change and the action needed to improve the health of the planet.

- **World Water Day 2023 Sahiwal Factory**
  PMPKL celebrated the World Water Day by organizing awareness session and plantation activity with external stakeholders for the shared water challenges. At Sahiwal Manufacturing site, 100% of water is recycled and reused resulting in zero liquid discharge.




- **Plantation activity in District Sahiwal**

PMPKL's Sahiwal Factory has planted around 1000 native tree species i district Sahiwal. These plantation activities have been carried out in the following location

i. Govt. Girls Primary School 55-4/R
ii. University of Sahiwal
iii. Child Protection and Welfare Bureau
iv. Park and Local neighborhood
v.

Plantation activities



Tree Plantation Activity at Govt. Girls Primary School 55-4/R


Tree Plantation Drive at University of Sahiwal

Tree Plantation Activity at Child Protection and Welfare Bureau

1.5. Environment Health and Safety

PMPKL is steadfast in its commitment to ensuring that its technologies and workplace practices are devoid of health hazards and exert minimal environmental impact. The organization is actively engaged in reducing health, safety, and environmental (HSE) risks associated with its operations by fostering secure working conditions and continually enhancing its environmental performance. PMPKL's goal is to cultivate a mutually supportive sustainability culture in which the responsibility for health, safety, and the workplace environment is firmly entrenched within highly proficient individuals and self-sufficient teams.

To guarantee the health and safety of both employees and contractors, PMPKL has established dedicated management systems, which are aligned with recognized guidelines and standards, including ISO 45001:2018 (Occupational Health and Safety Management Systems). PMPKL consistently updates these standards and conducts training for its staff to ensure that teams comprehensively comprehend and adhere to the specified requirements.

Figure 1.2: Health and safety trainings at PMPKL's Sahiwal Factory

1.6. Nature, size and location of Project

1.6.1. Nature and size of project

PMPKL plans to upgrade the existing warehouse for storage of hazardous waste produced during the operations of the company. Due to expansions in the operations, the upgraded area will be dedicated for the storage of hazardous waste properly before ultimate disposal via EPA approved waste management contractor. Following type of waste will be stored in the proposed hazardous warehouse;

1. Oils and chemicals for machine maintenance.
2. Power Batteries
3. Glass items
4. Contaminated PPEs
5. Paints
6. Nicotine waste products
7. Raw material powder waste
8. any other waste Hazardous waste

The details of the total area of the hazardous ware house after upgradation is provided in table below

Existing Warehouse area (sq.ft)	Proposed extension (sq.ft)	Total Area (sq.ft)
210	310	530

With the proposed upgradation of the existing warehouse into hazardous waste storgae warehouse, PMPKL's Sahiwal Factory will manage and store hazardous waste more appropriately before ultimate disposal.

1.6.2. Project Location and Surrounding

The site for the new warehouse is located in the existing factory of Philip Morris in U.C 24, Tehsil and district Sahiwal. The Philip Morris factory is approximately 650m away from the Lahore-Multan road. Surrounding area of the factory mainly comprises of agriculture land with few commercial shops. In the North side of the project area is located the bari doab canal which is approximately 320m away from the proposed project area, separated by N5. Administratively the project falls in jurisdiction of Tehsil and District Sahiwal.

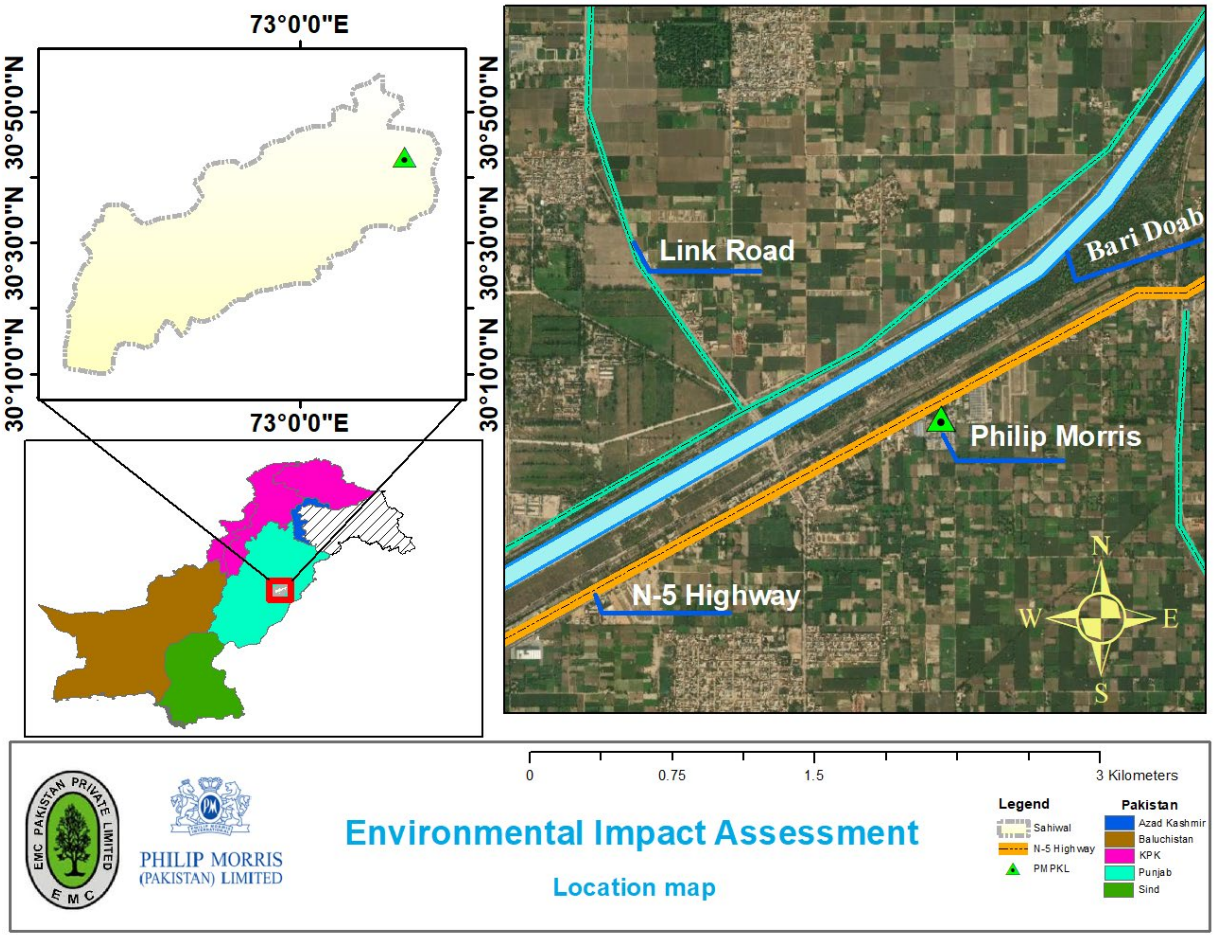


Figure 1.3 Location Map

1.7. Screening

Environmental Impact Assessment is a planning tool accepted as an integral component of sound decision making. The purpose of EIA is to give environment its due place in the decision-making process by clearly evaluating the environmental consequences of the proposed activities before action is taken. Early identification and characterization of critical environmental impacts allows the public and the government to form a view about the environmental acceptability of the proposed developmental project and what conditions should apply to mitigate, reduce or compensate those risks and impacts.

Environmental Impact Assessment (EIA) of the Project has been carried out in compliance with the mandatory requirement of Section 12 of Punjab Environmental Protection Act, 1997 (amended 2012 & 2017) which requires that:

"No Project shall commence construction or operation unless it has filed with the Agency an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) and has obtained from Agency approval in respect thereof. Punjab EPA shall review the IEE & EIA and accord approval subject to such terms and conditions as it may prescribe or require."

The Punjab Environmental Protection (Review of IEE and EIA) Regulations 2022, provide list of projects requiring IEE or EIA study. The proposed warehouse project falls in following category:

Schedule	Category	Description
II	G3	Hazardous substance or waste storage warehouse

Hence, this Environmental Impact Assessment study has been conducted. The EIA report presents the evaluation of environmental impacts of the upgradation and operation of the hazardous warehouse.

1.8. Objective of EIA

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

- Describe the key components of the microenvironment & macro environment of project area.
- Identify, analyze and evaluate the type and extent of potential environmental and social impacts with emphasis on significant beneficial/adverse effects the proposed project will cause on the existing biological, physical and socio-economic environments of the project area.
- Recommend mitigation measures and strategies to minimize or avoid adverse environmental and social impacts including monitoring plans for implementation of the mitigation measures.
- Assist planners and decision-makers in evaluating the project's feasibility based on its potential environmental impacts.
- Describe the project & all the activities to be carried out during the life of the project, including design, construction, operation, maintenance or any other activities relating to the project.

1.9. Scoping

Scoping is an early step during the environmental assessment study to identify the important issues to be considered and eliminate those that are not important. Scoping helps identify the boundaries of the project and TORs for later stages of baseline collection and impact identification and evaluation and help to save extra efforts and resources.

Scoping for the project was conducted to identify the key issues that need to be covered in the EIA and determine the scale and magnitude of same for further planning and management.

The proposed project involve activities related to the upgradation of existing warehouse for storage of hazardous waste before handling over to the EPA approved hazardous waste management contractor for ultimate disposal.

1.9.1. Spatial and temporal Boundaries for Environmental Assessment

The project activities have been assessed w.r.t project's impacts on micro and macro-environment. The project area considered as microenvironment comprises the project site and its immediate surroundings in 500 meters radius. Macro-environment is studied with respect to Tehsil Sahiwal. The EIA study has covered assessment of impacts on physical and ecological environment. Due to location social impacts are anticipated to be small scale.

1.9.2. Important issues and concerns raised during consultation

Details of the consultations with stakeholders is provided in section 5 of the report. Important issues highlighted during consultation are:

- Hazardous waste shall be stored in the dedicated waste storage warehouse.
- The Hazardous waste should be disposed off via waste contractor.
- Secondary containment pits shall be built to prevent seepage & soil contamination.
- Fire suppression system should be adequate to handle any emergency.
- Moreover, people have no grievances with regard to this project.

1.9.3. Significant impact and factors to be considered

Important impacts and factors during different phases of the project need to be considered include but not limited to;

- Waste generation
- Natural Disasters
- Firefighting
- Safety Hazards

Detail regarding screening of impacts is provided in section 6.

1.10. Methodology of EIA

Environmental Impact Assessment (EIA) is a systematic process that identifies and evaluates the potential impacts (positive and negative) that a proposed project may have on the biophysical and socio-economic environment. It identifies mitigation measures that need to be implemented in order to avoid, minimize or reduce the negative impacts, and identifies measures to enhance positive impacts. The EIA is not fully a linear process, but one where several stages are carried out in parallel and where the assumptions and conclusions are revisited and modified as the project progresses. The following sections provide additional detail regarding the key stages in this EIA process. These stages are:

- Scoping Phase;
- Specialist Study Phase; and
- Integration and Assessment Phase.

Figure 1.4 shows different phases of EIA.

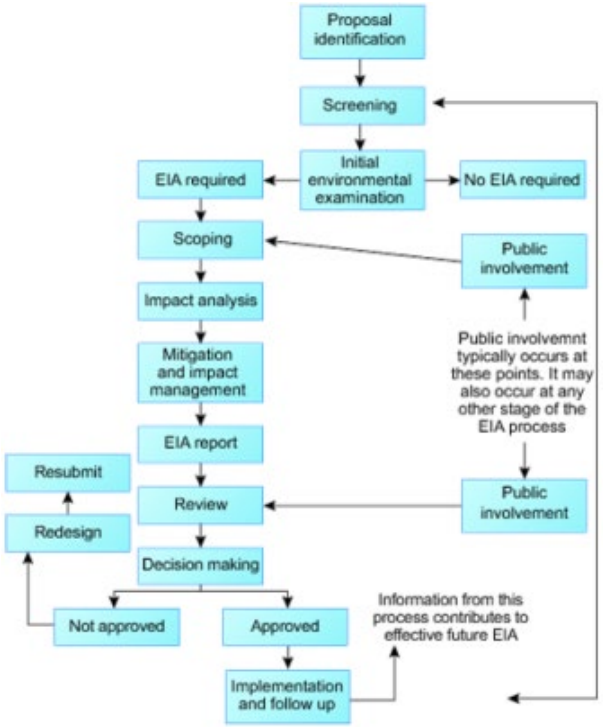


Figure 1.4: Methodology of EIA

1.10.1. Collection and review of project information

This was the very first step to embark on the study initiated through meetings held with the officials of Philip Morris (Pakistan) Limited. In the meetings, discussions were made to clarify the nature and extent of project in environmental perspectives. Basic information in the form of raw input received from the proponent was analyzed by the experts to comprehend the project & to assess its influence on the environment.

1.10.2. Identification of legal requirements for the project (legislative framework)

National legislations and environmental guidelines were reviewed to develop environmental legislative framework for the proposed project. This included review national and provincial laws pertaining to environmental management and social conformance. International guidelines and best practices were also reviewed to identify good practices.

1.10.3. Stakeholder Consultation

Stakeholder consultations were held to involve the public in the decision making process and to have a fair interaction with all community groups and assuring them that every attempt would be made to reduce the negative impacts of the project, and that adequate remedial measures would be taken to recompense the loss of the affected persons, if any.

1.10.4. Review of Literature (Secondary data)

Information from published studies/reports, previous studies by EMC, district reports etc. were reviewed to develop an understanding of the project area. Literature review also included previous reports carried out in Pakistan and internationally to identify prevailing issues and best practices in the Philip Morris (Pakistan) Limited.

1.10.5. Baseline Surveys

Field surveys of project location were conducted by EMC team in which experts visited the area and collected primary data ad identified need and scope of further surveys. The relevant surveys were carried out under the supervision of senior environmental experts. Preliminary socio-economic evaluation was also undertaken. Schedule of surveys followed is given below:

Figure 1.5: Survey of project area

Detailed environmental baseline survey was conducted to collect primary data in the Project surrounding to help identify sensitive receptors. The primary data were examined and compared with secondary data available from earlier environmental studies in the area.

1.10.6. Impact Assessment & Mitigation Measures

Based on the developed aspects inventory, experts analyzed the aspects for their logical outcome as potential impacts on the physical, ecological and social environment. These impacts have been identified, assessed and weighed for different activities during construction, commissioning and operational phases of the project. Mitigation measures were also proposed for various activities of projects in order to minimize the potential impacts during the life span of the project.

1.10.7. Environmental Management & Monitoring Plan

In the light of impacts identified and mitigations proposed, an Environmental Management Plan (EMP) has been developed which has a pivotal role in assigning tasks to personnel for the environmental management and implementation of mitigation measures as well as to monitor its effectiveness throughout the life cycle of the project. It also provided monitoring plans/procedures to be followed for checking and compliance maintenance of environmental quality and legal requirements through suggested mitigation measures.

1.10.8. Documentation Review & Conclusion

This is the final step to complete the environmental assessment and compile all the work done in shape of a report. Report writing started just after the initiation of environmental assessment. The report has been written by experts of EMC and compiled by the office staff in coordination with the experts. At the end of the study, the entire report is reviewed by the team leader followed by recommendations and conclusion in the light of the assessment.

1.10.9. Report Structure

The EIA report has been structured on the standard format, prescribed by the EPA. The Report has been presented in the following sections:

Chapter 1: Provides an introduction and overview of the project

Chapter 2: Details the project description, its objective, location of the facilities and construction/upgradation & operation details including analysis of alternatives along with proposed schedule for implementation

Chapter 3: Gives an overview of policy and legislation along with international guidelines relevant to the project

Chapter 4: Provides description of the microenvironment and macro environment of the project area. This chapter contains the description of the physical environment, socio-economic condition and built environment of the area.

Chapter 5: Provides details of stakeholder consultation and the issues and concerns raised by the stakeholders and interested parties.

Chapter 6: Describes the potential environmental and social impacts of the proposed Project. General and project specific guidelines were used to assess the potential environmental impacts at the various stages - designing, construction and operations of the project.

Chapter 7: Presents the Environmental Management Plan and Monitoring Program for the project

Chapter 8: Summarizes the report and presents its conclusions.

1.10.10. Study Team

Table 1.2: List of EIA Study Team

S. No	Names	Positions
1.	Mr. Asif Shuja	Chief Operating Officer
2.	Ms. Farhat Shaheen	Environmental Specialist & Project Coordinator
3.	Dr. M Mohiuddin	Environmental Specialist
4.	Ms. Ayesha Noor	Environmentalist
5.	Mr. Owais Ahmad	Environmentalist

2. PROJECT DESCRIPTION

2.1. The Project

PMPKL's Sahiwal factory plans to upgrade the existing warehouse for the storage of hazardous waste produced during factory operations. This upgrade is necessary due to the extension of PMPKL's Sahiwal factory operations following the installation of a new packing line. The previously constructed warehouse, with an area of 220 sq. ft., will be expanded by an additional 310 sq. ft. for hazardous waste storage, bringing the total area to 530 sq. ft. The upgraded warehouse will be used to temporarily store hazardous waste materials such as oils and chemicals for machine maintenance, power batteries, glass items, contaminated PPE, paints, nicotine waste products, and raw material powder waste before being handed over to EPA approved waste management contractor.

2.2. Project Objectives

The primary objectives of the project are as follows:

- Upgrade the existing warehouse for storage of hazardous waste.
- Extend the area of hazardous waste warehouse by 310 sq ft.
- Ensure strict compliance with safety and environmental regulations.
- Implement effective risk mitigation and emergency response plans.

2.3. Location and Site Layout

The proposed project site is located within existing factory of Philip Morris in Tehsil and District Sahiwal. The factory is approximately 650m away from the Lahore-Multan road while the project area mostly falls in agriculture land. In the North side of the project area is located the Bari Doab Canal which is approximately 0320m away from the proposed project area. Administratively the project falls in District and Tehsil Sahiwal.

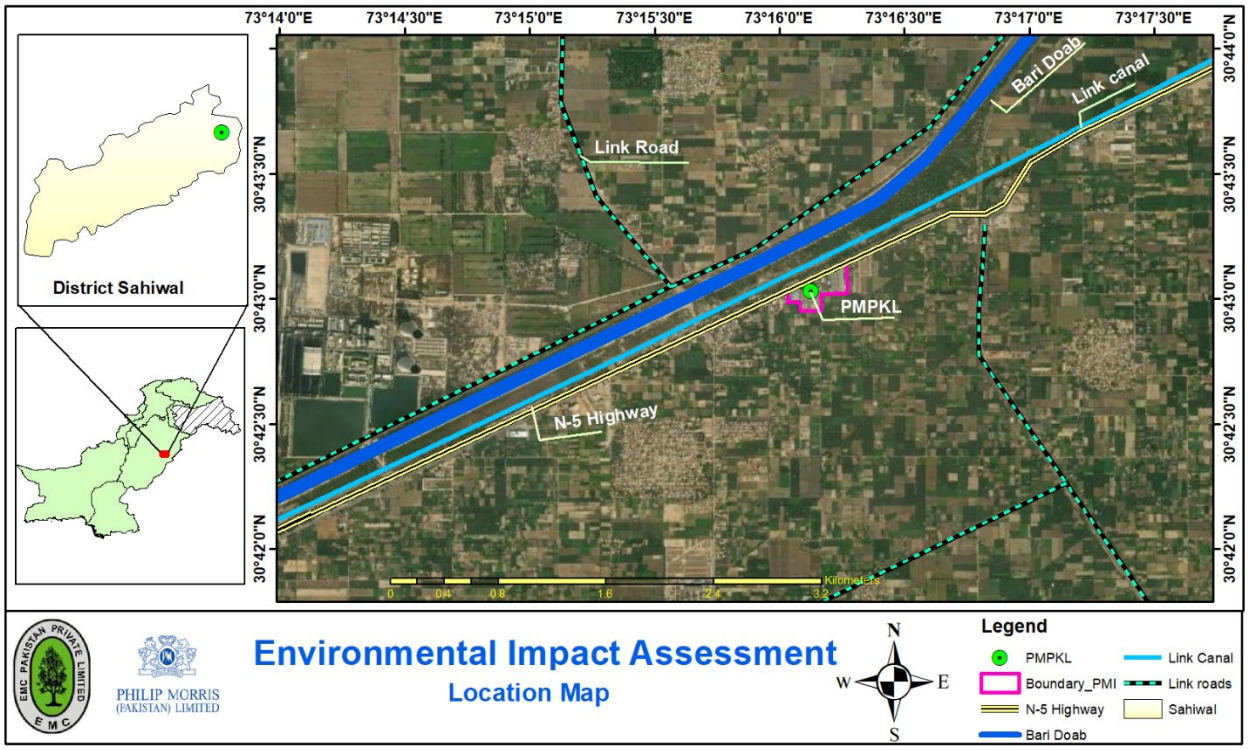


Figure 2.1: Project Location Map

Site layout of the project is given in Figure 2.2 and Annex-I.

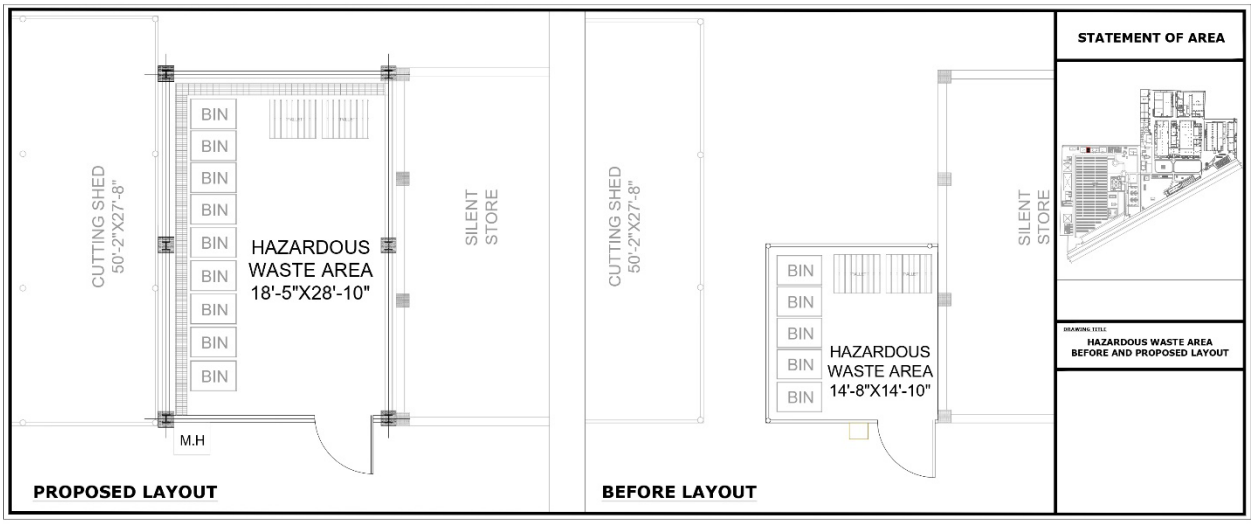


Figure 2.2: Site Layout (also attached as Annex-I)

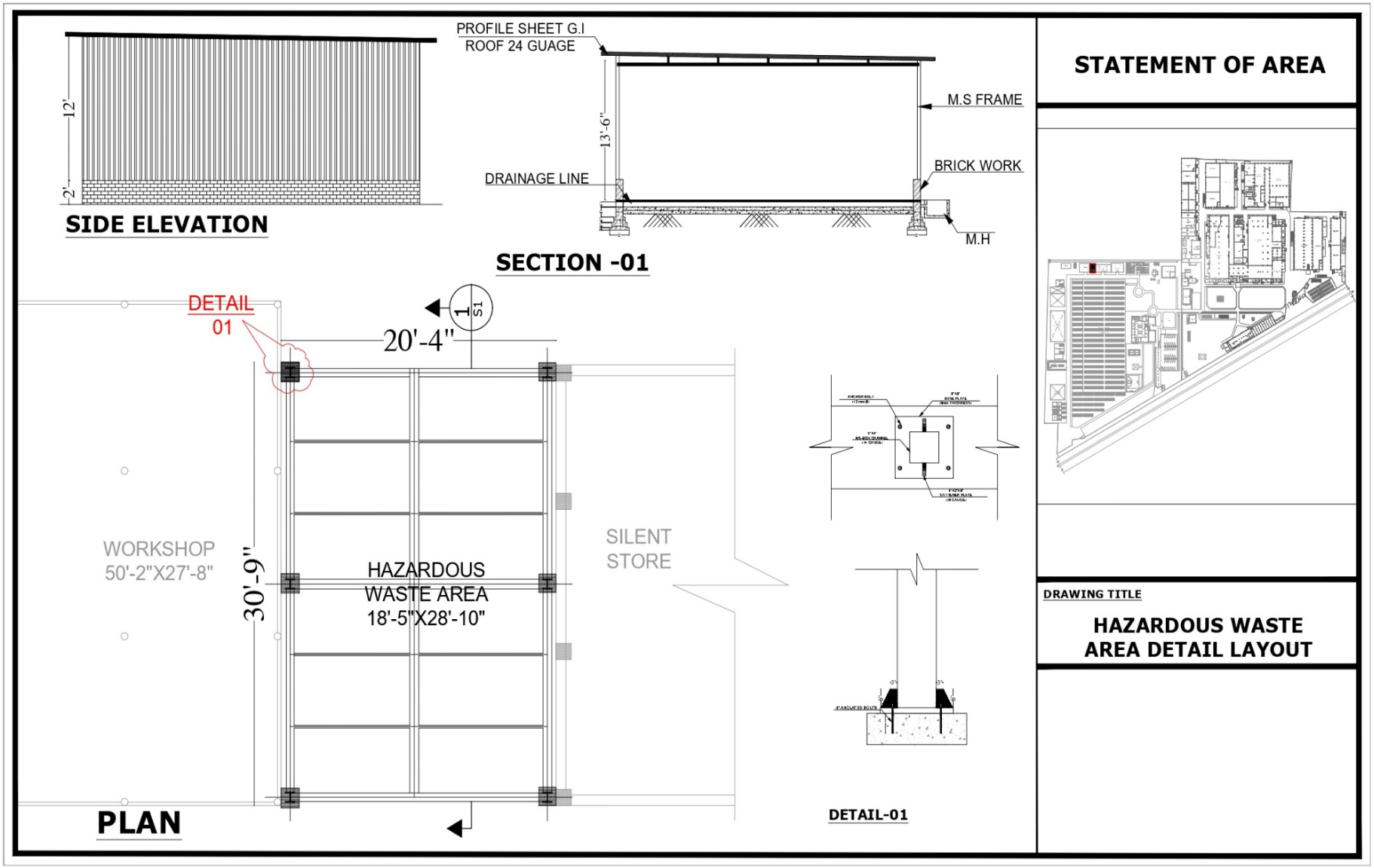


Figure 2.3: Detailed Site Layout (also attached as Annex-I)

2.4. Land Use on the site

The site for warehouse is currently open land within the Philip Morris Sahiwal factory. There is no residential area within 1km radius of the factory. The closest settlement is located at 1.05 km i.e., Chak No. 56/5-L, Sahiwal. Another settlement present in the South-East of the project is Chak No. 55/5-L at a distance of 1.7 km. The link road which is connected with Lahore-Multan road is located in the North of the project at a distance of approximately 1.06km. The surrounding land uses near the project are as follows:

North:	Lahore-Multan Road, Bari Doab canal, Yousaf wala Railway Track
South:	Agricultural Land
South west:	Residential area (Chak No. 56/5-L)
East:	Agricultural Land
South-East:	Residential area (Chak No. 55/5-L)
West:	Baba Bhory Shah Shrine

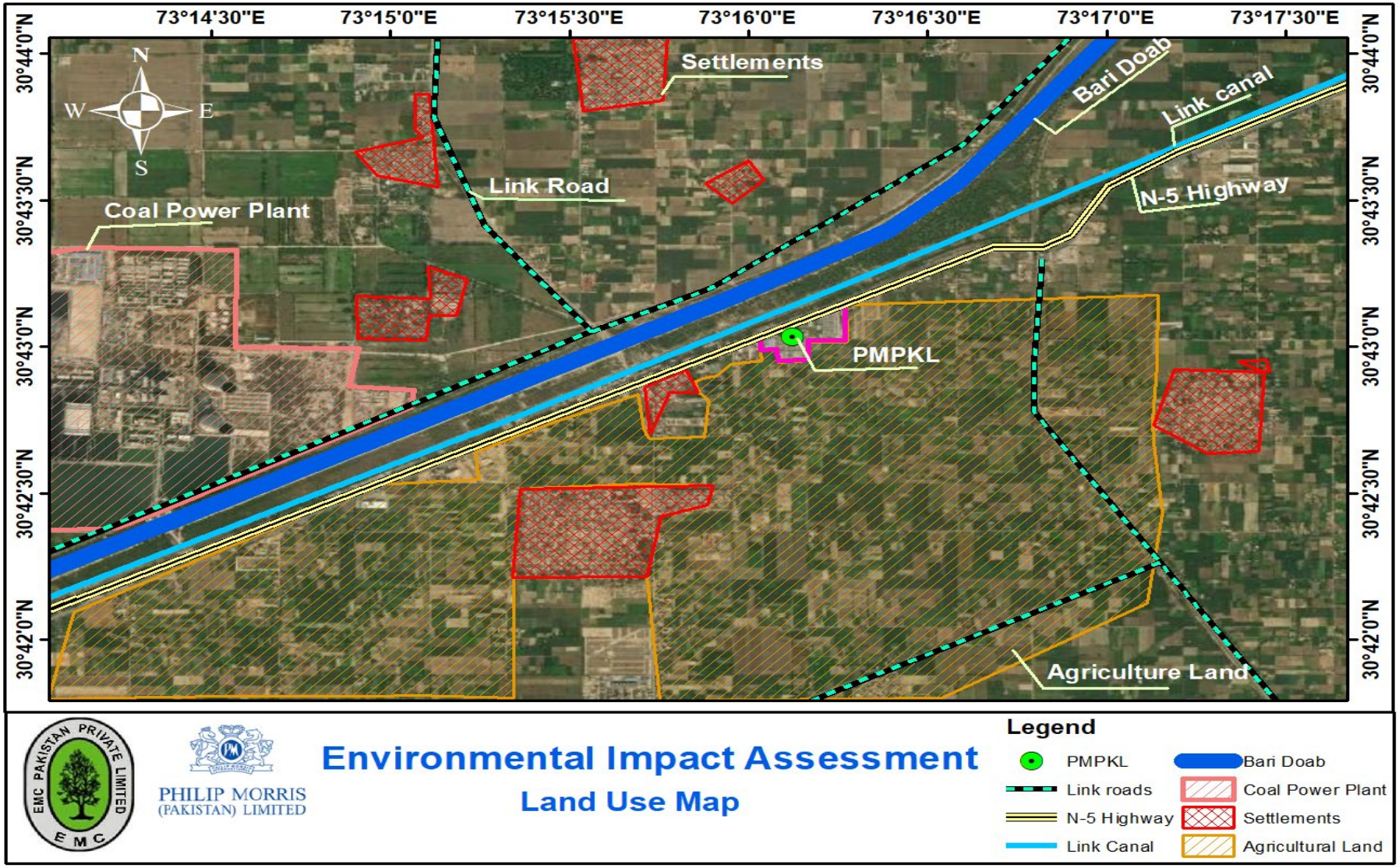


Figure 2.4: Land use in Project Area

2.5. Road Accessibility

The proposed site can be accessed via Lahore Multan Road (N5). The Philip Morris Sahiwal factory is located at approximately 7.2km away from the Yousafwala. There is no residential area within 1km radius of the project. The link road which is connected with Lahore-Multan road is located in the North of the project on a Distance of approximately 1.06km. Figure 2.3 shows road accessibility map

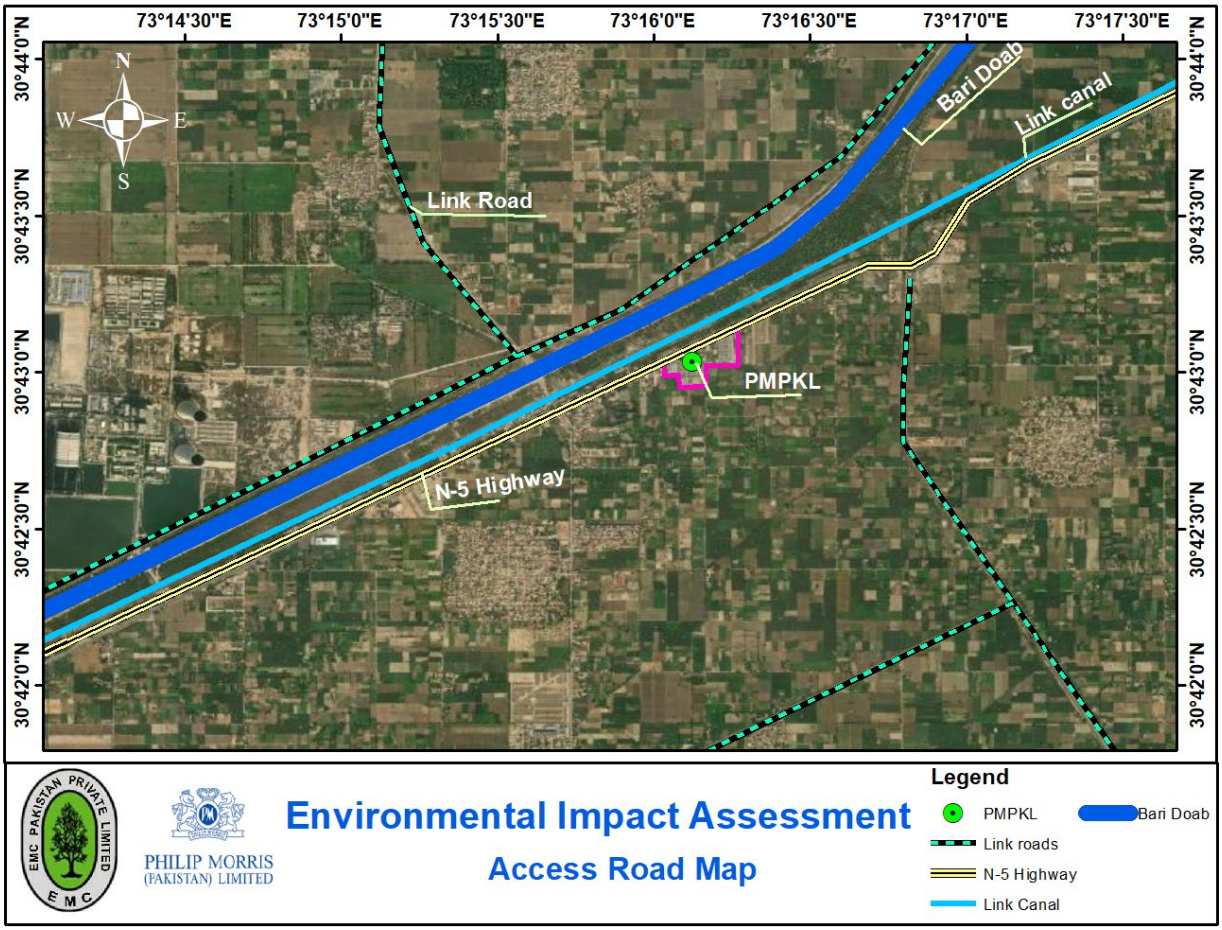


Figure 2.5: Road access map

2.6. Vegetation features of the Project Site

Site being part of the existing factory is clear of any vegetation. The surrounding area comprises agricultural land. Natural vegetation is almost non-existent and comprises mainly the trees along peripheries of green fields /crop fields. There was no vegetation at project site except patches of grass and few trees along plot boundaries. Overview of vegetation in project area is given in figure below.

Figure 2.6: Vegetation features in the Project Area

2.7. Cost and Magnitude of operation

The project is a small scale project of 310 sq.ft to be executed at a cost of PKR 5 million approximately including construction, installation work, equipment, material and designing.

The details of cost is as under

Table : Cost estimation of the upgradation of existing warehouse	
Description	Cost in millions (Rs)
Civil cost	1.2
Steel shed	2.5
Electrical works	1.3
Total cost	5

2.8. Schedule of Implementation

The duration of construction of a hazardous waste storage warehouse is 1.5 months starting from the August 2024 to end in September 2024.

2.8.1. Construction/ Upgradation Work Activities

Key activities during construction/upgradation phase include following:

a) Mobilization
b) Site Preparation
c) Foundation
d) 4" Thickness RCC Concrete Floor
e) Ramp Work
f) MS Shed Installation
g) Covering Sheets Installation
h) Electrical work/Wiring
i) Smoke Detector Installation

Following are the raw materials or by products in the process, as the process mainly includes the construction/upgradation of warehouse for storage of hazardous waste in PMPKL's Sahiwal Factory.

Table 2.2: Raw Material Usage		
Sr No.	Raw Material	Quantity
1	Cement (bags)	38 (concrete) + 29 (toe wall)
2	Sand (Cubic feet)	91 (concrete) + 250 (toe wall)
3	Aggregate/Crush (Cubic feet)	182 (concrete)
4	Bricks (Nos)	4250 (toe wall)
5	Steel (kg)	300 kg
6	Epoxy powder and liquid (20 liters/drum)	0
7	Smoke/Heat Detector	2

2.8.2. Installation of temporary resting area for workers

A temporary shed having area of 10x10 sq ft will be installed during the upgradation of the warehouse. This temporary shed will be used as a sitting area for the workers and will be removed at the end of the construction activities.

2.8.3. Temporary waste storage area

A temporary waste storage area will be constructed within PMPKL's Sahiwal Factory to store waste generated during the upgradation activities. This area will cover 350 sq. ft and will be properly enclosed to ensure that the stored waste is protected from rainfall and wind. The temporary storage area will be removed once the hazardous waste warehouse is completed.

2.9. Waste collection and storage process

2.9.1. Process Flow

The proposed project involves a streamlined process flow designed to ensure the safe and efficient storage of hazardous waste. The key components of the process flow include:

Receive of Hazardous Waste: All hazardous waste produced during the operations of the factory will be transferred to the hazardous warehouse. The hazardous waste will be collected by the trained team that will seal the waste at the point of origin and will transport waste in cart to the warehouse. The hazardous waste collection team will insure that no waste shall be discharged/leftover/spilled during the transport from the factory to the warehouse.

Storage: The hazardous waste will be stored in designated areas within the warehouse, adhering to strict safety protocols and storage guidelines.

Safety Measures: The warehouse will be equipped with state-of-the-art safety measures, including fire suppression systems, ventilation systems, emergency response equipment, and hazard signage. Regular safety inspections and training will be conducted to ensure a safe working environment.

Waste Management: An EPA approved waste management contractor will collect the waste from the hazardous warehouse and dispose off as per instructions of EPA.

2.9.2. Raw Materials and by-products

Since the project only involves storage activities for the hazardous waste materials, the project itself does not involve use or production of any raw materials or by-products.

2.9.3. List of Hazardous Waste to be Stored

Following hazardous waste will be stored in the hazardous warehouse:

- Oils and chemicals for machine maintenance.
- Power Batteries
- Glass items
- Contaminated PPEs
- Paints
- Nicotine waste products
- Raw material powder waste

2.10. Restoration and Rehabilitation Plan

Upon the completion of the construction/upgradation activities, restoration and rehabilitation process will be initiated for the construction site. Since construction/ upgradation activities will be carried out within already existing factory so at the end of the construction phase, the excess materials and debris will be removed from the site and wherever necessary, the minor impacted infrastructure will be restored. The key activities to be undertaken during the site restoration phase include:

- Construction contractor will demobilize
- All equipment and temporary structures build for construction/ upgradation work will be removed.
- All waste shall be collected and removed from site for disposal.
- It will be ensured that after restoration activities the site is clean and that no refuse has been left behind.
- Development of green area and plantation will be carried out as per landscaping plan given in the EMP.

3. CONSIDERATION OF ALTERNATIVES

3.1. General

The objective of screening alternatives during the Environmental Impact Assessment (EIA) exercise is to identify options that most effectively meet the project's environmental objectives. This is achieved either by enhancing the environmental benefits of the proposed activity or by reducing or avoiding potentially significant negative impacts.

For the proposed project, alternatives considered include:

1. Site alternatives
2. Design/Technology alternative
3. Environmental Alternative
4. Economic Alternative

3.1.1. Site Alternative

The proposed project site of the hazardous warehouse is situated within the PMPKL's Sahiwal factory. Currently, PMPKL is upgrading the existing warehosue to store hazardous waste. The PMPKL is situated along the along the main Grand Trunk Road in Sahiwal. The immediate vicinity of the project site include some commercial shops, filling station along with different industries. The selected project site is considered the most suitable option, as it is located within the premises of PMPKL's Sahiwal Factory, providing logistical and operational advantages.

3.1.2. Design/Technology Alternative

The project entails the upgradation of a warehouse dedicated for the storage of hazardous waste such as oils and chemicals for machine maintenance, nicotine waste products, raw material powder waste, discarded power batteries, discarded glass items, contaminated PPEs, paints and any other hazardous waste produced during the operations. The design and technology employed in the upgradation of the warehouse will prioritize safety measures and compliance with PMI standards. Since the existing warehouse that will be upgraded for the storage of hazardous waste is situated within PMPKL's Sahiwal factory, therefore no alternative options are under consideration.

3.1.3. Environmental Alternative

Key environmental aspects relevant to the project include:

Siting Considerations: The project site's location within the boundary area of the PMPKL;s Sahiwal Factory is identified as the most suitable option.

Alteration to Environmental Quality: The current project deal with upgradation of warehouse for the storage of hazardous waste. The project's air emissions are anticipated to be negligible. For the prevention of the soil and groundwater contamination, Secondary containment pits will be constructed to prevent seepage & soil contamination.

Smoke detectors will also be installed in the hazardous waste storage warehouse to detect fires along with the installation of the appropriate fire extinguishers. By considering these environmental aspects and adopting a

proactive approach to monitoring and control, the project aims to safeguard environmental quality while achieving its core objective of safe storage of hazardous waste.

3.1.4. Economic Alternative

In Pakistan, PMPKL is recognized as one of the leading tobacco companies, offering cigarette brands such as Marlboro, Parliament, Morven by Chesterfield, Diplomat, and Red & White. During the production of the tobacco products and other operations of the Sahiwal factory, hazardous waste will be produced that will be stored in the dedicated hazardous warehouse. Due to expansion in company operations, PMPKL's Sahiwal factory plans to upgrade the warehouse for storage of hazardous waste. Since the proposed project is regarding the upgradation of existing warehouse, economic alternative cannot considered and implemented.

4. LEGISLATIVE & ADMINISTRATIVE FRAMEWORK

4.1. Introduction

This section of the EIA report aims to identify the legislative requirements for the project by summarizing the relevant environmental policies, legislation and guidelines. The provisions of these guidelines have been integrated into the mitigation measures and the Environmental Management & Monitoring Plan (EMMP) to ensure effective management of the project's environmental and social issues. The environmental assessment has been conducted in compliance with both local and international guidelines. The main among these are:

- National Environmental Laws & Legislations
- National Environmental Guidelines
- International Treaties
- Policies and Laws related to Punjab

Philip Morris (Pakistan) Limited (PMPKL), the proponent of this project, must comply with the relevant policies and legislations throughout the project operations. The proponent shall ensure that the project activities align with environment, health, and safety management standards, as well as social responsibility across all operational aspects to:

- Protect the environment and promote sustainable development.
- Conduct all operations in an environmentally friendly manner.
- Ensure Safe disposal of all waste, both hazardous and non-hazardous, without posing any threat to health, the environment, and/or safety.
- Adopt appropriate standards in the absence of adequate laws and regulations.
- Stop any operation if the health, environment, or safety risks are identified.
- Maintain a high level of preparedness to manage emergency situations.

4.2. National Environmental Laws, Policies & Plans

4.2.1. National Conservation Strategy

The National Conservation Strategy (NCS) is the primary policy document of the Government of Pakistan (GoP) addressing national environmental issues. The Strategy was approved by the Federal Cabinet in March 1992, The NCS was also endorsed by International Financial Institutions, including the World Bank. The NCS had identified 14 core areas such as biodiversity conservation, pollution prevention, soil and water conservation, and cultural heritage preservation, recommending immediate action to protect Pakistan's environment.

A mid-term review of the NCS in 2000 found that its main achievements were raising awareness and building institutions rather than significantly improving the environment and natural resources. The review was noted that the NCS was neither designed nor adequately focused as a national sustainable development strategy (GoP), November 2002. Thus, the need for a more focused National Environmental Action Plan (NEAP) was formulated and approved by the Pakistan Environmental Protection Council in 2001, NEAP aimed to practically enhance the national environment, with a focus on poverty reduction and sustainable economic development.

The National Environment Action Plan (NEAP) now forms the national environmental agenda, with its core being to initiate actions that safeguard public health, promote sustainable livelihoods and enhance the quality of life for the people of Pakistan. The GoP and United Nations Development Program (UNDP) have jointly initiated an umbrella support Program called the NEAP-Support Program, which was signed in October 2001 and implemented in 2002. This program aims to achieve environmental sustainability and poverty reduction within the context of economic growth. The new policy includes a total of 171 guidelines addressing sectoral and cross-sectoral issues, focusing on sustainable development and the protection of the country's natural resources. The following are the approved Sectoral Guidelines:

- Water Supply and Management.
- Air Quality and Noise.

- Waste Management.
- Forestry.
- Biodiversity and Protected Areas.
- Climate Change and Ozone Depletion.
- Energy Efficiency and Renewable.
- Agriculture and Livestock.
- Multilateral Environmental Agreements

4.2.2. Biodiversity Action Plan

The key to protecting Pakistan's biological heritage lies in involving local communities and supporting competent institutions in conservation and sustainable use efforts. The Government of Pakistan has recognized the importance of these measures in the preparation of National Conservation Strategy and in becoming a signatory to, and ratifying, the Convention on Biological Diversity (CBD) in 1994. One of the most significant direct steps toward addressing biodiversity loss has been the development of the Biodiversity Action Plan for Pakistan in 2000.

There will be no loss of biodiversity during this project because project area has no biodiversity.

4.2.3. Pakistan Penal Code, 1860

Section XIV of PPC deals with the offences affecting the public health, safety, convenience, decency and morals. Person may be found guilty of public nuisance if his act or omission causes common injury, danger or annoyance to the public or results in spread of infection of diseases dangerous to life. The section also deals with environmental pollution.

Although provisions under this Act relating to the environment are no longer being enforced following the promulgation of the Pakistan Environmental Protection Act, 1997. However, pollution offences can still be prosecuted under the Pakistan Penal Code, 1860.

4.2.4. The Forest Act, 1927

This Act grants the Government the authority to designate areas for reserved forest, village forest and protected forest, and to acquire such areas to prohibit or restrict the public use of the resources or other activities. Consequently, it is essential to implement measures for conservation of forests and vegetation cover. The project area does not include any reserved forest in its vicinity to require protection. Limited areas of natural vegetation exists in the project area due to extensive agricultural activity and development works. Linear Plantation, mainly consisting of Eucalyptus trees, are commonly found along roads. However, there are no designated reserved forests near the Philip Morris (Pakistan) Sahiwal Factory.

4.2.5. Antiquities Act, 1975

The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The Act aims to safeguard antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area that may contain such articles of archaeological significance.

There are no structures of historical or cultural significance within or immediately adjacent to the project site. However, if any artifact of significance under the Act is found, it will be reported to the Antiquities department of Punjab Government.

4.2.6. Land Acquisition Act, 1894

This Act provides the legal framework for the acquisition of land required for public purposes and for companies and as well as for determining the amount of compensation for such acquisitions. It details the various processes involved in land acquisition, including preliminary investigation, objections to acquisition, declaration of intended acquisition, enquiry into measurements, valuation and claims, taking possession, court references and

procedures, apportionment of compensation, payment, temporary occupation of land, acquisition of land for companies, dispute resolution, penalties, and exemptions. This Act consists of 55 sections addressing different areas. Such as section 4(2) states that it shall be lawful for any official authorized by the Collector to enter upon and survey, to dig or to do all other acts necessary to ascertain that whether the land is adapted for such purpose.

4.2.7. National Climate Change Policy, 2021

The main objectives of Pakistan's National Climate Change Policy (NCCP) include:

- To pursue sustained economic growth by appropriately addressing the challenges of climate change
- To integrate climate change policy with other inter-related national policies
- To focus on pro-poor gender sensitive adaptation while also promoting mitigation to the extent possible in a cost-effective manner
- To build climate-resilient infrastructure
- To track impact of climate change on water, food and energy security of the country, and to implement remedial plans to support water, energy and food policies
- To minimize the risks arising from the potential increase in frequency and intensity of extreme weather events such as floods, droughts and tropical storms
- To develop climate-resilient agriculture and food systems for all agro-ecological zones in the country
- To promote country's transition to cleaner, lower emission and less carbon intensive development
- To accelerate the policy coherence and integration to achieve the United Nations' Sustainable Development Goals (SDGs) in the light of its Sustainable Development Report 2020 (SDR2020) and our Nationally Determined Contributions
- To strengthen inter-ministerial and inter-provincial decision making and coordination mechanisms on climate change
- To facilitate effective use of the opportunities, particularly financial, available both nationally and internationally
- To foster the development of appropriate economic incentives to encourage public and private sector investment in adaptation and mitigation measures
- To enhance the awareness, skill and institutional capacity of relevant stakeholders
- To promote tree plantation, conservation of natural resources, nature-based solutions and long-term sustainability

4.2.8. National Hazardous Waste Management Policy, 2022

The National Hazardous Waste Management Policy, 2022 is formulated in the manner as follows:

A policy to facilitate the implementation of international treaties & Conventions on a national level to improve the definition & implementation of Hazardous Waste Management (HWM) for better environmental management, clarify institutional responsibilities related to HWM, and strengthen the management of hazardous & other wastes.

Whereas matters mentioned above are pivotal for reducing environmental pollution;

And whereas as defined under the Federal Legislative List, Part I, Entries No.3 and 32 read with Article - 70(4) of the Constitution of the Islamic Republic of Pakistan, 1973, which gives the Federation the jurisdiction to make laws relating to the 'implementation of international treaties and Conventions.' However, the 18th Constitutional Amendment has significantly transformed the governance structure in the country, particularly concerning the environment and sustainable development. Prior to the enactment of the 18th Amendment, Pakistan Environmental Protection Act (PEPA) 1997 governed all operations and activities related to the protection of environment, including the implementation of international Conventions. On the one hand, the Constitution (Eighteenth Amendment) Act 2010 gives provincial governments exclusive powers to legislate on the subject of 'environmental pollution and ecology.' Hence, provincial governments have the task of formulating their own environmental legislation ahead of them. On the other side, there is no mechanism - post 18th Amendment - that allows for the Provincial-Federal interaction regarding the implementation of international Conventions which address the issue of Hazardous Waste (HW).

Therefore, it is expedient for the Ministry of Climate Change (MoCC) to formulate a National Hazardous Waste Management Policy to integrate all relevant sectors for compliance with Multilateral Environmental Agreements (MEAs) on Hazardous Waste Management. This Policy will act as an umbrella to address the issue of Hazardous Waste (HW) and systemize all relevant departments and other stakeholders to take legal and institutional steps to control the pollution crisis of HW in the country.
PMPKL's Sahiwal Factory has hired EPA approved hazardous waste management contractor for the safe disposal of the waste. Furthermore, all the hazardous waste produced during the factory operations is temporary stored in the designated hazardous waste warehouse and later handed over to EPA approved hazardous waste management contractor.

4.3. Provincial Laws and Regulations

4.3.1. Punjab Environmental Protection Act, 1997 (amended 2012 & 2017)

As a result of the 18th amendment to the Constitution of Pakistan, the Punjab Environmental Protection Act, 1997 (amended 2012 & 2017) is now the principal provincial legislation in Punjab for:

1. Protection, conservation, rehabilitation and improvement of the environment,
2. Prevention and control of pollution, and
3. Sustainable development.

The salient features of the Act are mentioned below:

1. Prevention of polluting discharges and Emissions: Section 11 of the Punjab Environmental Protection, 2012 requires a person to ensure that no release is done to the environment in the form of harmful discharges / effluents or emissions which could cause degradation of the ambient environmental quality. However, release of effluents/air emissions is allowed if the concentration of its constituents is within the limits as prescribed in the Punjab Environmental Quality Standards.
2. Environmental Quality Standards: The Act provides for fixing the Environment Quality Standards and their strict enforcement. For default, the Government has been empowered to levy a pollution charge.
3. IEE/EIA: Under Section 12, no project can be started unless the IEE or EIA has been conducted and its approval obtained from the Responsible Authority, in the present case from Punjab EPA.
4. The imports of hazardous waste into the country has been banned and the transport of hazardous substances and dangerous chemicals or toxic material or explosive substances etc. has been regulated, through licenses, under prescribed rules and procedure. For the effective implementation of the provisions of the law, the Pakistan Environmental Protection Agency, headed by a Director General with other staff has been constituted. This Agency is responsible for enforcing the policy and implementing the provisions of the law. On the same pattern, Provincial Environmental Protection Agencies have been created in each province.

4.3.2. Environmental Protection Agency Review of IEE/EIA Regulations 2022

The IEE-EIA Regulations 2000 outline the detailed procedures for the preparation, submission, and review of the IEE and the EIA. A key component of these regulations is the categorization of projects based on their anticipated environmental impact. Project types listed in Schedule II of the regulations are considered to have potentially serious environmental impacts and thus require an EIA. In contrast, projects listed in Schedule I are expected to have less adverse effects and require an IEE, the proposed project falls in Schedule II requiring an EIA as the project is categorized as: G. Waste Storage and Disposal: 3. Hazardous substance or waste storage warehouse. Hence, an EIA study for the proposed project of the upgradation of existing warehouse for storage of hazardous waste has been conducted to thoroughly assess the potential impacts in detail.

4.3.3. Punjab Environmental Quality Standards, 2016

In exercise of the powers conferred under clause (c) of subsection (1) of section 4 of the Punjab Environmental Protection Act, 1997 (XXXIV of 1997), the Environmental Protection Council has approved the PEQS for Municipal and Liquid Industrial Effluents, Drinking Water, Motor Vehicle Exhaust and Noise, Ambient Air Noise, and Industrial Gaseous Emissions, with Notification No. SO (G)/EPD/7-26/2013.

Table 3.1(a): PEQS for Ambient Air			
Pollutant	**Time- weight average**	**Concentration in ambient air**	**Method of measurement**
Sulfur dioxide (SO2)	Annual average*	80 µg/m^3	Ultraviolet Fluorescence method
	24 hours**	120 µg/m^3	
Oxides of nitrogen as (NO)	Annual average	40 µg/m^3	Gas phase Chemiluminescence
	24 hours **	40 µg/m^3	
Oxides of nitrogen as (NO_2)	Annual average	40 µg/m^3	Gas phase Chemiluminescence
	24 hours **	80 µg/m^3	
Ozone (O_3)	1 hours	130 µg/m^3	Non dispersive UV absorption method
Suspended particular matter (SPM)	Annual average	360 µg/m^3	High volume sampling (Average flow rate not less than 1.1 m^3 /min)
	24 hours**	500 µg/m^3	
Respirable particulate matter PM_{10}	Annual average	120 µg/m^3	Preferably β-Ray absorption method
	24 hours**	150 µg/m^3	
Respirable particulate matter $PM_{2.5}$	Annual average	15 µg/m^3	Preferably β-Ray absorption method
	24 hours**	35 µg/m^3	
Lead (Pb)	1 hours	15 µg/m^3	ASS method after sampling using EPM 2000 or equivalent filter paper
	24 hours**	1 µg/m^3	
	1 hours	1.5 µg/m^3	
Carbon Monoxide (CO)	8 hours	5 µg/m^3	Non dispersive infrared (NDIR) method
	1 hours	10 µg/m^3	
*** annual arithmetic means of minimum 104 measurement in a year taken twice a week 24 hourly at uniform interval**			
*** 24 hourly /8 hourly values will be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days**			

Table 3.1 (b): PEQS for municipal and liquid industrial effluents			
No	Param(eter	Into in land water	In sewage treatment
1	Temperature or temperature increase	≤3 C	≤3 C
2	pH value (H+)	6-9	6-9
3	Biochemical oxygen demand (BOD_5) at 20 C (1)	80	250
4	Chemical oxygen demand (COD) (1)	150	400
5	Total suspended solids (TSS)	200	400
6	Total dissolved solids (TDS)	3500	3500
7	Grease and Oil	10	10
8	Phenolic compounds (as phenol)	0.1	1.3
9	Chloride (as CI-)	1000	1000
10	Fluoride (as F-)	10	10
11	Cyanide (as CN-) total	1.0	1.0
12.	An-ionic detergents (as MBAs) (2)	20	20
13.	Sulfate (so^2_4-)	600	1000
14.	Sulfide (S2-)	1.0	1.0
15.	Ammonia (NH3)	40	40
16.	Pesticides (3)	0.15	0.15
17.	Cadmium (Cd)(4)	0.1	0.1
18.	Chromium (trivalent and hexavalent) (4) (1)	1.0	1.0

Table 3.1 (b): PEQS for municipal and liquid industrial effluents			
No	Param(eter	Into in land water	In sewage treatment
19.	Copper (Cu) (4)	1.0	1.0
20.	Lead (Pb) (4)	0.5	0.5
21.	Mercury (Hg) (4)	0.01	0.01
22.	Selenium (Se) (4)	0.5	0.5
23.	Nickel (Ni) (4)	1.0	1.0
24.	Silver (Ag) (4)	1.0	1.0
25.	Total toxic metals	2.0	2.0
26.	Zinc (Zn)	5.0	5.0
27.	Arsenic (As) (4)	1.0	1.0
28.	Barium (Ba) (4)	1.5	1.5
29.	Iron (Fe)	8.0	8.0
30.	Manganese (Mn)	1.5	1.5
31.	Boron (B) (4)	6.0	6.0
32.	Chlorine (Cl_2)	1.0	1.0

Table 3.1 (c): PEQS for Industrial Gaseous Emissions			
No	Parameter	Source of emission	Standard
1	Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann scale or equivalent smoke number
2	Particulate matter	(a)boilers and furnaces	
		(i) Oil fired	300
		(ii) Coal fired	500
		(iii) Cement kilns	300
		(b) grinding crushing clinker coolers and related processes metallurgical processes converters blast furnaces and cupolas	500
3	Hydrogen chloride (HCI)	Any	400
4	Chlorine	Any	150
5	Hydrogen fluoride (HF)	Any	150
6	Hydrogen sulphide (H_2S)	Any	10
7	Sulphide oxides (2x3)	Sulfuric acid /sulfonic acid plants	5000
		Other plants except power plants operation on oil and coal	1700
8	Carbon monoxide (CO)	Any	800
9	Lead (Pb)	Any	50
10	Mercury (Hg)	Any	10
11	Cadmium	Any	20
12	Arsenic	Any	20
13	Copper (Cu)	Any	50
14	Antimony (Sb)	Any	20
15	Zinc (Zn)	Any	200
16	Oxides of nitrogen	Nitric acid manufacture unit	3000
		Other plants except power plants operating on oil or coal	

Table 3.1 (d): Sulfur dioxide background levels microgram per cubic meter (ug /m^3) standard				
Background air quality (SO_2 Basis)	Annual average	Max.24-hour interval	Criterion I Max. SO2 emission (tone per day per plant)	Criterion II

				Max. allowable ground level increment to ambient (ug/m^3) (one year average)
Unpolluted moderately polluted	<50	<200	500	50
Low	50	200	500	50
High	100	400	100	10
Very polluted**	>100	>400	100	10
*** For intermediate value between 50 and 100 µg/m^3 linear interpolations will be used** ****No project with sulfur dioxide emission will be recommended**				

4.3.4. Self-Monitoring & Reporting Rules, 2001

Pakistan Environmental Protection Council constituted an Environmental Standards Committee in 1996 to devise realistic modalities for environmental quality standards enforcement and simplified monitoring procedures with the consultation of representatives of industrial interest groups, non-governmental organizations (NGOs) and other stakeholders. Their efforts succeeded in the bringing up of "Self-Monitoring and Reporting System for Industry" in 2001. As per the rules set by this system, industries have to monitor effluents and emissions in compliance with the environmental quality standards and report it to provincial or federal EPAs. This system classifies industry into three categories A, B and C each corresponding to a specified reporting frequency. PMPKL's Sahiwal factory has been practicing Self-Monitoring & Reporting Rules, 2001and carried out quarterly monitoring of the environmental parameters and submit the report to the local EPA office for information.

4.3.5. The Punjab Special Premises (Preservation) Ordinance, 1985

The Punjab Special Premises (Preservation) Ordinance, 1985 provides a legal framework for the preservation of premises of historical, cultural, archaeological, and architectural significance in the province. The Ordinance specifically prohibits implementation of developmental schemes or new constructions within a radius of two hundred feet from notified special premises. There are 24 protected sites notified under this Ordinance, with about 4 sites located in Sahiwal. However, none of these sites are situated near the project area.

4.3.6. The Canal and Drainage Act, 1873

The Canal and Drainage Act, 1873 prohibits the contamination or fouling of water canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of drainage. This requires that any of the project activities including waste streams generated from project activities do not contaminate the water bodies of project area. The Bari Doab Canal is located to the north of the project site. However, the proposed project is located within the Philip Morris Sahiwal factory and at a safe distance from the canal.

4.3.7. The Punjab Wildlife (Protection, Preservation, Conservation, and Management) Act, 1974

The Punjab Wildlife (Protection, Preservation, Conservation, and Management) Act, 1974 addresses the protection of wildlife resources in the province. In addition to creating an environment conducive for their rearing and livelihood, the Act also regulates hunting, poaching, possession, and trade in birds and animals. Government has the authority to notify and amend lists of protected ecosystems, national parks, wildlife sanctuaries, safari parks, and game reserves. The updated lists of these protected and special areas can be obtained from the National Council for Conservation or alternatively from the Forest and Wildlife Department, Government of Punjab. Key features of the Punjab Wildlife Protection Act include:

1. Ban on hunting of protected animals unless permitted otherwise in accordance with requirements of the Act.
2. Prohibition of any activity (residence, cultivation, land use that could damage vegetation, hunting, killing or capturing of any wild animal etc.), inside a wildlife sanctuary or National Park.

3. Prohibition of any activity (hunting and shooting etc. of a wild animal) in the game reserve, except under a special permit.
4. Penalties for those who contravene the provisions of the law.

Under the powers conferred to the government of Punjab through this Act, the government can declare certain areas reserved for the protection of wildlife and control activities within in these areas. In Punjab, currently there are 58 wildlife protected areas which include national parks, game reserves and wildlife sanctuaries.

None of these designated protected sites is located within or in proximity to the project area. Being agricultural land and due to land use transformations, there are no habitats for wildlife found in project area.

4.3.8. Local Government Act, 2019

Under Clause 48 of the 8th Schedule of this Act, the local governments are empowered to restrict any project causing pollution to air, water or land. They may also initiate schemes for improving the environment vide this legislation. The local government offices at union council level are given the authority through this law, to monitor any polluting activity and issue instructions to the responsible person for undertaking pollution prevention measures.

Implementation of EMP developed for the project will ensure that project activities do not lead to pollution of ambient environment. The proponent will be responsible to ensure that the project \ activities are undertaken in accordance with the environmental management requirements and recommendations given in this IEE as well as the conditions given in the NOC to be issued by the Punjab EPA.

4.3.9. Punjab Hazardous Substances Rules, 2018

Waste Management Plan: (1) The waste management plan, if required to be submitted by an applicant shall –

i. Provide for the generation, collection, transport and disposal of the hazardous waste in accordance with the principles of environmental technology to protect against adverse environmental effects.

ii. Ensure that the hazardous waste is not mixed with non-hazardous waste, unless the applicant can prove that such mixing will better protect against an adverse environmental effect.

(2) The waste management plan shall be reviewed every year by the licensee to incorporate by taking into consideration the development of new technologies and management practices which can better protect against an adverse environmental effect, and if required revised waste management plan and fresh Hazardous Substances Report shall be submitted with the application for renewal of license.

PMPKL comply with the regional, national and international rules and regulation regarding the hazardous waste storage and disposal.

4.3.10. Plastic Management Strategy Punjab, 2023

The strategy suggests implementable actions and interventions for plastic management in the province based on reduce, reuse, and recycle (3Rs) principles.
Through this strategy, some single-use plastics are proposed to be out rightly banned for the production and consumption as given in Schedule-II. Further, the thickness of Single-use plastic shopping bag is to be fixed as 5 microns at the start, which will be subsequently enhanced to 100 microns until FY 2027 and then to 125 microns up till FY 2023. Thus, making transition towards a circular economy for plastics in the Punjab. The strategy also proposes some alternatives to SUPs as enunciated in Schedule-III.
There will be no use of single-use plastics during the operations of the PMPKL.

4.4. International Guidelines

4.4.1. International Environmental Treaties

Pakistan is a signatory to various international treaties and conventions on the conservation of the environment and wildlife protection. The country is thus obliged to adhere to the commitments specified in these treaties.

4.4.2. Employment of Child Act, 1991

Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any factory, mines or any other hazardous employment. In accordance with this Article, the Employment of Child Act (ECA) 1991 disallows the child labor in the country. The ECA defines a child to mean a person who has not completed his/her fourteenth years of age. The ECA states that no child shall be employed or permitted to work in any of the occupation set forth in the ECA (such as transport sector, railways, construction, and ports) or in any workshop wherein any of the processes defined in the Act is carried out. The processes defined in the Act include carpet weaving, bidi (kind of a cigarette) making, cement manufacturing, textile, construction and others).

The contractors will be bound by the ECA to disallow any child labor at the project sites or campsites.

4.4.3. Climate Change & the Ozone Layer

- United Nations Framework Convention on Climate Change, 1992
- Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997
- Vienna Convention for the Protection of the Ozone Layer, 1985
- The Montreal Protocol on Substances that Deplete Ozone Layer and associated amendments, 1987

4.4.4. Waste & Pollution

Basel Convention on the Control of Trans boundary Movement of Hazardous Wastes and their Disposal, 1989.

4.4.5. Biodiversity & the Protection of Plants and Animals

- Convention on the Biological Diversity, 1992
- Cartagena Protocol on Bio safety to the Convention on Biological Diversity, 2000
- International Plant Protection Convention, 1997
- IUCN red list published by IUCN and includes those species that are under potential threat of extinction. These species have been categorized as endangered, vulnerable in decline, lower risk and data deficient.

5. DESCRIPTION OF ENVIRONMENT

A key element of EIA is to provide adequate description of the current Environmental and Social conditions – the Baseline. Baseline data is collected to serve two purposes in the EIA study. First, it helps us understand the current conditions of the area, and how the project needs to be implemented considering these conditions. Second, and most importantly, it helps us assess and predict the possible environmental changes that could occur, once the project is underway.

Information for this section was collected from primary and secondary sources, including published literature, reports of other studies conducted in the area by the EMC Pakistan Pvt. Ltd., archives of the experts, and field surveys conducted for this study by the team of EMC Experts.

Description of the environment of the project requires baseline data on the existing resources of its microenvironment and macro environment, the following in particular:

Physical Resources: the area, the topography, the geological characteristics, climate, ambient air, hydrology, seismicity, etc.

Ecological Resources: the biodiversity of the area, types of flora and fauna, presence or absence of endangered species and/or sensitive ecosystems etc.

Socioeconomic: demography, social structure, economic conditions, development & cultural resources, etc

5.1. Study Area

Microenvironment for the baseline has been considered as 250 meters radius of the project area upto a maximum of 500 meters. For environmental aspects relating to geology, hydrology, ecology and social setup, the study area has been expanded to the district level where appropriate. Macro environment for the project has been studies at district level for climate, groundwater, physiography, vegetation types etc.

5.2. Location and Surrounding

The proposed project site is located in District Sahiwal, the jurisdiction of the area belongs to U.C 56/5.1, Tehsil Sahiwal. The project area is approximately 0.65 km away from the Lahore-Multan road while the project area is mostly falls in agriculture land. In the North side of the project area Bari doab canal is located which is approximately 0.32 km away from the proposed project area. In the 1km radius of the project area Yusafwala railway line is present in the North side of the project which is 0.17 km away from the proposed side area.

There is no residential area within 1km radius of the project. The closest settlement is located at 1.05 km i.e., Chak No. 56/5-L, Sahiwal. Another settlement present in the South-East of the project is Chak No. 55/5-L at a distance of 1.7 km. The link road which is connected with Lahore-Multan road is located in the North of the project on a Distance of approximately 1.06km. The surrounding areas near the project are as follows:

North:	Lahore-Multan Road, Bari Doab canal, Yousaf wala Railway Track
South:	Agricultural Land
South west:	Chak No. 56/5-L
East:	Agricultural Land
South-East:	Chak No. 55/5-L
West:	Baba Bhory Shah Shrine

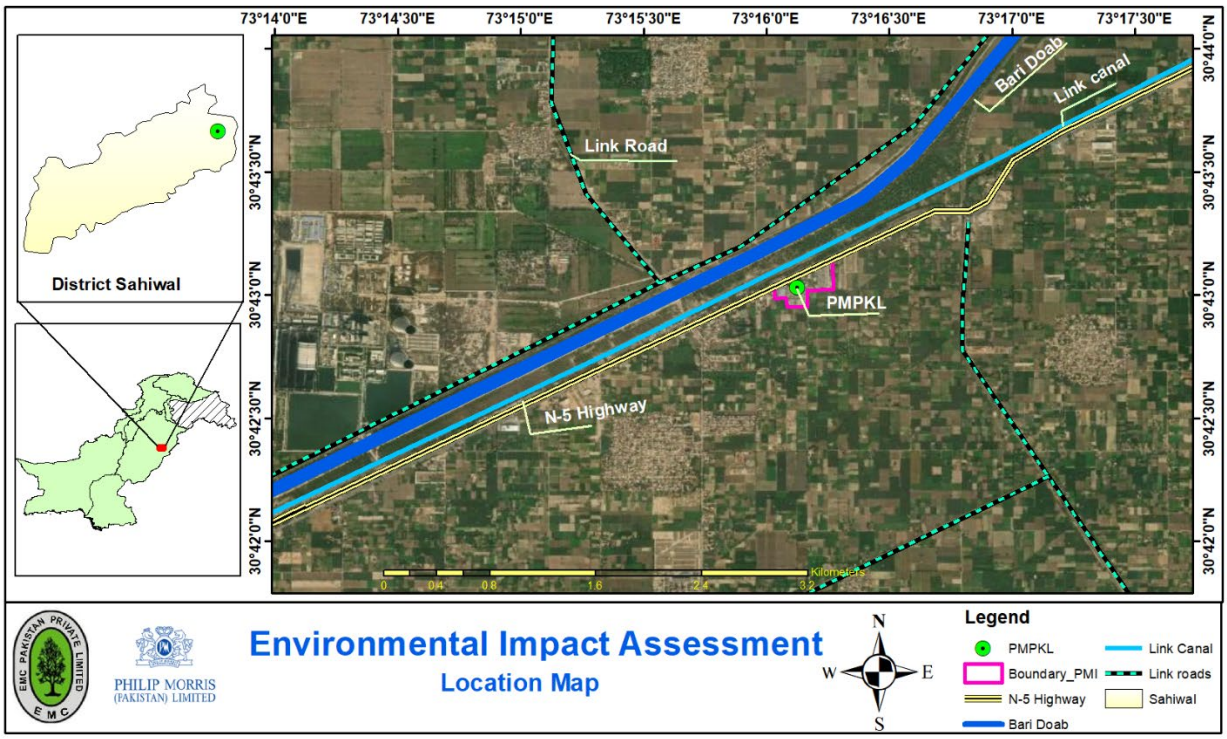


Figure 4.1: Project Location Map

5.3. Land Use

The project area comprises of residential, industrial and agricultural land. Surrounding area of the alignment comprises three major residential settlements i.e., 2 Chak no.56/5L which is located in the south-West of the project, the settlement chak 55/5L is located in the South-East and chak no 62/4R is present across the Lahore – Multan road at the North side of the project.

PMPKL's Sahiwal Factory

<table>
<tr><td> 
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</td></tr>
<tr><td>PMPKL Wast Water Treatment Plant</td><td>PMPKL Waste Water Treatment Tank</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Proposed Hazardous Waste Warehouse</td><td></td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Bari Doab Canal</td><td>Solar System</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td colspan="2">Lahore-Multan Road</td></tr>
</table>


Agriculture Area

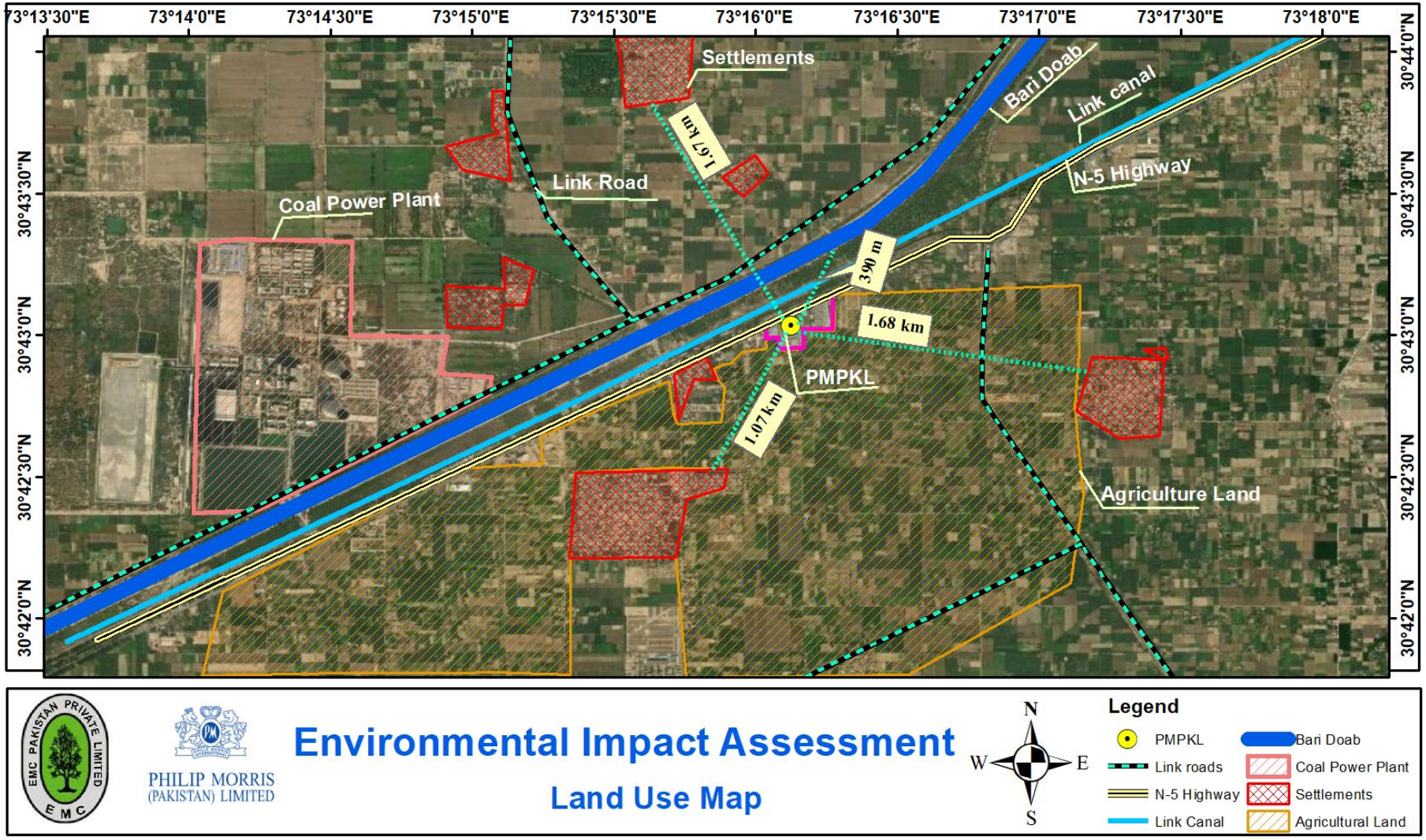

Figure 4.2: Surroundings of the project site

5.4. Site Suitability

The proposed project site is within the factoryof PMPKL and it is not located within or near any prohibited, environmentally sensitive area. Also, no form of resettlement or removal of business is required for project execution.

5.5. Physical Environment

5.5.1. Topography

Sahiwal town is situated about 29 km from the left bank of the river Ravi, 187 km west of Lahore and 200 km east of Multan. The Grand Trunk Road and the main railway line pass through the town; they also connect Peshawar and Lahore with Karachi. The Lower Bari Doab Canal separates the town into two parts. Its approximate height is 152 m above sea level. Sahiwal lies at 30°39'52.16" N latitude and 73°6'30.54" E longitude.

The topography of Sahiwal consists of a flat semi-arid plain that is fertilized using its extensive irrigation canal. The Lower Bari Doab is the main source of irrigation in the area and it is fed by a link from the Chenab river. From a topographical point of view, the semi-arid plain is remarkably homogeneous. The only noticeable relief is that of the flood plain bluffs and the belts of ravines and land that were formed by gully erosion along the Lower Bari Doab and its distributaries. Generally, the natural slope runs northeast to southwest. On the whole, the area is flat.

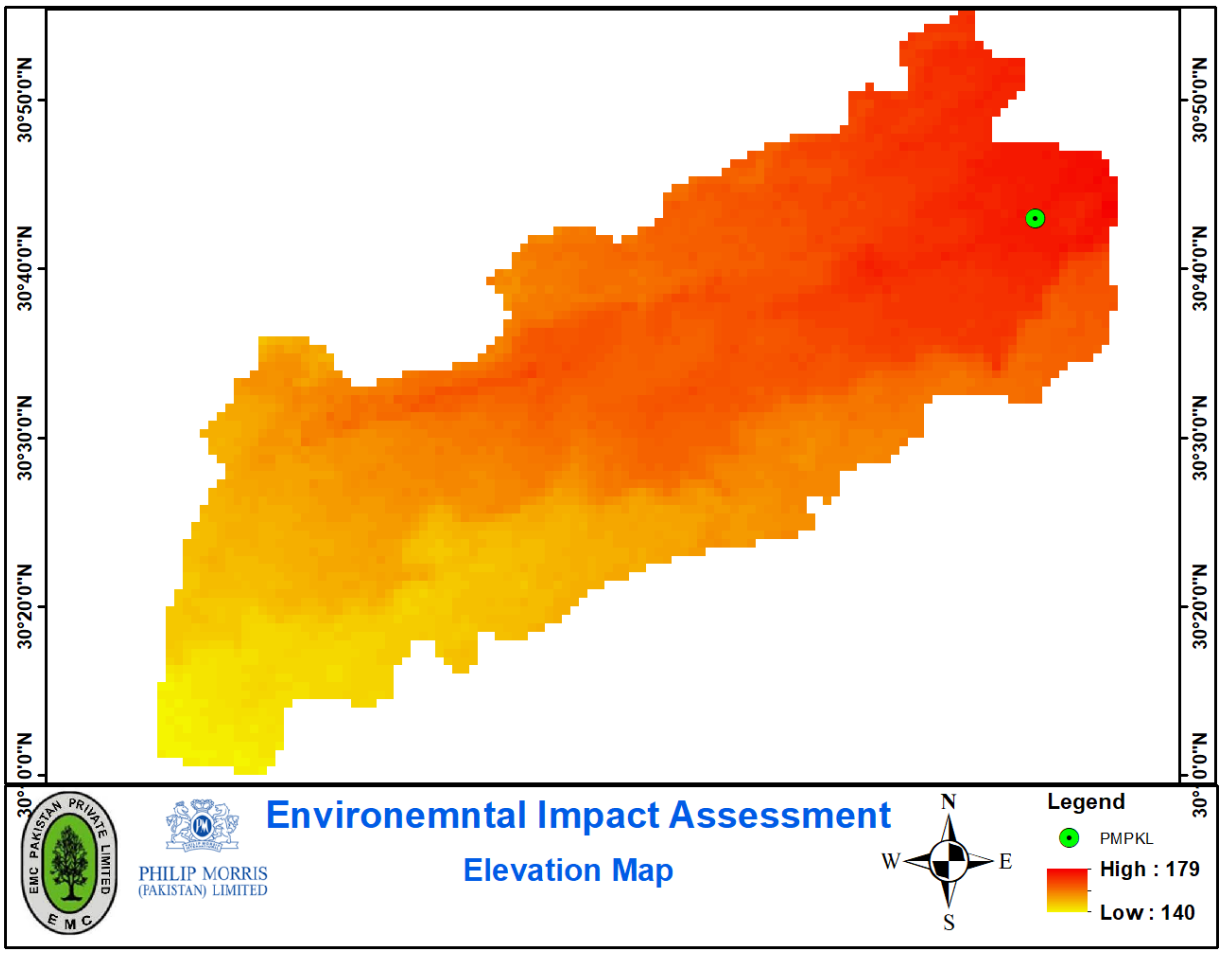

Figure 4.3: Elevation Map of the Study Area

5.5.2. Geology

Geologically, the area does not have any outstanding features. Saltpeter, which is made from saline earth called kallar, is found when the water table is high. In the east of the town, there can be found common salt mixed with a lesser quantity of sulfate of soda and a very small quantity of lime and magnesium salt.

5.5.3. Seismicity

Pakistan lies in a seismically active zone. Seismic observations indicate that hundreds of shocks occur in the region every year. According to the seismic zoning map of Pakistan, included in Pakistan Building Code Seismic Provisions (2007), the project area falls under seismic zone 2A, with a peak horizontal ground acceleration of from 0.08 to 0.16. The seismic zoning map of Pakistan is given as Figure-4.4 below.

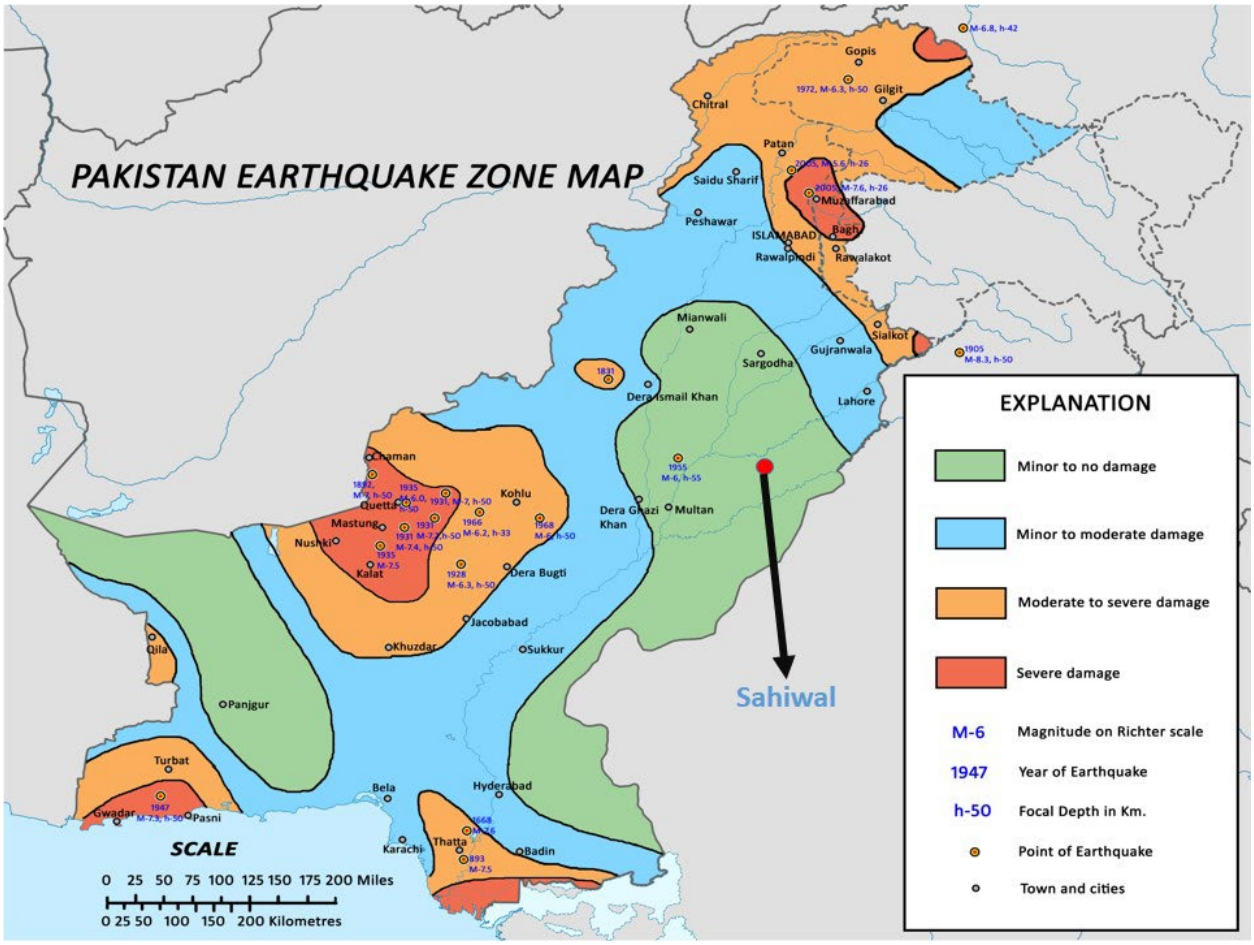

Figure 4.4: Seismotectonic Map of Pakistan

5.5.4. Climate

In general, Sahiwal has the same basic natural and climatic conditions that prevail in Punjab. The climate in most of the area is arid to semi-arid, characterized by four district seasons in a year: winter from mid-November to February; spring from mid-March and April; summer from May to mid-September; and autumn from mid-September to mid-November.

Punjab's terrain is one of relatively low-lying plains, with several rivers that traverse the area from the northeast to the southwest and feed into the Indus River. The Ravi River is closest to Sahiwal, but it is still a distance of nearly 20 km. There is no history of the city being threatened by floods. The most challenging weather

phenomenon in Sahiwal is the winds called 'Loo', which blow during the day in the predominately hot and dry summer

The dust from the dry parched earth rises, the air becomes laden with it, and out-door work is difficult. Trees shed their leaves to avoid the loss of moisture and where there is no canal or well, the countryside presents a very dreary aspect. Occasionally, the hot weather is broken by thunderstorms and dust storms. The heavy rainfall, which the thunderstorms bring, and light rain, which follows the dust storm, produces a slight decrease in temperature. This temporary relief from the excessive heat is welcomed.

Average Temperature in Sahiwal

The hot season lasts for 3.4 months, from April 23 to August 5, with an average daily high temperature above 98°F. The hottest month of the year in Sahiwal is June, with an average high of 104°F and low of 85°F

The cool season lasts for 2.6 months, from December 6 to February 21, with an average daily high temperature below 74°F. The coldest month of the year in Sahiwal is January, with an average low of 46°F and high of 68°F.[3]

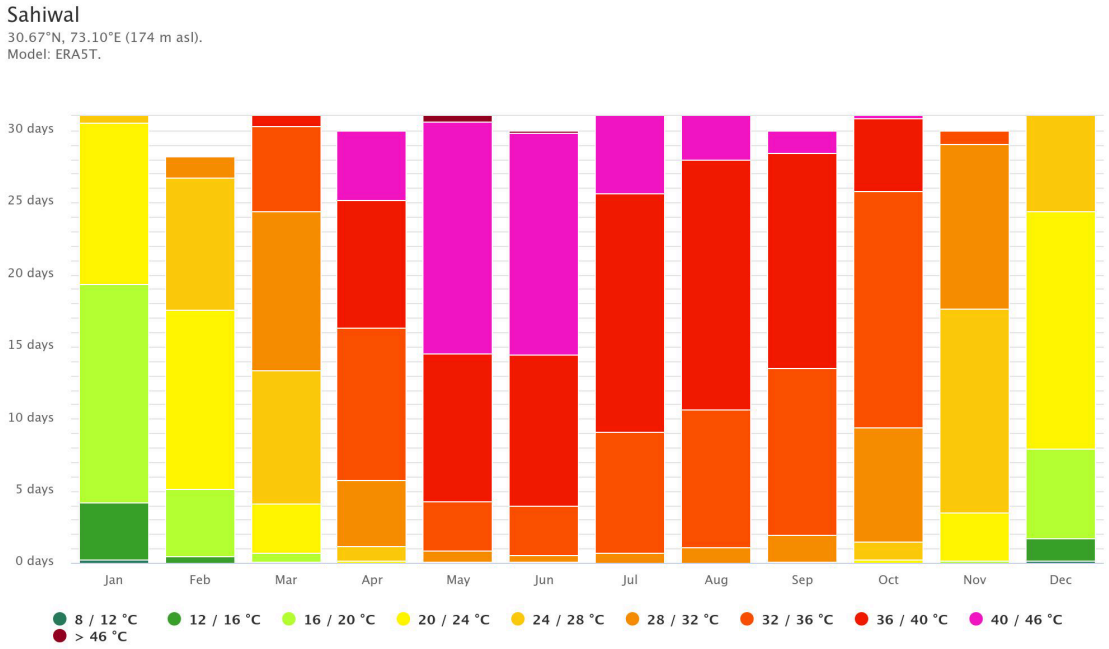

Figure 4.5 Average Monthly Temperature in Sahiwal[4]

Precipitation

A wet day is one with at least 0.04 inches of liquid or liquid-equivalent precipitation. The chance of wet days in Sahiwal varies significantly throughout the year.

The wetter season lasts 2.7 months, from June 21 to September 10, with a greater than 17% chance of a given day being a wet day. The month with the most wet days in Sahiwal is July, with an average of 8.9 days with at least 0.04 inches of precipitation.

The drier season lasts 9.3 months, from September 10 to June 21. The month with the fewest wet days in Sahiwal is November, with an average of 0.6 days with at least 0.04 inches of precipitation.

Among wet days, we distinguish between those that experience rain alone, snow alone, or a mixture of the two. The month with the most days of rain alone in Sahiwal is July, with an average of 8.9 days. Based on this

[3] Weatherspark
[4] https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/sahiwal_pakistan_1166548

categorization, the most common form of precipitation throughout the year is rain alone, with a peak probability of 32% on July 23[5].

Rainfall

To show variation within the months and not just the monthly totals, we show the rainfall accumulated over a sliding 31-day period centered around each day of the year. Sahiwal experiences significant seasonal variation in monthly rainfall.

The rainy period of the year lasts for 7.9 months, from February 7 to October 2, with a sliding 31-day rainfall of at least 0.5 inches. The month with the most rain in Sahiwal is July, with an average rainfall of 2.2 inches.

The rainless period of the year lasts for 4.1 months, from October 2 to February 7. The month with the least rain in Sahiwal is November, with an average rainfall of 0.1 inches

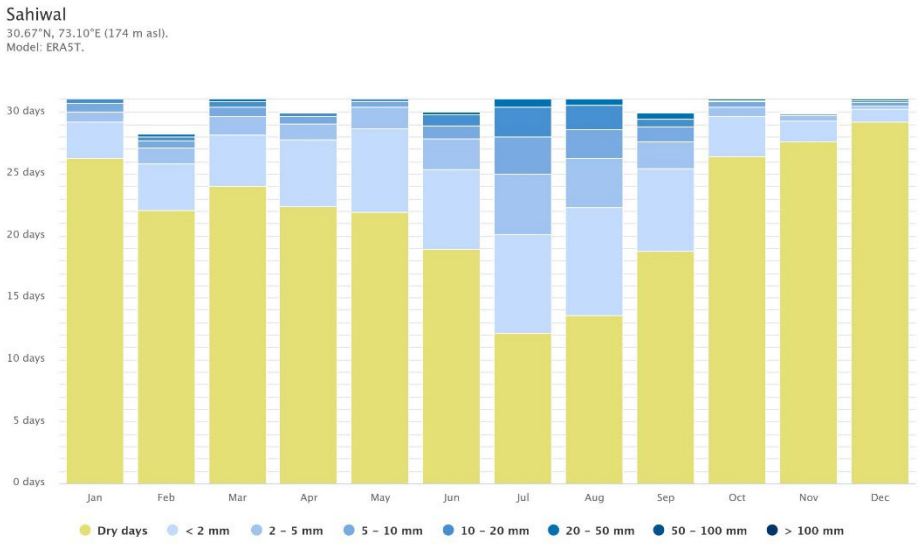

Figure 4.6: Rainfall Chart of Sahiwal

Humidity

Sahiwal experiences extreme seasonal variation in the perceived humidity. Higher humidity levels are observed for 3.9 months, from 4th June to 2nd October. Figure 4.7 shows the yearly variations in the humidity levels in Sahiwal. [6]

[5]Weatheronline
[6] Weatheronline

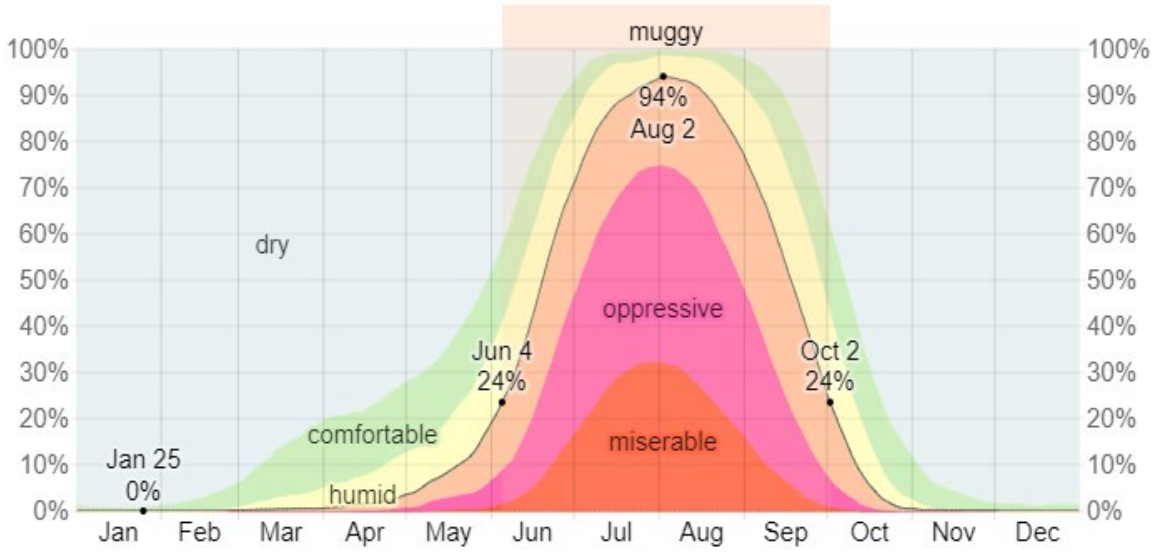

Figure 4.7: Humidity Level in Sahiwal

Wind Direction

Sahiwal is situated in southwest Punjab and is influenced by monsoon winds throughout the year. In winter, the wind blows from the north and heads east. In summer, the wind direction is southwest. However, these wind directions are usually disturbed by cyclones, which cause the temperature to drop and low-pressure systems to set in. This situation prevails in autumn. The Wind rose for Sahiwal is provided as Figure 4.8 below [7]which shows how many hours per year the wind blows from the indicated direction.

[7] https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/sahiwal_pakistan_1166548

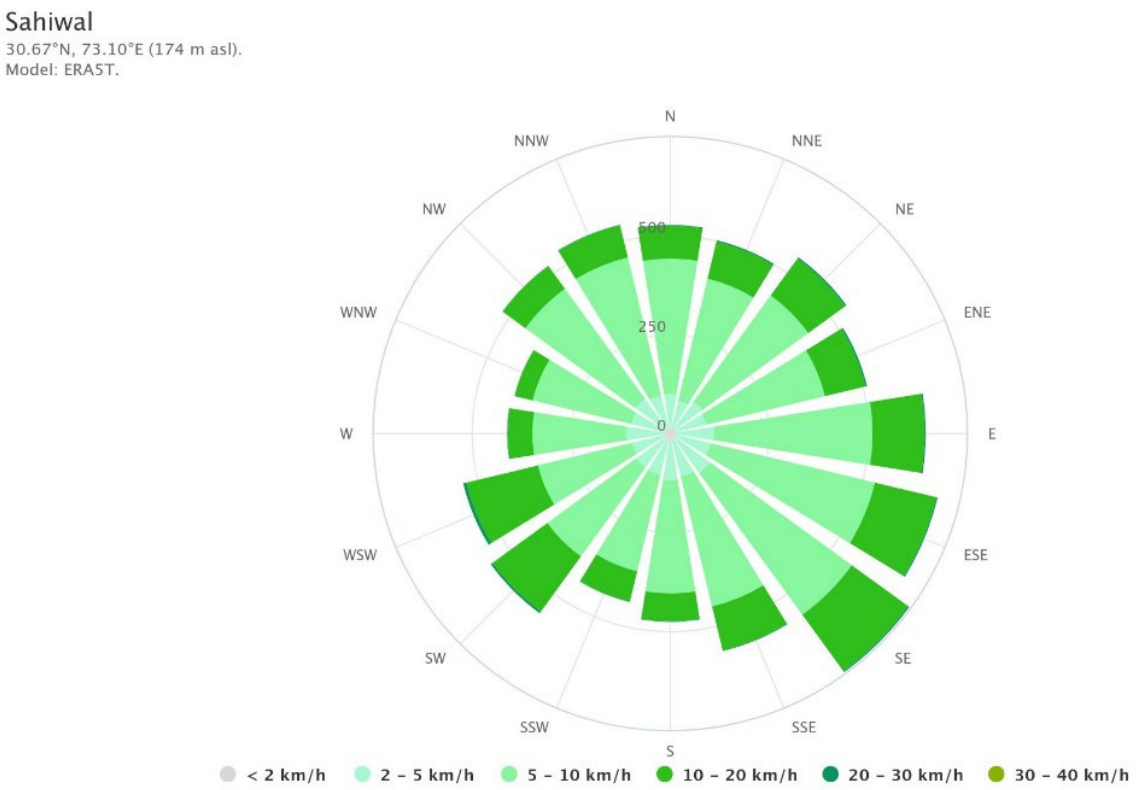

Figure 4.8: Wind Rose of Sahiwal

5.5.5. Ambient Air and Noise Quality

Air pollution sources in the project area are limited and include road traffic, and industrial units. In order to develop baseline air quality profile of the project site. Ambient air monitoring was carried out near the project site through Punjab EPA certified laboratory. Air quality was monitored to determine the concentration of NO_2 NO, NOx, SO_2 CO, O_3, $PM_{2.5}$, PM_{10}, Lead and SPM. According to monitoring results, all parameters are within the PEQS limits. Results are given in the following table:

Table 4.1 (b): Meteorological Data

Time	Ambient Temp (°C)	Wind Direction	Wind Velocity(m/s)	Humidity (%)	Pressure (mm of Hg)
11:05	40	SW	3.1	35	748.5
12:05	39	SW	2.3	33	747.6
13:05	38	SW	2.5	32	756.6
14:05	37	SW	2.4	34	742.4
15:05	37	SW	2.9	29	744.3
16:05	29	SW	2.6	28	754.5
17:05	28	SW	2.8	25	755.1

Table 4.1 (b): Meteorological Data					
Time	**Ambient Temp (°C)**	**Wind Direction**	**Wind Velocity(m/s)**	**Humidity (%)**	**Pressure (mm of Hg)**
18:05	28	SW	2.7	22	751.6
19:05	27	SW	1.6	24	751.2
20:05	26	SW	1.7	20	753.6
21:05	27	SW	1.9	19	754.3
22:05	28	SW	1.7	18	754.6
23:05	29	SW	1.5	26	755.5
00:05	28	SW	1.6	28	754.9
01:05	27	W	3.7	26	755.9
02:05	28	W	3.9	38	754.3
03:05	27	W	3.8	36	752.6
04:05	29	W	3.8	43	758.3
05:05	32	SW	3.5	45	759.3
06:05	33	SW	3.1	44	754.6
07:05	35	SE	2.9	47	752.9
08:05	38	SE	2.4	44	751.8
09:05	38	SE	2.4	41	750.9
10:05	39	SE	2.6	38	754.6

Noise sources in the project area are few comprising road traffic. The area is mostly calm and serene air shed with ambient noise levels less than 60 dBA most of the time.

5.5.6. Hydrology

Surface Water

Surface water resources in the project area comprise mainly canal, storm water channels, after rain in natural or man-made depressions etc. In the project area the Bari doab canal is located in the North side of the project.

Table: Chemical analysis of ground water sample			
Client Name:	Philip Morris (Pakistan) Limited	**Sample Matrix:**	Surface Water Sample
Sample Date:	27-06-2024	**Sampled By:**	GCEC
Sample Receipt Date:	28-06-2024	**Date of Completion of Analysis:**	03/07/2024
Grab/Composite:	Grab Sampling	**Address**:	Grand Trunk Rd, Sahiwal, Punjab, 57000
Sample Identification			

Sampling Site	Lower Bari Doab Canal		Sampling Coordinates:	30°41'16.8"N 73°12'03.1"E	
Parameters	Analysis Method	Unit	LOR	Result	FAO**
				1	
PHYSICAL & CHEMICAL ANALYSIS					
Temperature	APHA-2550-B	^{0}C	-	28.5	-
pH**	APHA-4500H$^+$ B	pH unit	0.01	6.7	6.5-8.4
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1	281	450-2000
Oil and Grease**	USEPA-1664	mg/l	0.2	<0.2	-
Biological Oxygen Demand	APHA-5210 B	mg/l	1	9	-
Chemical Oxygen Demand**	APHA-5220-D	mg/l	1	24	-
Total Suspended Solid**	APHA-2540-D	mg/l	1	19	-
Phenolic Compound	APHA-5530 D	mg/l	0.01	<0.01	-
Chloride (Cl)**	APHA-4500Cl$^-$ B	mg/l	0.24	11.82	10-Apr
Fluoride (F)**	APHA-4500F$^-$ C	mg/l	0.01	<0.01	1
Cyanide (CN)	APHA-4500CN E	mg/l	0.01	<0.01	-
Detergent	APHA-5540 B	mg/l	-	ND	-
Sulphate**	APHA-4500-SO_4C	mg/l	0.41	7.4	-
Sulphide	APHA-4500-S_2-E	mg/l	0.4	<0.4	-
Ammonia	APHA-4500-NH_3-B	mg/l	0.002	<0.002	-
Silver	APHA-3500Ag-B	mg/l	0.0032	<0.0032	-
Cadmium**	APHA-3500Cd B	mg/l	0.0028	<0.0028	0.1
Chromium**	APHA-3500Cr B	mg/l	0.0054	<0.0054	0.1
Copper **	APHA-3500Cu B	mg/l	0.0045	<0.0045	0.2
Lead**	APHA-3500-Pb B	mg/l	0.013	<0.013	5
Mercury	APHA-3500-Hg B	mg/l	0.0008	<0.0008	0.01
Nickel**	APHA-3500-Ni B	mg/l	0.008	<0.008	0.2
Zinc**	APHA-3500-Zn B	mg/l	0.0033	<0.0033	2
Arsenic	APHA-3500As B	mg/l	0.01	<0.01	0.1
Barium	APHA-3500Ba B	mg/l	0.031	<0.031	-
Manganese**	APHA-3500-Mn B	mg/l	0.0016	<0.0016	-
Iron**	APHA-3500-Fe-B	mg/l	0.1	<0.1	-
Boron	APHA-4500B-C	mg/l	0.1	<0.1	0.7-3.0
Total Chlorine	APHA-4500Cl-B	mg/l	0.1	<0.1	-
Selenium	APHA-3500Se C	mg/l	0.23	<0.23	-
Pesticides	APHA-6630 B	mg/l	-	ND	-
Total Toxic Metals	-	mg/l	-	ND	-

Ground Water

The groundwater is the major source of water in the area, which is extracted with the help of pumps and motors. The groundwater is used to fulfill various domestic, irrigation and industrial needs. A limited quantity of potable water is accessible to the citizens from different scarce resources. Furthermore, water is also drawn directly from canals and supply to domestic and commercial users after its treatment. However, people prefer to use filtered water for drinking purposes available in Sahiwal.


Groundwater Sources

For baseline survey one ground water sample has been taken from the project area to assess groundwater quality. The chemical analysis results of groundwater samples show that water quality is good and within NEQS limits. Ground water analysis results are presented in table below.

Client Name:	Philip Morris (Pakistan) Limited		Sample Matrix:	Ground Water Sample	
Sample Date:	27-06-2024		**Sampled By:**	GCEC	
Sample Receipt Date:	28-06-2024		**Date of Completion of Analysis:**	03/07/2024	
Grab/Composite:	Grab Sampling				
Address:	Grand Trunk Rd, Sahiwal, Punjab 57000				
Sample Identification					
1	Turbine-2 (PMI)		**Sampling Coordinates:**	30°43'04.8"N 73°16'09.8"E	
Parameters	**Analysis Method**	**Unit**	**LOR**	**Result**	**PEQS**
PHYSICAL & CHEMICAL ANALYSIS					
pH**	APHA-4500H+ B	-	0.01	7.65	6.5-8.5
Odor	In-house	-	-	Odorless	Non-Objectionable
Taste	In-house	-	-	Sweet	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1	<1.0	≤15 TCU
Turbidity**	APHA-2130 B	NTU	0.1	<0.1	<5 NTU
Total Hardness**	APHA-2340 B & C	mg/l	0.1	84	< 500 mg/l
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1	292	< 1000
Ammonia	APHA-4500-NH_3-B	mg/l	0.002	<0.002	-
Chloride**	APHA-4500Cl- B	mg/l	0.24	11.82	< 250
Cyanide (CN)	APHA-4500CN E	mg/l	0.01	<0.01	≤ 0.05
Fluoride (F)**	APHA-4500F- D	mg/l	0.01	<0.01	≤ 1.5
Nitrite	APHA-4500NO2 B	mg/l	0.01	<0.01	≤ 3 (P)
Nitrate**	APHA-4500NO3 C	mg/l	0.1	0.2	≤ 50
Phenolic Compound	APHA-5530 D	mg/l	0.01	<0.01	-
Residual Chlorine	APHA-4500Cl G	mg/l	0.1	<0.1	0.2-0.5
Aluminum (Al)	APHA-3111Al B	mg/l	0.028	<0.028	≤ 0.2
Cadmium**	APHA-3111Cd B	mg/l	0.0028	<0.0028	0.01
Copper**	APHA-3111Cu B	mg/l	0.0045	<0.0045	2
Chromium**	APHA-3111Cr B	mg/l	0.0054	<0.0054	≤ 0.05 (P)
Mercury	APHA-3112Hg B	mg/l	0.0008	<0.0008	≤ 0.001

Antimony (Sb)**	APHA-3111Sb B	mg/l	-	ND	≤ 0.005 (P)
Nickel**	APHA-3111Ni C	mg/l	0.008	<0.008	≤ 0.02
Zinc**	APHA-3111Zn B	mg/l	0.0033	<0.0033	5
Arsenic	APHA-3111As B	µg/l	0.1	20	≤ 0.05 (P)
Barium	APHA-3111Ba B	mg/l	0.031	<0.031	0.7
Manganese**	APHA-3111Mn B	mg/l	0.0016	<0.0016	≤ 0.5
Iron**	APHA-3111Fe B	mg/l	0.1	<0.1	-
Boron	APHA-4500-B (C)	mg/l	0.1	<0.1	0.3
Lead**	APHA-3111Pb B	mg/l	0.013	<0.013	≤ 0.05
Selenium	APHA-3111Se B	mg/l	-	ND	0.01 (P)
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA:9222 B	CFU/100ml		Absent	0/100ml
Faecal Coliforms (Ecoli)	APHA:9222 D	CFU/100ml		Absent	0/100ml
Abbreviations:					
ND: **Not Detected**	LOR: **Limit of Reporting**			PEQS: **Punjab Environmental Quality Standards**	

Figure 4.9: Monitoring Location Map (Surface and Ground Water)

5.6. Ecological Environment

This section describes the baseline environmental conditions related to the biological environment, based on both primary and the secondary data. A reconnaissance survey of the project area was conducted, followed by a detailed desktop study of the area's ecology.

5.6.1. Flora

Sahiwal district, located in the Indus basin plain, falls under the Tropical Thorn Forest type and has a hot semi-arid climate, bridging the characteristics between desert and humid climates, with notable agricultural potential. The climate tends to have hot, sometimes extremely hot, summers and mild warm winters. The soil and climatic characteristics support short or scrubby vegetation which can be termed as open and pronouncedly of xerophytic nature in which thorny leguminous species predominate. Since the project area has already been utilized by the PMPKL's Sahiwal factory for the operations, it does not contain any tree or vegetation. Therefore no tree cutting or vegetation removal is required.

In Sahiwal district, the most important tree species include Kikar (Acacia Arabica), Shisham or Tahli (Delbergia sissoo), Beri (Zizyphus jujube), Toot (Morus alba), Sharin (Albizzia lebbek), Dherek (Melia azeharach), Phulai (Acacia modesta), Pipal (Ficus religiosa),, and Bohr (Ficus bengalansis), which are primarily planted for shade.

Eucalyptus trees have been planted along the Bari Doab and other link canals. The commonly found vegetation of in the vicinity of the PMPKL's Sahiwal factory include species listed below:

Eucalyptus

Eragrostis curvula

Acacia Modesta

Acacia Nolitica

Calotropis Procera

Dalbergia sissoo

Figure 4.10: Vegetation of the Project area

5.6.2. Trees at the project site

There are no trees within the premises of the proposed project site. Therefore, no tree cutting will be required during site preparation.

5.6.3. Fauna

Most of the Punjab is characterized by intensive irrigated cultivation, with livestock rearing being extensively practiced, and milk animals are common. The use of chemical fertilizers and pesticides is also very common. Several wildlife species have adapted to the changed habitat, including the jackal, jungle cat, Bengal fox, small

Indian mongoose, shrew, hog deer, ravine deer, wild hare, and various rodent pests such as porcupine, fruit bats, and wild boar.

The avifauna that has adapted to the modified habitat includes doves, black partridge, cuckoos, koel, woodpeckers, bulbuls, babblers, bee eaters, finches, owls, and house sparrow. The reptilian species in this habitat include krait, cobra, saw scaled viper, rat snake, and monitor lizard.

In these modified habitats, due to the extensive use of pesticides has led to a reduction in the winter bird species from the Himalayas, as these birds primarily feed on the insects. These birds play an important role in controlling insects' population, particularly in the forests.

No IUCN red list endangered species have been found within 1 km of the study area.

5.6.4. Ecological Protected Areas

There is no protected area located near the proposed project site.

5.7. Socioeconomic Environment

5.7.1. Administrative Jurisdiction

Sahiwal is one of the nine divisions of Punjab, Pakistan. Sahiwal Division was formed in an area of 10302 km^2. Its three districts are Sahiwal District, Pakpattan District and Okara District, each governed by a District Coordination Officer. Sahiwal District has two tehsils; Sahiwal and Chichawatni. Towns in these tehsils include Qadirabad, Yousafwala, Iqbal Nagar, Kassowal, Noorshah, Gogera, Malkahans, Harappa and Ghaziabad.

The project falls in districts Sahiwal, Punjab. There are two tehsils, fourteen union councils and According to The Punjab Local Government Act 2019 there are 1 Metropolitan Corporation, 1 Municipal committee, 2 Town Committees and 2 Tehsil councils in Sahiwal district.

Table: 4.4 Administrative Jurisdiction

Sr. #	District Name	Tehsils	Project Area Falls in
1	Sahiwal	• Sahiwal • Chichawatni.	Sahiwal

5.7.2. Demography and Population

According to 2017 population census provisional statistics, the total number of households in District Sahiwal are 1,190,094. The type of houses includes Kacha, Pakka, and Semi Pakka.

Table: 4.5 Demography and population of Sahiwal

Administrative Unit	House Hold	Population 2017	Population 1998	Gender Ratio 2017	1998-2017 Average Annual Growth Rate
Sahiwal District	1,190,094	2,517,560	1,843,194	103.62	1.65
RURAL	926,473	2,000,440	1,481,284	103.62	1.59
URBAN	263,621	517,120	361,910	103.58	1.89

5.7.3. Education

Educational facilities in any area predict the educational level and the interest of the people towards the education. Educational status of the respondents of surveyed village is shown in Table-4.6. This table shows that 149 children having age group of 1-3 have been excluded. Out of remaining, majority of the respondents had middle level education. It is also obvious from the table that the ratio of the masters is very low as compared to those having education up to primary, middle and matriculation.

Table 4.6: Education status				
Education Level	Male	Female	Male (%)	Female (%)
Primary	115	103	21	25
Middle	130	127	24	31
Matriculation	118	24	22	6
Intermediate	51	22	9	5
Graduation	34	16	6	4
Masters	08	14	2	3
Deeni Taleem	04	08	1	2
Illiterate	78	99	15	24

Source: Socio economic Survey, February 2017

5.7.4. Healthcare

Sahiwal district has nine hospitals, but with a total number of beds of slightly under 1,300. In addition, there are six regional health centers and 42 basic health units. As in most secondary urban centers, is retaining qualified staff, in both the health and education sectors, is one of the challenges. Staff often migrates to a major city to take advantage of the amenities it offers. The better the overall urban environment, quality of life, and social and economic amenities, the more likely they are to stay.

The prevalence of hepatitis B and C is reported at 5%. The 2011 Millennium Development Goals (MDG) Report for Punjab indicated a prevalence of Hepatitis B at 2.4% and C at 7.1% in the district. Participants of all FGD indicated that hepatitis prevalence is highest in Sahiwal City because of water supply contamination. In their opinion, roughly one quarter of the city population was suffering from hepatitis because of contaminated water, highly inadequate waste water disposal and inappropriate solid waste removal[8].

5.7.5. Employment

Source of income in the project area include farming, daily-waged labor, cart vendors and shop owners. Some people in the project area are associated with government and private institutions

5.7.6. Utilities

Sahiwal does not have an adequate, reliable and uninterrupted 24/7 power supply. Interruptions are frequent, forcing industries, other businesses, and many of the residents who can afford it to rely on back-up diesel generators and uninterrupted power supply systems.

The groundwater is used to fulfill various domestic, irrigation and industrial needs. However, people prefer to use filtered water for drinking purposes available in Sahiwal.

5.7.7. Transportation

The primary modes of transportation in the Sahiwal district are road and railway networks. For intercity travel, there is a variety of both public and private transportation options, including public vans, rental cars, and buses. Sahiwal serves as a convenient departure point for travel to various cities.

[8] https://www.urbanunit.gov.pk/Upload/ProjectDocument/PASDP%20Sahiwal.pdf

5.7.8. Waste Management

The project area does not have a proper sewerage network. Open dumping of waste practiced by people. There is no solid waste management system in the vicinity of the project site. There is no engineered landfill site in the district Sahiwal.

In study area, there is no proper waste collection system and the waste is thrown by the masses along the road side and in open plots.

5.7.9. Tribes and Ethnic Groups

The project area is inhabited by the people of various castes including Bhutta, Bhatti, Mughal, Rajpoot, Araen, Rae, Sayyed, Malik, Dogar, Rajpoot, Rana, Jat, Rehmani and Chaudhry. Among all these, Araen is the dominant caste. Reportedly, lower castes associated with hereditary menial professions are also the part of the village population.

5.7.10. Languages

Punjabi is the most common language spoken by majority of population in the area. Urdu is spoken as secondary language. While Raangri is also spoken.

5.7.11. Religion

The main religious groups in the area are Muslims and Christians. The population of the surveyed settlement is predominately Muslims i.e., 98% followed by Christians 2%.

5.7.12. Archaeological and Religious sites

Harapa

Harappa is one of the two main cities of the Indus culture, and is located about 20 west of Sahiwal. It is a major tourist attraction and contains ruins of a fortified Bronze Age city. The city is believed to have had as many as 23,500 people living there as early as 2,500 BC, which can be considered a large population for that time

Harappa is generally characterized as having differentiated living quarters, flat-roofed brick houses, and fortified administrative or religious centers. Although copper and bronze were in use, iron was not yet employed. Cotton was woven and dyed for clothing; wheat, rice, and a variety of vegetables and fruits were cultivated; and a number of animals were domesticated, including the humped camel.

Baba Bhory Shah

Baba Bhory shah is a famous shrine in the project area which is approximately 1.5 km away from the project side. However, no project activities will affect the shrine.

6. STAKEHOLDER CONSULTATION

6.1. Stakeholder Engagement

Stakeholder engagement is a process that involves project relevant stakeholders in decision-making conducted when the participation of individuals and groups is important in attaining the success of a project. It is also most important where there are vulnerable groups. These are people who are already so marginalized that without support they may not benefit from the development project. The Project identifies them to ensure that their needs are met in project planning and implementation and uses the input from stakeholders to make better decisions.

6.2. Objectives of Stakeholder Consultation

The stakeholder consultation process followed for the proposed project is in line with the key objectives of stakeholder consultation identified below:

- Provide information related to proposed project activities;
- Identify stakeholder interests and issues;
- Identify mitigation measure for these concerns and integrating them into project design, operations, and management;

6.3. Primary and Secondary Stakeholders

Stakeholders are individuals, groups, or institutions that may be affected by and can significantly influence the project activities, or are integral to the achievement of the objectives of a project. Stakeholders can be divided into 2 broad categories; primary and secondary; Tables 5.1.

Primary stakeholders are those who have a direct interest in the project which includes residents, commercial entities and institutions falling in the project area. Secondary stakeholders include the relevant government agencies and public interest groups which may indirectly influence or be influenced by the project. The concerns and input from both primary and secondary stakeholders are important to identify the issues arising from the construction and/or operation phase of the project and propose mitigation measures that minimize the negative project impacts and enhance the positive ones.

Table 6.1: Primary & Secondary Stakeholders

S. #	Stakeholder Groups	Stakeholders
	Proponent	Philip Morris (Pakistan) Limited
1	**Settlements near the project area**	1. Chak No.56/5-L 2. Chak No 55/5-L
2	**Commercial entities**	Filling Stations, Grocery Shop, Tea Stall,

6.4. Consultation Approach

The main purpose of the consultation exercise was to disseminate project information to relevant stakeholders so that any feedback received could be used to address the issues at an early stage. Identification of stakeholders is one of the major steps for designing an effective consultation process. Consultation meetings were conducted with the identified stakeholders. The stakeholders were briefed about background and scope of project Concerns and suggestions of the respondents were noted down by the team and pictures of the session were taken with the

consent of the stakeholders. If the villagers had any queries regarding the project, the team responded to their queries during the session.

6.5. Stakeholders' Feedback

6.5.1. Consultation with Proponent Environmental Management Team

Starting from the project award to site visits, project understanding, data acquisition, report preparation, review and finalization and report submission, PMPKL project team and environmental management team was in contact with consultant through meeting, telecoms and emails. The proposed process and project activities were discussed w.r.t environmental management and relevant measures discussed during the meeting with proponent.

6.5.2. Consultation with Responsible Authority/EPA

A meeting was conducted with Mr. Ahmed Hassan, Monitoring Inspector, regarding the project on July 31, 2024. The EMC team briefed him about the nature of the proposed project. The EPA did not show any concern regarding the project and provided the following suggestions:

- PPE shall be provided to the workers during construction activities.
- A waste management contractor shall be hired for the disposal of waste.
- Activities that produce noise shall not be carried out at night.
- Training shall be provided to the workers handling the equipment during the construction phase.

6.5.3. Consultation with TMA

A meeting was conducted with Mr. Ashfaq Ahmed Ghafoor (Chief Officer) on 31st July, 2024, regarding the proposed project. Following feedback has been provided by the TMA officer

- No proponent shall be allowed to dump waste outside the factory premises without prior permission from the TMA.
- A EPA waste management contractor shall be hired to dispose the construction waste

6.5.4. Consultation with Environmental Practitioner and Expert

Dr. Muhammad Irshad, Professor, Department of Environmental Sciences at COMSATS University was consulted for the project. Following remarks were shared by him regarding the project:

- The hazardous waste warehouse shall have secondary containment to avoid the risk of seepage and runoff during accidental spills.
- The hazardous waste warehouse shall have properly ventilation and waste shall be stored at the designated places.

6.5.5. Consultation with Community

Summary of consultation with local residents is given below:

- Overall, the local residents showed no objection regarding the project.
- They requested that the proponent should consider hiring local labor during construction works

Sr. No	Name	Occupation	Village
21.	Zeeshan Ahmed	Labor	Chak 55/5L
22.	Muneeb Awan	Labor	Chak 55/5L
23.	Sohail Ahmed	Shopkeeper	Chak 55/5L
24.	Muhammad Ali	Driver	Chak 55/5L
25.	Muhammad Junaid	Driver	Chak 55/5L
26.	Jamshed Khan	Hotel owner	Chak 55/5L
27.	Muhammad Hassan	Cattle farm	Chak 55/5L
28.	Muhammad Fazal	Private job	Chak 55/5L
29.	Rehmat Ali	Cattle farm	Chak 55/5L
30.	Shah Alam	Labor	Chak 55/5L
31.	Arif Shah	Labor	Chak 56/5L
32.	Muhammad Asif	Labor	Chak 56/5L
33.	Bahadar Ali	Shopkeeper	Chak 56/5L
34.	Baqir Ali	Labor	Chak 56/5L
35.	Hassan Ali	Shopkeeper	Chak 56/5L
36.	Muhammad Jameel	Private job	Chak 56/5L
37.	Fareed Hussain	Private job	Chak 56/5L
38.	Muhammad Younis	Driver	Chak 56/5L
39.	Ijaz Ahmed	Labor	Chak 56/5L
40.	Hashim Khan	Labor	Chak 56/5L

Written Feedback Form-Consultation with local residents
Upgradation of Existing Warehouse for Storage of Hazardous Waste at Philip Morris Sahiwal Factory

Sr No	Name	Occupation	Area/Residence	Feedback	Signature
1.	ذیشان احمد	مزدور	چک 55/5L	مہنگائی کم کی جائے۔	ذیشان
2.	منیب عوان	مزدور	چک 55/5L	تنخواہ بڑھائی جائے۔	M
3.	سہیل احمد	دکاندار	چک 55/5L	بجلی کی لوڈشیڈنگ ختم کریں۔	Sahil
4.	محمد علی	ڈرائیور	چک 55/5L	روڈ ٹھیک کیے جائیں۔	Ali
5.	محمد جنید	ڈرائیور	چک 55/5L	روزگار کے مواقع اچھے کریں۔	جنید
6.	حمید خان	ہوٹل کا مالک	چک 55/5L	آلودگی کنٹرول کریں۔	Hamid
7.	محمد حسن	جانوروں کا باڑہ	چک 55/5L	پانی میں زہریلا مواد نہ چھوڑا جائے	حسن
8.	محمد فضل	ریٹائرڈ جاب	چک 55/5L	نوکریاں بڑھائی جائیں۔	Fazal
9.	رحمت علی	جانوروں کا باڑہ	چک 55/5L	جانوروں کا ہسپتال فراہم کیا جائے۔	رحمت
10.	شاہ عالم	مزدور	چک 55/5L	پراجیکٹ کے حوالے سے نوکری دی جائے	شاہ

Written Feedback Form-Consultation with local residents
Upgradation of Existing Warehouse for Storage of Hazardous Waste at Philip Morris Sahiwal Factory

Sr No	Name	Occupation	Area/Residence	Feedback	Signature
11.	عارف خان	مزدور	چک 55/5L	مہنگائی کم کی جائے۔	عارف
12.	محمد عاصف	مزدور	چک 55/5L	روزگار کے مواقع اچھے کریں۔	A
13.	بہادر علی	دکاندار	چک 55/5L	روڈ ٹھیک کریں۔	Bahadur
14.	باقر علی	مستری	چک 55/5L	پراجیکٹ کے حوالے سے مواقع دیے جائیں۔	باقر
15.	حسن علی	دکاندار	چک 55/5L	ہسپتالوں میں سہولیات بہتر کریں۔	Hasan
16.	جمیل	مزدور	چک 55/5L	مہنگائی ختم کریں۔	جمیل
17.	فرید حسین	دکاندار	چک 55/5L	گھروں میں صاف پانی دیا جائے۔	فرید
18.	ہمر یونس	ریٹائرڈ جاب	چک 55/5L	تمام لوگوں کو پراجیکٹ کے حوالے سے آگاہی دی جائے	Yunus
19.	اعجاز احمد	ڈرائیور	چک 55/5L	بہتر سہولیات فراہم کی جائیں۔	Ijaz
20.	ہاشم خان	ریٹائرڈ جاب	چک 55/5L	ماحولیاتی آلودگی نہ پھیلائیں۔	Hashim

7. POTENTIAL ENVIRONMENTAL & SOCIO-ECONOMIC IMPACTS AND THEIR MITIGATION MEASURES

7.1. Introduction

This section of the report makes assessment of the potential impacts imposed upon the physical, biological and socio-economic environment due to the project activities. The screening process has, through review of literature, and expert judgment made assessment of the potential impacts of said activities on the physical, biological, and socioeconomic environment of the Project.

Guidelines have been reviewed for classification of polluted and unpolluted sites with respect to their air shed, watershed and land use; sensitivity of ecosystem including flora, fauna, wildlife, aquatic life, historical and archeological sites and their values, and the sensitivity of the site.

The review / screening provides the assessment of impacts of different activities before the start of construction/ upgradation, during construction as well as installation of machinery and the resulting emission of noise and gases, and wastewater discharges during operation phase.

7.2. Project Location

The proposed project of PMPKL is located in Lahore Multan Road, which comes under Tehsil and District Sahiwal, Punjab, Pakistan. The geographical coordinates of the project site are 30°43'2.27"N 73°16'6.39"E.

7.3. Project Design

PMPKL's Sahiwal factory plans to upgrade the existing warehouse for hazardous waste storage within its premises. This upgraded warehouse will be dedicated to storing hazardous waste produced during factory operations. The project aims to enhance storage capabilities, ensure compliance with strict safety and environmental standards, and meet growing demand.

7.4. Methodology adopted for impact assessment

The screening process proceeds by identifying the potential environmental aspects of siting the project, identifying the potential environmental impacts at design, construction and operational stages of the project and adoption of mitigation measures that may be needed at the outset of activities. The impacts on environmental resources from the proposed project will be short-term and temporary in nature.

A systematic strategy was developed to provide an assessment of the likely impacts on the micro and macro environment of the Project site. The strategy included:

- Review of General Guidelines.
- Identification of potential environmental impacts by conducting survey, public consultation.
- Assessment of the intensity and significance of potential impacts by obtaining expert opinion and carrying out environment analysis.
- Defining mitigation measures to reduce impacts to as low as practicable.

Method for Assessment: Checklist method was used for impact assessment and guidelines were referred for the verification of permissible levels of environmental parameters during project operation and classification of the site with respect to its pollution status, soil, and ecology including fauna, flora and wildlife, historical and archaeological sites.

The environmental aspects of the project were identified by situation analysis related to present land use, damage to vegetation, noise and other forms of nuisance during construction at site, air pollution due to fugitive dust emission and operation of equipment during construction, air pollution due to burning of wastes.

The entire screening procedure was designed in such a way so as to provide a complete assessment of the impacts on the macro-environment and microenvironment of the project. The project site has no protected area such as game reserve, wildlife, national parks, archaeological sites or cultural heritage in its neighborhoods. Impacts may arise during different stages of project phases which are summarized below. The process for identification of potential impact involves understanding of source of effect in relationship between an activity and environmental parameters. The impact assessment criteria are summarized in table 6.1, which as follows:

Table 6.1: Impact Assessment Criteria	
Nature of Impact	**Adverse or Beneficial**
Mitigation	What measures could be applied to reduce negative impacts or enhance positive impacts
Extent	Localized or Regional
Significance	The Significance of the impact is determined as a synthesis of the above assessment criteria in where; **Low significance**-That the impact would not have an effect on the decision to approve the project (or a particular project alternative), **Medium significance**- The assessed impact should have an effect on the decision unless it is effectively mitigated. **High significance**- The decision would be influenced regardless of any mitigation.
Further investigation or monitoring	A recommendation for further investigation (prior to the commencement of the activity) or monitoring (prior to commencement and/or during operations or even post closure).

7.5. Screening of Potential Environmental Impacts at Different Stages of Project Development

Upgradation of warehouse for storage of hazardous waste at PMPKL;s Sahiwal factory would include following major activities:

j) Mobilization
k) Site Preparation
l) Foundation
m) 4" Thickness RCC Concrete Floor
n) Ramp Work
o) MS Shed Installation
p) Covering Sheets Installation
q) Electrical work/Wiring
r) Smoke Detector Installation

Major issues of environmental concern relate to construction/upgradation phase:

- Impacts on Physical Environment;
  - Air Quality Deterioration
  - Soil Contamination
  - Noise emissions
  - Generation of Solid Waste
  - Water Quality Deterioration
- Impacts on the Socio-economic environment;
  - Occupational Health and Safety Risks

While during the operational phase few significant impacts are expected as follows;

- Risk of Fire and Explosion
- Soil and water contamination
- Accidental Spills

7.6. Screening Methodology

The following Checklist provides the screening of potential environmental impact on different components of ecosystem of the proposed project.

Table 6.2: Checklist provides the screening of potential environmental impact			
Screening Questions	**Yes**	**No**	**Remarks**
Project Siting **Is the project area…**			
Densely populated?		X	Moderately populated settlements are outside 1km radius of the project.
Heavy with development activities?		X	The project area is mainly agricultural land with some industries nearby.
Adjacent to or within any environmentally sensitive areas?		X	No protected habitat or game reserve is present in the immediate vicinity of project.
Cultural heritage site		X	There are no cultural heritage sites in the project vicinity.
Protected area		X	No protected habitat or game reserve is present in the immediate locality.
Wetland or water body	X		Surface water bodies in the area including Bari Doab Canal and agriculture canal nearby.
Estuarine		X	Not Applicable
Buffer zone of protected area		X	Not Applicable
Bay		X	Not Applicable
B. Potential environmental impacts Will the project cause…			
Dislocation or involuntary resettlement of people?		X	No resettlement will be required.
Deterioration of environmental conditions of surrounding of project site.		X	The impact of the upgradation and excavation activity would be localized within the microenvironment immediate vicinity within 500meters).
Degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?		X	Ecosystem degradation not envisaged by the project activities as the area's natural environment has already undergone transformation due to land use changes.
Degradation of cultural property, and loss of cultural heritage?		X	Not envisaged. No such sites are found in the project area.
Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	Not envisaged.
Pollution of receiving drainage waters resulting in residential land, agriculture grounds, and land resource?		X	Not envisaged. No runoff generating activities are planned in the construction.
Water resource problems (e.g. depletion / degradation of available water supply, deterioration for		X	Project is not water intensive. Water resource depletion is not envisaged from project.

Table 6.2: Checklist provides the screening of potential environmental impact			
Screening Questions	**Yes**	**No**	**Remarks**
surface and ground water quality, and pollution of receiving waters?			
Air pollution due to emissions?	X		Minor and limited during construction phase only. The Existing air quality is within PEQS. New development scheme may impact local air shed due to vehicle movement during construction and excavation but severity is low.
Social conflicts between construction workers from other areas and local workers?	X		Local workforce deployment for the project will reduce the risk of social conflicts. This can be further avoided by training of workers on social issues and grievance redressal mechanisms.
Noise and dust from construction activities?	X		Temporary and less significant, but will be minimized through better management practices.
Contamination of surface and ground waters due to improper waste disposal?		X	Excavated soil will be the major waste during construction which will be stored on site and used in back-fill. Other small quantities of construction waste will be managed onsite through Waste Management Plan. Solid and liquid waste disposal system will be in place to prevent possible contamination of water resources.
Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?		X	The project area is not vulnerable with respect to any demographic or socioeconomic aspects.

7.7. Construction/upgradation Phase Impacts

Key activities during upgradation phase include following:

- Mobilization
- Site Preparation
- Foundation
- 4” Thickness RCC Concrete Floor
- Ramp Work
- MS Shed Installation
- Covering Sheets Installation
- Electrical work/Wiring
- Smoke Detector Installation

7.7.1. Impacts on Physical Environment

7.7.1.1. Air Quality Deterioration

The construction/upgradation phase of the dedicated warehouse will impact air quality due to fugitive dust and emissions from construction machinery and vehicular traffic.

Following are the critical sources of air pollution during the construction phase:

Mitigation Measures

- Appropriate PPE shall be provided to the workers to reduce/ minimize the health impact.
- Water sprinkling on unpaved haul roads and over excavated earth piles shall be practiced at regular intervals to reduce dust emissions.
- The construction site, including soil and material piles, shall be barricaded to prevent material escape and dust generation.
- Proper and prior planning, appropriate sequencing, and scheduling of all construction activities shall be done to avoid days with high wind speeds. Timely availability of infrastructure support needed for construction shall be ensured to avoid delays.
- All construction equipment and vehicles shall be maintained in good working conditions, properly tuned, and maintained to keep emissions within the permissible limits. Engines shall be tuned off when not in use to reduce pollution.
- Monitoring of air quality at regular intervals shall be conducted during the construction/ upgradation phase.

7.7.1.2. Soil Contamination

During the construction/ upgradation stage, land contamination can occur due to unchecked chemicals or oil spills resulting from improper handling, transportation and storage. The sources of spills are:

- Maintenance of vehicle and machinery
- Leakage from the container or equipment
- Traffic Accident

Mitigation Measures

Actions necessary to manage the risk from contaminated land will depend on factors such as the level and location of contamination, the type and risks of the contaminated media, and the intended land use. However, a basic management strategy shall include:

- Fuel oils, lubricants, and chemicals shall be stored in covered dyked areas, underlain with impervious lining.
- Vehicles and equipment maintenance shall be taken place at specified site.
- Regular inspections shall be carried out to detect leakages in construction vehicles and equipment.
- Construction vehicles and machinery shall be examined on a regular basis for leakage prevention.
- Chemicals and wastes or any other material which are capable of contaminating the soil in covered vehicles shall be transported

7.7.1.3. Noise Emissions

The construction of the sub-project is expected to involve the use of powered mechanical equipment and local labor using hand tools. This equipment can produce substantial noise and vibration, with cumulative effects from multiple machines potentially being significant.

Mitigation Measures

- Low noise producing equipment shall be used.
- Surface shall be dampened before start of excavation to reduce excess noise production.
- Workers shall use ear protection near high noise areas.
- Continuous monitoring of noise near sensitive receptors shall be conducted.

To further minimize these impacts, the construction supervision consultants (engineer) should require the contractor for this subproject to provide evidence and certification that all construction equipment is equipped with air pollution and noise dampening devices that meet EPA requirements.

7.7.1.4. Generation of Solid Waste

The waste generated during the construction/ upgradation works at site shall be properly disposed in accordance with local and regional applicable laws and guidelines and environmental best practices.

Mitigation Measures

- No waste shall be disposed off openly or in landfill area without prior approval of the TMA.
- Used oil and lubricants shall be recovered and reused or removed from the site in full compliance with the National and Local regulations.
- Oily wastes shall not be burned and shall be handed over to EPA approved waste management contractor for ultimate disposal.
- Machinery shall be properly maintained to minimize oil spill during the construction.
- Solid waste shall be disposed at an approved solid waste facility; open burning is illegal and contrary to good environmental practice.
- EPA waste management contractor shall be hired to dispose off hazardous and nonhazardous waste as per EPA guidelines.

7.7.1.5. Water Quality deterioration

Proper implementation of best practices shall be ensured so that the hydrology of the area is not adversely impacted.

To prevent adverse water quality impacts due to negligence and ensure unavoidable impacts are managed effectively. Ensure adverse impacts on water quality caused by construction activities are minimized.

Mitigation measures

- Limitations shall be practiced on excavation depths in use of recharge areas for material exploitation or spill disposal.
- Landscaping shall be utilized as an integrated component of construction activity as an erosion control measure.
- Lubricants, fuels and other hydrocarbons shall be stored in self-contained dedicated enclosures >50m away from water bodies.
- Construction material and spoil stockpiles shall be covered with a suitable material to reduce material loss and sedimentation and avoid stockpiling near to water bodies.
- Topsoil stripped material shall not be stored where natural drainage will be disrupted.
- Borrow sites (if required) should not be close to sources of drinking water.

7.7.2. Impacts on the Social environment.

Following impacts on socioeconomic settings of the area are anticipated:

7.7.2.1. Occupational Health and Safety Risks

Potential hazards include falls, long work hours, poor ergonomic conditions, unstable work surfaces, frequent movement across unstable sites, work under extreme weather conditions, noise, dust, vibrations and etc.

Safe work practices need to be implemented during operation works to avoid associated occupational hazards. Potential occupational safety hazards associated with project include:

- Exposure to dust and noise

- Occupational accidents (injury, cuts, burn etc.)

In order to provide safe working environment to workers, implementation of good industry practices is mandatory.

Mitigation Measures

- Following procedures and protocols shall be implemented to ensure work related hazards are prevent during project implementation:
  - EHS Policy
  - Work permits/SOPs for critical jobs
  - Emergency Response Procedures
- PPEs shall be provided to workers involved in critical jobs.
- Safety trainings prior to start of critical operations and safe working practices shall be ensured.
- Signs and warnings shall be displayed at relevant places regarding HSE hazards
- Monitoring and supervision of project activities shall also involve assessment of implementation of measures for occupational safety.

7.8. Operational Phase Impacts

Storing hazardous waste in a warehouse can pose several potential negative impacts during operational phase, which can be broadly categorized into environmental, health, and safety impacts:

7.8.1. Soil Contamination

Hazardous substances like oils, chemicals, and raw material powders, can seep into the soil, leading to long-term contamination that affects plant life and can reach groundwater sources, making it unsafe for consumption.

Mitigation Measures

- Use secondary containment pits to capture any leaks or spills.
- Ensure the warehouse has impermeable flooring to prevent substances from seeping into the ground.
- Conduct frequent inspections of storage containers and areas to detect and address any leaks promptly.

7.8.2. Water Pollution

Hazardous substances can leach into nearby water bodies, causing significant harm to aquatic ecosystems and making water unsafe for human use.

Mitigation Measures

- Spill blanket shall be available at waste hazardous warehouse to control the spill at site.
- No drainage shall be built near the hazardous waste warehouse that directly discharge storm water outside the factory.
- Spill response plans shall be developed and implement to tackle the emergency situation.
- Training shall be provided to workers regarding the containment of the spills from hazardous waste warehouse.

7.8.3. Air Pollution

Volatile organic compounds (VOCs) from paints, chemicals, and nicotine products can evaporate, contributing to air pollution and posing health risks to humans and wildlife.

Mitigation measures:

- Install proper ventilation systems to capture and filter out harmful emissions.
- Store volatile substances in tightly sealed containers to minimize evaporation.
- Regularly monitor air quality in and around the warehouse to detect and address any harmful emissions.
- Inflammable waste shall be stored at separate place and monitored properly.

7.8.4. Fire and Explosions

Flammable materials like oils, chemicals, paints, and batteries can increase the risk of fire and explosions if not stored properly.

Mitigation measure:

- Install automatic fire suppression systems, such as sprinklers and fire extinguishers.
- Store flammable materials away from ignition sources and in designated, fire-resistant areas.
- Conduct regular fire drills and training on emergency response procedures.

7.8.5. 1.8.5. Toxic Exposure

Exposure to hazardous substances through inhalation, ingestion, or skin contact can cause acute or chronic health problems, including respiratory issues, skin irritation, and more serious illnesses like cancer.

Mitigation measure:

- Ensure all workers wear appropriate PPE, including gloves, masks, and protective clothing.
- Provide comprehensive training on the hazards associated with each substance and safe handling procedures.
- Provide facilities for workers to wash and change clothing to avoid carrying contaminants outside the warehouse.

7.9. Environmental Enhancement Measures

Although environmental enhancements are not a primary focus for this sub-project, it is worth noting that creating local hard and soft landscaping, as well as successfully planting fruit trees and shrubs, has been commonly practiced at many sites. This practice should be encouraged wherever feasible.

7.9.1. Landscaping and Green Belt Development Plan

Site restoration phase will include landscaping of the project area and development of green area with grass and planation of trees in project vicinity. This will improve the aesthetics of microenvironment and increase local flora. The objective shall be to ensure a green cover providing conducive ambient environment. During planation local species shall be selected. The general guidelines for development of greenbelt are:

- Trees able to grow up to 5 m or more shall be planted along the premises and along the roadsides.
- Plantation shall be done in rows.
- Open areas inside the tobacco mill boundary shall be covered with grass lawns.
- Local species of the plants shall be selected for plantation.

7.9.2. Resource Conservation

- Water conservation practices shall be followed during construction and operation phase of the project.
- Avoid, Reduce, Reuse and Recycle approach shall be used to minimize waste generation.
- Recyclable waste shall be segregated and handed over to recycling contractor.
- Energy efficient equipment and lighting shall be preferred.
- Construction workers shall be sensitized to switch off the machinery/equipment when not in use to save energy and fuel

8. ENVIRONMENTAL MANAGEMENT & MONITORING PROGRAM

8.1. Introduction

This Chapter presents an Environmental Management Plan (EMP) as the implementation mechanism to manage environmental and social issues and mitigation measures identified in Chapter 7 on screening potential environmental impacts and mitigation measures.

8.2. Objectives of Environmental Management Plan

The EMP shall help, the Proponent, in managing the environmental impacts from to the project, enhance project benefits, and introduce standards of good environmental practice. The primary objectives of the EMP are to:

- Outline functions and responsibilities of key players for EMP.
- State and implement standards and guidelines which will be required under environmental legislations particular in context to the project. Facilitate the implementation of the mitigation measures by providing the technical details of each project impact and proposing implementation schedule of the proposed mitigation measures.
- Define a monitoring mechanism and identify monitoring parameters to ensure that all proposed mitigation measures are completely and effectively implemented.
- Identify training requirements at various levels and provide a plan for the implementation of training sessions.

8.3. Scope of EMP

This Environmental Management Plan has provided detailed strategy to be implemented for achieving improved environmental performance in the following areas:

1. Pollution Prevention/Environmental Management
2. Recycling and Waste Management
3. Occupational health safety risks and hazards
4. Contingency Planning

The EMP has been developed in view of the potential environmental and social impacts as identified during the impact assessment exercise and intends to provide a workable mechanism to ensure sustainable construction and operation of the project.

8.4. Management Approach

Management will undertake overall responsibility for compliance with the EMP. It will ensure that all the activities that the management executes comply with positive environmental sensitivities as well as it will cooperate with the concerned regulatory agencies such as Punjab Environmental Protection Agency (EPD). The approaches that are followed towards successful implementation of the environmental management plan listed below:

- Compliance with the relevant legislative and regulatory requirements of the project.
- Developing appropriate monitoring indicators in order to assess the performance as well as magnitude of impact on the environment.
- Regular review of the project activities and assessing their impacts on the environment.
- Setting project's key environmental concerns and addressing issues through public support, awareness and publicly reporting its progress.
- Communicating broadly with internal and external stakeholder on issue of environmental concerns.

8.5. Health, Safety & Environmental Management System

Health, Safety and Environment (HSE) Management System is essential and integral component of the environmental management system for the safe and secure working environment assuring sustained development. EHS issues and aspects are outlined in EMP with mitigation measures based on principles of best management practices. In order to oversee the matters pertaining to environment, health and safety, it is recommended that the proponent setup a unit dedicated to environment, health and safety management of the project. Alternatively, the management may hire and appoint an environmental officer for the project to look after the environmental and health safety aspects of the project.

8.6. Risk Assessment

8.6.1. Identification of Environmental and Social Aspects of Project

Potential environmental and social aspects from the project include the following key activities:

- Equipment mobilization, procurement and storage of construction material
- Electric shocks
- Repetitive strain injuries to the arms & back
- Respiratory issues from off-gassing
- Eye/skin damage from acids & gas
- Project's operations /Storage of products
- Handling and management of waste during operations
- Emergency situations

Risk assessment of the above mentioned project activities identifies the following environmental liabilities which would require mitigation/control measures to be implemented to reduce the environmental impacts to an acceptable level.

- Air and Noise emissions
- Possible contamination of water, soil and land from discharge of effluents including oily waste, sediment load from runoff
- Solid waste including excavated material, hazardous and non-hazardous wastes
- Traffic issues during preconstruction, and construction phase
- Resource consumption (water)
- Emergency case scenarios
- Conditions potentially leading to major accidents including electrical shock and emission of acids or lead fumes emitted during welding of lead electrodes and lead dust
- Emergency scenarios (Explosion); and
- Occupational safety hazards (accidents during work at height, poor ergonomic conditions etc. and exposure to hazards /hazardous waste)
- Socioeconomic impacts

Previous section has provided a detailed description of the impacts identified above along with recommended mitigation measures to minimize the adverse impacts. These measures include the use of mitigation options for siting, management, and physical control and are based on the understanding of sensitivity of environmental receptors in the project area, the legislative controls that apply to the project and a review of good management practices while operating in sensitive environments.

8.7. Schedule for Implementation & Environmental Budget

EMP implementation will be required during both construction/upgradation and operation phases of the project. A budget is proposed below for Environmental Management during project execution. The breakup is given below.

Table 7.1: Environmental Budget		
S. #	**Description**	**Cost/Annum (Rs)**
1.	Testing of Environmental Parameters (Air, water & Noise)	100,000.00
2.	PPEs	In-House
3.	Green Belt Development /tree plantation and maintenance	100,000.00
4.	Waste Management	In-House
5.	Trainings (Health safety/First Aid/emergency response preparedness)	In-House
	Total	**200,000**

8.8. Environmental Management Team along with their Roles and Responsibilities

Overall responsibility for environmental performance lies with the Manager Factory Logistic while daily management will be supervised under the direction of Manager. A brief structure of roles and responsibilities is given below:

8.8.1. Manager Factory Logistic Operations

Manager Factory Logistic, supervises the movement, distribution, and storage of supplies and materials in a company. Manages, plans and coordinates Factory Logistics Department, including at multi-sites markets if applicable that is responsible for all materials, Spare parts and Finished goods, Warehousing, internal logistics and Tax Stickers, ensuring these activities are performed in control and according to applicable law and practices and in a most cost-efficient way.

8.8.2. Manager Warehouse

Warehouse managers supervise the receipt, dispatching, and storage of goods. Warehouse managers manage warehouse staff, vehicles, and other equipment, and oversee security, sanitation, and administrative functions. Guarantee uninterrupted support in delivery of materials to manufacturing zone, as well as supporting the long-term production and shipment plans. Ensure a steady waste removal and disposal process, which performed and developed in a cost-efficient manner and targeted to reach more friendly environmental process.

8.8.3. Process Engineer

A process engineer designs, oversees, assesses, and implements processes that efficiently make products or provide services. The goal of a process engineer is to create systems that make the best use of workers, machines, materials, information, and energy. They review production schedules, design specifications, workflows, and other information to understand and adjust their company's processes to make them more efficient.

8.8.4. Internal Logistics Executive

Internal Logistic Executive oversee the complete shipping process of devices and accessories from electronics manufacturers via the fulfilment hub to the stores' warehouses and ensure an efficient supply chain flow in terms of time, cost and quality. Internal Logistic Executive also work closely with the Customer Care and Finance departments

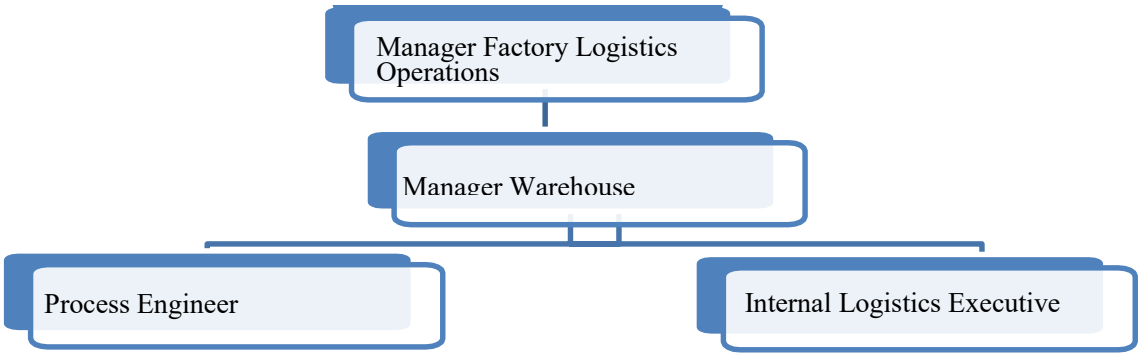

Figure 7.1: Proposed Organizational Structure for Environmental Management

8.9. Environmentally Sound & Safe Working Procedures

PMPKL Management and workers will be made aware of environmental aspects and Emergency Response Plan prior to commencing the work. Prior to leaving the site the workers will ensure that their work area is in safe position. On emergency call they will report in assembly area. Written procedures or standards will be prepared for all activities, where the absence of such procedures and standards could result in not following HSE policy, the law or the contract.

Safe Working Procedures will be based on the following four aspects of job safety:

Safe Place: Work site will be designed, and controls set up to ensure that working environment provides no significant risk to personnel, property and the environment.

Safe Equipment: All equipment for any job, including tools, machinery and protective equipment will be specified and/or designed to ensure that it poses no significant risk to personnel, property or the environment. All equipment will comply with legislative standards for conformity and test.

Safe Procedure: Procedures will be designed for all aspects of the job to facilitate safe use of equipment at the work site to complete tasks with no significant risk to personal, property or the environment. Design of procedure will be based on step-by-step analysis of the tasks involved (Job Safety Analysis), identification of associated hazards and elimination of control of those hazards. Procedures should allow for work in ideal conditions as well as under aggravating conditions e.g., adverse weather.

Trained Personnel: Suitable job-specific, safety skills and supervision training will be provided to personnel involved in construction and operation activities so that they are able to use the procedure and equipment at the worksite with no significant risk to personnel, property and environment. Safe Working Procedures will be available to workers, who will adopt the relevant labor laws of the country.

8.10. EMP Reporting and Review Procedures (Communications and Documentation)

For effective management and monitoring of the environmental performance during the construction and operation phase, communication will be maintained by the Construction Supervisor and HSE Engineer who will coordinate with the Engineer In charge Construction for onward reporting to General Manager (Projects) / General Manager (HSE) on necessary matters.

- **Construction/upgradation Phase:** Construction supervisor will be responsible for coordinating the project progress to the Engineer In charge Construction. He will supervise the construction work to ensure that provisions of EMP/EIA are not violated at any stage. If any undesirable event such as work-related injury, or any other emergency arises during construction, the Supervisor shall report this to the PMPKL EHS

department. Any issues that require attention of higher management will be communicated to Engineer In charge Construction for appropriate action by the General Manager (Projects). The site supervisor should report to the Engineer In charge Construction on weekly basis during the construction phase with inputs from EHS Engineer.

- **Operation Phase:** Following is suggested for an effective communication of project's HSE performance during the operation phase of the project.
- **Training & Awareness** to define the environmental responsibilities, awareness of EMP to the managing staff and to streamline the work plan according to the EMP. Training is a continuous activity for refreshing operational staff awareness
- **EHS Site Committee Meetings these meetings shall be conducted every two months** to review the progress of activities performed and effectiveness of measures in place for pollution control. Deadlines are re-evaluated in meeting and if necessary, the environment project program is revised in these meetings. In the end of these meetings, minutes will be issued to include the outcome of the meeting, issues discussed, and decisions. The minutes of meeting will also be provided to the General Manager (Operations) and the relevant persons for their own record.
- EHS site committee shall consist of In-charge Admin, HSE Engineer and any other Sectional Head (s) as nominated by GM (Operations). Agenda of Meeting may include (but not limited) to the following points: -

  a. Review of the site committee meetings
  b. Environmental incidents status / Corrective action status of suggested recommendations
  c. Non- Conformance Reports (NCR) Status
  d. Environmental Objectives and Targets Status
  e. Corrective Action Requests (CARs) Status
  f. Training Requirements / Status
- Responsibilities shall be assigned to the concerned in charge for implementations of the decisions made in the meeting and shall be followed up by HSE Engineer

8.11. Environmental Trainings

Necessary training on environmental and other safety issues will be provided to the technical and supporting staff before start of activities to ensure that all the staff is well acquainted with the nature of job, inherent risks, hazards, requirements of job safety and EMP. The EHS department will determine the training requirements related to HSE precautions and training needs against work related SOPs shall be determined by General Manager (Operations) and EIC.

All employees shall be trained prior to assigning any responsibility by EIC through relevant Construction Supervisors and by General Manager (Operations).

During the training, the following areas of knowledge and experience are considered essential:

- Understanding the properties (e.g., flammability, corrosiveness, toxicity, reactivity) of hazardous substances, as well as the levels at which they pose a significant danger requiring protective measures.
- Awareness of early-warning indicators, hazards/risk identification, and ability to recognize potentially hazardous situations.
- Familiarity with engineering controls to avoid occurrence of hazardous situations.
- Familiarity with capabilities and limitations of the facility to respond to hazardous emergencies: ventilation system, plumbing systems, shut-off systems, containment devices, and emergency response procedures.
- Knowledge of the use and maintenance of emergency response equipment, as well as routine equipment for health and safety monitoring and protection.

- Trainings related to Environmental Management Practices, Waste Management, and Implementation of Environmental Management plan (EMP).
- Social sensitive aspects for the project and plans to mitigate same.
- Environmental Management of activities near NSRs.

Records of all trainings will be maintained. It is recommended that in case of any undesirable event or emergency, a follow-up session should be arranged to review the weaknesses ad gaps in the existing system and possible reasons which caused the event. This would enable the management in keeping such events from recurring by placing additional and more efficient controls.

8.12. Construction/Upgradation Phase

8.12.1. Construction Work Management

All construction related work including installation, operation, and management of waste streams, equipment and material mobilization etc. shall follow the (1) mitigation plan and (2) provisions of NOC. Solid waste during construction will be removed on daily basis through a local waste contractor.

8.12.2. Construction Monitoring

Engineer In charge for the construction will monitor the construction work and EMP compliance which would also include monitoring of waste management. Performance of construction staff shall be monitored periodically.

8.13. Operation Phase

8.13.1. Monitoring

The proponent will ensure that the mitigation measures mentioned in the EIA are adhered to and HSE Management System is implemented during the proposed project. In case of emergency during handling of hazardous waste emergency plan will be implemented.

8.13.2. Emergency Procedures

Emergency may be defined as a sudden event causing and has the potential to cause serious human injury and/or environmental degradation of large magnitude. The best “cure” for an emergency is, of course, “prevention”. The probable emergency can be:

- Fire and explosion
- Chemical spillage
- Natural calamity such as heavy rain, flooding, dust storm, earthquake etc
- Bomb threat or any sabotage/terrorist activity

The HSE department will prepare contingency plans to deal with any emergency that may arise during the operation e.g., fire, major spillage, natural disaster etc. and communicate these to the regulatory agencies if required by these agencies. The HSE department will also implement necessary measures to prevent fire hazards, contain chemical spillage and electrical shock.

Emergency response management will be provided with dedicated Emergency Response Team of PMPKL who is adequately skilled and trained on emergency situations.

8.13.3. Compliance Monitoring

The management of the project shall monitor compliance by implementing the Environmental Monitoring Plan outlined in the subsequent section. The compliance will be reported in form of periodic reporting and the report may be submitted to the EPA. During the project operations, monitoring will be done on monthly basis.

8.14. Mitigation Matrix (Description of proposed Mitigation Actions)

It defines all the impacts and their remedial with highlighting the responsible personals to work on those mitigations. A mitigation plan is basically a mitigation matrix for construction and operational activities. All

these impacts and mitigations have already been given in previous section of this report. The proponent will be required to adhere to these mitigation measures throughout the project.

8.15. Green Belt Development Plan

Greenbelts are an effective mode of control of air pollution, where green plants form a surface capable of absorbing air pollutants and function as a sink of pollutants. Leaves with their vast area in a tree crown, sorbs pollutants on their surface, thus effectively reduce pollutant concentration in the ambient air. Often the adsorbed pollutants are incorporated in the metabolic pathway and the air is purified. Plants grown to function as pollution sink are collectively referred as greenbelts. The general guidelines for development of greenbelt are:

- Trees growing up to 5 m or more may be planted near canal banks, roadsides or other suitable areas as may be identified during construction.
- For adsorption of dust and gaseous pollutants the following types of plants may be considered,
  - Fast growing
  - Thick canopy cover
  - Adequate height and spread of crown
  - Big leaves (long and board laminar surfaces) supported by firm petioles.
  - Large number of stomata apertures. (Large leaf area index)
  - Perennial and evergreen

Table 7.2: Recommended Plant Species for Greenbelt

S. #	Local Name	Scientific Name	Type of vegetation
1.	Alstonia	Alstonia scholaris	Tree
2.	Bottle Brush	Callistemon lanceolatus	Tree
3.	Sirris	Albizzia lebbek	Tree
4.	Kachnar	Bauhinia variegate	Tree
5.	Shisham	Dilbergia Sisso	Tree

Table 7.1 : Environmental Management Plan During Construction Phase			
ProjectActivity	**Environmental Impact**	**Mitigation Measures recommended**	**Responsibility**
Construction/upgradation Phase	**Spillage from fuel Storage**	• Fuels and lubricants will be stored in covered bunded areas, underlain with impervious lining. • Appropriate arrangements, including shovels, plastic bags and absorbent materials, will be available near fuel and oil storage areas. • Contaminated soil will be removed and properly disposed after treatment such as bioremediation or incineration.	Contractor
	Contaminated Land	• Removal of oil and contaminated soil around the fuel and oil storage areas will be made possible by the availability of appropriate implements i.e., shovels, plastic bags and absorbent materials. • Contaminated media will be managed with the objective of protecting the safety and health of laborer at the site, the surrounding residents, and the environment. • Plans and procedures will be prepared, to respond to the discovery of contaminated media to minimize or reduce the risk to health, safety, and the environment. • Construction vehicles and machinery will be examined on a regular basis for leakage prevention.	Contractor
	Waste Management	• Construction sites will be equipped with temporary refuse bins, and construction wastes should be collected daily and contained in a temporary designated waste storage area on each site. • Designated waste storage areas should not be within 50 m of water ways. • Construction sites generate considerable waste and provision will be made for suitable separation and storage of waste in designated and labeled areas throughout the site. • Wastes will be routinely collected from the designated area and disposed at waste disposal facilities approved by local EPA. • Trainings will be conducted regarding solid waste segregation and housekeeping issues on site. • Segregation of hazardous and non-hazardous waste will be done in accordance with color coding system.	Contractor
	Impact on Water Quality, Consumption and Conservation	• Preventing site runoff. • Regular monitoring of water consumption. • Regular monitoring of water quality for good quality concreting. • Use of leak proof storage tanks.	Contractor

Table 7.1 : Environmental Management Plan During Construction Phase			
ProjectActivity	**Environmental Impact**	**Mitigation Measures recommended**	**Responsibility**
	Dust & Exhaust Emissions	• Dust exposed surfaces should be regularly wetted in a manner that effectively keeps down the dust at the construction site. • Watering of stripped road surfaces along which construction vehicles and trucks travel will control dust emissions by up to 70%. • A fulltime watering truck shall be maintained on site for watering road surfaces as needed to minimize fugitive dust emissions. • Vehicles transporting earth materials shall be covered en-route. • Ensure the proper maintenance of vehicles and generators used at the construction site to produce low emission. • Dust masks shall be provided to operators in order to protect them from dust impacts.	Contractor
	Wastewater Generation	• Wastewater generation will be minimized by controlling the pollutant at the source. • The oily waste will be separated before disposing the wastewater into the septic tank. • Regular monitoring of the wastewater generation will be taken into consideration. • Adequate portable or permanent sanitation facilities serving all workers will be provided at all construction sites. • Sanitary wastewater in construction and other sites will be managed.	Contractor
	Noise level	• The noise generating sources shall be enclosed with acoustic proof material to cut down the noise levels. • Construction machinery and vehicles shall be serviced at regular intervals in order to keep noise to minimum level. • Green belt shall be developed in and around the proposed facility. • Noise level in and around the project site shall be measured. • Workers will be equipped with earplugs or earmuffs. • A construction interval will be established, used and adhered to. • Work discipline will be enforced on site. • Employees shall be trained on noise abatement and PPE's (personal protective equipment) practice. • Workers operating equipment that generates noise will be equipped with the appropriate noise protection gear.	Contractor
	Biodiversity	• Establishment of green areas on the site should include the planting of bird feeding trees.	Contractor

Table 7.1 : Environmental Management Plan During Construction Phase			
ProjectActivity	**Environmental Impact**	**Mitigation Measures recommended**	**Responsibility**
	Traffic Flow	• The proponent will put in place measures to address such concerns by ensuring that construction vehicles preferably deliver materials during off-peak hours when traffic volume is low. • There will also be provision for caution signs on the access road to alert users on construction activities in progress in order to prevent occurrence of accidents. • Impacts from the traffic flow will be minimized through proper planning of the transportation of materials to ensure that vehicle fills are increased, in order, to reduce the number of trips done or the number of vehicles on the road.	Contractor
	Procurement of construction material on site	• Construction material will be transported only in securely covered trucks to prevent dust emission during transportation. The drivers will be advised to cover the material before starting off. • Other temporary tracks within the site boundary will be compacted and sprinkled with water during the construction work. • Project traffic will maintain a maximum speed limit of 20 km/h on all unpaved roads within the mill site.	Contractor
	Occupational Health and Safety	• Provide measures for the management and appropriate disposal of hazardous wastes will be ensure for the protection of the workforce and the prevention and control of releases and accidents; • Provide for the provision of appropriate fire extinguishers and fire response plans and appropriately trained first aid response staff; • Provide for the provision of appropriate first-aid equipment and stations at both work sites including appropriately trained first-aid staff on site and provision of adequate transport facilities for moving injured persons to the nearest hospital; • Provide for the provision of appropriate personal protective equipment (PPE) to minimize risks, such as but not limited to appropriate (insulated if necessary) outerwear, boots and gloves; eye protectors; ear plugs safety helmets, etc.; • Provide training for workers, and establish appropriate incentives to use and comply with health and safety procedures and utilize PPE; • Include procedures for documenting and reporting occupational accidents, diseases, and incidents; and • Include emergency prevention, preparedness, and response arrangements in place.	Contractor
	Water Sourcing	• Water conservation strategies will be implemented by the contractor to prevent wastage of water and excess wastewater generation.	Contractor

Table 7.2: Environmental Management Plan during Project Operations			
Project Activity	**Environmental Concern**	**Mitigation Measures recommended**	**Responsibility**
Operation Phase	**Air Emissions**	• Good house-keeping practices will be adopted in the plant premises. • Paved surfaces for transportation should be used • General cleanliness of the area to be maintained to prevent excessive dust generation	EHS Manager/Officer
	Chemical Spillage	• Any chemical spillages to the soils or into the spill collection sump, the area to be removed from site by a specialist waste removal contractor. • Appropriate chemical Spill kits will be easily accessible and workers will be trained in the use thereof. • Staff and contractors will be trained in the handling and storage of different types of hazardous waste	EHS Manager/Officer
	Occupational Health and Safety Impacts/Hazard Risks	• Risk assessment will be done for every job to determine the potential health and safety issues and their severity so that appropriate controls can be planned and implemented for risk minimization. • HSE policy will be developed and implemented. • Trainings will be given to the staff regarding job safety aspects and job specific hazards. • PPEs will be provided to workers involved in critical jobs. • Monitoring and supervision of project activities will also involve assessment of implementation of measures for occupational safety.	EHS Manager/Officer

8.16. Environmental Monitoring Program

Monitoring of activities during the construction and operation phase will be necessary to assess the impacts of these activities on the environment. For this purpose, the proponent will engage an Independent Monitoring Consultant (IMC) for implementing a monitoring program to:

- Monitor the:
  - Air Emissions
  - Groundwater Quality
  - Effluent Quality
  - Solid waste management
  - Occupational Safety
- Follow the monitoring frequency of selected parameters as per the monitoring plan
- Record all non-conformities observed and report them along with actions to Project Management for further action.
- Report any impact anticipated along with recommendations for further action.

Compliance Monitoring

The compliance monitoring of the project activities is principally a tool to ensure that the environmental control measures identified in the EIA are strictly adhered to during the project activities. Compliance monitoring will be the responsibility of all organizations involved in the field activities.

The Contractor shall take note of the recommendations relating to issues identified in the construction monitoring report. Similarly, the HSE department will consider the issues identified by IMC for the operation phase monitoring. Table below presents a proposed monitoring plan to monitor different environmental Aspects during the Construction and Operations Phases of the Project. This monitoring plan can be improved by the HSE department if found necessary to improve the usefulness of the Plan.

Maintenance of the EMP

EMP needs to be revised on periodic basis to maintain up-to-date environmental management requirements with the changing physical and regulatory constraints. Therefore, outlining and defining the responsibilities of personnel and activities under the project's operation execution, implementation, operation & monitoring phase are integral part of maintenance of the EMP. Dissemination of reviewed and revised EMP (in case of first and second order change) to all stakeholders particularly, relevant government agency so that their modified role is also redefined and re-established in the overall environmental management process.

Monitoring Report

After completion of project activity, a monitoring report will be prepared by Proponent's site representative. The report will mainly include the details of project activities, resource used during the project, list of non-compliances recorded, photographic records controls adopted and conclusion.

Table 7.4: Environmental Monitoring Plan (Construction Phase)

Environmental Concern	Parameters to be Monitored	Monitoring Location	Frequency	Responsibility
	SPM (Suspended Particulate Matter)	Construction site	Once before construction	- PMPKL - Contractor

Table 7.4: Environmental Monitoring Plan (Construction Phase)				
Environmental Concern	**Parameters to be Monitored**	**Monitoring Location**	**Frequency**	**Responsibility**
Dust Pollution (particulate matter) during construction	PM10 PM2.5		monthly	-IMC
	Dust clouds	Construction site	Daily	- PMPKL - Contractor -IMC
Exhaust emissions from generators and other construction equipment	Smoke, COx, NOx, SOx and PM from generators and other equipment	All exhausts/stacks	- Prior to start of work - Monthly	- PMPKL - Contractor -IMC
Noise level	Continuous Noise level Leq dB(A) monitoring	Construction site	Monthly	- PMPKL - Contractor -IMC
Groundwater Quality	As per NEQS	Construction site	Monthly	PMPKL - Contractor -IMC
Solid Waste Management	Record and logging of daily generated waste. Hazardous and non-hazardous waste quantity	Construction site	Daily	- PMPKL - Contractor -IMC
Occupational Health and Safety	HSE compliance	Construction site	Daily	- PMPKL - Contractor -IMC

Table 7.4: Environmental Monitoring Plan (Operational Phase)				
Environmental Concern	**Parameters to be Monitored**	**Monitoring Location**	**Frequency**	**Responsibility**
Waste Management	-Record of waste type and quantities collected and disposed.	Warehouse	Weekly	HSE officer

9. CONCLUSION & RECOMMENDATIONS

9.1. Summary of Findings

The EIA study for Project has identified potential impacts that are likely to arise during construction and operation phases of the proposed project. Potential Project impacts have been identified related to the project. Impact predictions are based on the consultants' previous experiences on similar projects; professional judgment; data collected in the field; discussions with local communities, relevant government officials and relevant technical specialists. Predicted impacts relate to all aspects of the proposed project. Many of the mitigation measures are related to good design practices, others with good construction and housekeeping practices.

Screening process for potential impacts leads to following findings:

- The impacts from the project will be mainly confined to the construction phase including impact on air quality, soil and noise. Management plan for same is given in the EMP.
- Land is being acquired by PMPKL.
- There is not voluntary or involuntary resettlement need for the project.
- Project does not fall within or close to protected areas.
- There will be no impact on project area's environmental quality from project operations.
- Dust emissions from project will be controlled by water sprinkling over surfaces to suppress dust.
- Effects monitoring will be continuously done at construction site and measures adopted to reduce the severity of impact.

EMP has been developed for the project to assist the proponent in implementation of mitigation measures during different project phase to control the adverse environmental impacts. In addition to provisions of EMP, PMPKL has fully functional HSE policies and protocols that will be implemented during project to ensure project is executed in environmentally conducive manner.

9.2. Recommendations

The project activities were reviewed, and an assessment was made of the impact of these activities on the area's natural, ecological and socioeconomic environment. Where appropriate, mitigation measures are recommended to keep the adverse environmental impact within the acceptable limits. The consultant therefore recommends that:

- All mitigation, and environmental enhancement measures proposed in this EIA report are implemented as described in the EMP.
- Continuous monitoring as per EMP be carried out to ensure there are no violations to EMP.
- Adoption of best available technology for the operation of the project.
- Adoption of best management practices for the both the construction and operation of the project, including defining environmental management policy, roles and responsibilities.
- Noise attenuation is diligently performed to prevent impact on nearby communities.
- Dust control measures are effectively adopted and implemented to prevent impact on nearby communities. Measures have been proposed in the EMP for same.
- Waste Management practices should be followed as per the EMP.
- PPE and Hazard Safety measure must be followed in order to improve the safety of working environment.

- Mitigation measures identified for different stages of the project will be monitored for environmental compliance.

The proponent is committed to ensure the potential impacts from project operations are mitigated using good industry practices and monitoring of EMP compliance. Mitigation measures proposed for the operation phase include adoption of standard procedures for hazardous waste as per international standards.

To ensure effective implementation of EMP environmental monitoring plan has also been developed for each phase of the project focusing on monitoring of air quality, stack emissions and waste water.

9.3. Conclusion

The EIA study concludes that potential impact from the proposed project are mainly confined to construction phase which will need to be carefully executed. The EIA report may be approved with the condition that provisions of EMP will be implemented and necessary measures would be adopted to reduce the severity of impacts.

Annexure - 1: Land Documents

Annexure - 2: Layout of Project Site

Annexure - 3: Environmental Monitoring Reports

Annexure - 4: Chemical Handling & Spill Control

Annexure - 5: Emergency Preparedness & Response

Annexure - 6: Waste Management Plan

Annexure - 7: EHS Policy