ESTABLISHMENT OF PHARMACEUTICAL UNIT

BY M/S FUSION CHEMICALS (PVT.) LTD.

PLOT NO. 67/68 VEHARI INDUSTRIAL ESTATE, VEHARI.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Prepared by

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EXECUTIVE SUMMARY

The pharmaceutical industry in Pakistan is undergoing significant growth, with numerous leading manufacturers driving innovation and expanding production capabilities. This sector plays a crucial role in meeting the country's healthcare needs, producing a wide range of essential medicines, including antibiotics, vaccines, and chronic disease treatments. Increased health awareness, rising demand for quality healthcare, and supportive government policies have contributed to the expansion of the industry. Particularly after the COVID-19 pandemic, there has been a heightened focus on local manufacturing and self-sufficiency in essential drugs. With both established firms and new entrants investing in research, development, and compliance with international standards, Pakistan's pharmaceutical sector is poised for sustained progress and global competitiveness.

The proposed project for the commissioning of its objective and construction requires fulfilling the legal requirements of the Punjab Environmental Protection Act (amended act 2012), Section 12, for which this Environmental Impact Assessment (EIA) report is being submitted.

i- TITLE AND LOCATION OF PROJECT:

Title: Establishment of Pharmaceutical Unit by M/S Fusion Chemicals (Pvt.) Ltd.

Location: Plot No. 67/68 Vehari Industrial Estate, Vehari.

ii- PROJECT PROPONENT

Proponent: Imran Shah

Address: 11—G, Shah Rukan-e-Alam Colony, Multan.

iii- NAME OF ORGANIZATION PREPARING REPORT:

Integrated Environment Consultants

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iv- BRIEF OUTLINE OF THE PROJECT

The project involves establishing a pharmaceutical unit at Plot No. 67/68 Vehari Industrial Estate, Vehari, designed to produce 404352 liters of syrup and 269568 kilograms of powder annually at an area of 0.984 Acres.

v- PROJECT IMPACTS AND RECOMMENDATIONS FOR THEIR MITIGATION

Impact assessment is crucial for project initiation as it enables the identification and comprehension of a project's potential positive and negative effects. Understanding these impacts aids in tailoring the

project to maximize benefits and minimize risks. Impact assessment assists in recognizing environmental, social and economic challenges and risks and gives the directions to develop strategies that mitigate these risks and adjust the plan accordingly.

E1: Impacts and Mitigation Measures of Construction and Operational Phase

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
Construction Phase		
Dust emissions likely to occur during the excavation of the top soil and loading and transportation of the construction waste.	Minor/Short Term	• Watering all active construction areas when necessary. • Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard. Pave, apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites. • Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites. • Provision of PPEs to workers.
Hydrology and water quality degradation.	Minor/Short Term	• Installation of the septic tank. • The proponent will prepare a hazardous substance control systems and emergency response plans that will include preparations for quick and safe clean-up of accidental spills.
Oil spills from machines to be used on site and vehicles.	Minor/Short Term	• The machinery and the equipment will be regularly maintained. • The contractor will control the dangers of oil spills during construction by maintaining the machinery in specific areas designed for this purpose hence

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		will not be a serious impact as a result of the construction.
Noise pollution due to the moving machines (mixers, tippers) and incoming vehicles	Minor/Short Term	• Install portable barriers to shield compressors and other small stationary equipment where necessary. • Limit pickup trucks and other small equipment, observe a common sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible.
Workers accidents and hazards during construction.	Minor/Long Term but reversible	• Provision of appropriate and adequate Personal Protective Equipment (PPE) to employees. • Enforcement and proper use of PPE by all construction workers. • Provision of appropriate tools, equipment, and machinery in sound working conditions to employees.
Operation Phase		
Solid waste production during the operational activities.	Major/ Long term	• Solid wastes resulting from the unit will be disposed of properly to avoid any threat to the environment. • Conducting public awareness campaigns to educate workers about the environmental impact of solid waste and the benefits of waste reduction. • Collection facilities will be provided.
Noise will be generated from the standby generator and machineries.	Minor/ Long Term	• Proper covering of standby generator, to reduce the noise.

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		• Noise reduction measures like buffering of noise through trees will be adopted where deemed necessary to reduce the noise level at the project boundary.
Air Emissions will be generated from standby generator	Minor/Long Term	• Tree plantation in and around the facility will be encouraged. • Ventilation System will be ensured.
Release of wastewater during operations	Minor/ Short Term	• No Wastewater will be produced during production of pharmaceutical products however domestic waste will be generated which is treated through septic tanks and discharge into main drain. • Proper sampling of wastewater will be done during operational phase to ensure the quality of wastewater.

1 INTRODUCTION

M/s Fusion Chemicals (Pvt.) Ltd. is establishing a modern pharmaceutical manufacturing facility at Plot No. 67/68, Vehari Industrial Estate, over an area of 0.984 Acres. The proposed unit is designed to produce 404,352 liters of medicinal syrup and 269,568 kilograms of pharmaceutical powder annually. These products will cater to a wide range of therapeutic needs, including treatments for common infections, chronic conditions, and nutritional deficiencies.

The facility will be equipped with advanced machinery and production lines to ensure high efficiency, precision, and compliance with Good Manufacturing Practices (GMP). The manufacturing environment will be maintained under strict quality control protocols to safeguard the integrity and safety of all formulations. Raw materials, processing, and packaging will all adhere to national and international pharmaceutical standards. The demand for locally produced, high-quality medicines is growing rapidly due to increasing population health awareness and the need for affordable healthcare solutions. By enhancing local production capabilities, the project will help reduce reliance on imported pharmaceutical products, ensuring better accessibility and availability of essential drugs in the country. In addition to meeting market needs, the establishment of this unit will also generate employment opportunities for skilled and semi-skilled labor, support ancillary industries, and contribute to the overall economic development of the Vehari region. The project reflects a forward-looking investment in Pakistan's healthcare and industrial sectors.

The proposed project aims to fulfill its objectives through construction and operation necessitating compliance with the legal regulations specified in Punjab Environmental Protection Act 2012, Section 12. In accordance with these requirements, this Environmental Impact Assessment (EIA) is being submitted.

1.1 PURPOSE OF THE REPORT

As per the Punjab Environmental Protection Act (PEPA), Section 12, which covers Initial Environmental Examination and Environment Impact Assessment, no project proponent is allowed to initiate construction or operations without filing the necessary documentation with the designated Government Agency under the Provincial Environmental Agencies. If the project is anticipated to cause adverse environmental effects, it necessitates an environmental impact assessment. Subsequently, approval must be obtained from the Government Agency. This requirement set forth by the Government of Punjab mandates the preparation of this Environmental Impact Assessment (EIA) Report to secure Environmental Approval (EA) from the Environmental Protection and Climate Change Department (EPA), Government of Punjab, Lahore.

This report provides comprehensive information and data on the environmental, economic, and social impacts of the project, enabling its assessment and justification that the project will comply with the requirements of environmentally sustainable practices during both installation and operation stages, as required by the Punjab Environmental Protection Act, 2012, the Punjab Environment Quality Standards, and the rules and regulations thereof.

1.2 IDENTIFICATION OF PROJECT AND PROPONENT

I. TITLE AND LOCATION OF PROJECT:

Title: Establishment of Pharmaceutical Unit by M/S Fusion Chemicals (Pvt.) Ltd. Located at Plot No. 67/68 Vehari Industrial Estate, Vehari

Location: Plot No. 67/68 Vehari Industrial Estate, Vehari.

II. PROJECT PROPONENT

Proponent: Imran Shah

Address: 11—G, Shah Rukan-e-Alam Colony, Multan.

III. NAME OF ORGANIZATION PREPARING REPORT:

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IV. BRIEF DESCRIPTION OF NATURE SIZE AND LOCATION OF PROJECT

The project involves establishing a pharmaceutical unit at Plot No. 67/68 Vehari Industrial Estate, Vehari, designed to produce 404352 liters of syrup and 269568 kilograms of powder annually at an area of 0.984 Acres.

1.3 LIST OF NAMES, QUALIFICATIONS AND ROLES OF TEAM MEMBERS CARRYING OUT THE EIA STUDY

The proponent has assigned the task of preparing EIA report to M/S Integrated Environment Consultants, Lahore. The EIA study of the proposed project has been conducted according to Environmental Assessment Procedures, 1997, Review of IEE and EIA Regulation 2022 as prescribed by the Federal Environmental Protection Agency (Pak EPA), Government of Pakistan. The study team of M/S Integrated Environment Consultants which completed the EIA report consists of following expert

Table 1-1Members Completed EIA Process

Name	Qualification	Status in Project
Mr. Ahtasham Raza	M.Phil (Env. Sciences) GC University, Lahore	Project In-charge
Mr. Adnan Sharif	MPhil (Env. Sciences) Diploma in Environmental Law - Punjab University	Team Leader
Mr. Mehmood Amjad	BS (Hons) Environmental Sciences NFC.IET. Multan	Monitoring In-charge
Iris Earnest	PhD Environmental Sciences GC University, Lahore	Senior Environmentalist
Nimra Shehzadi	MPhil Environmental Science GC University, Lahore	Environmentalist
Mohsin Majeed	BS Environmental Sciences University of Lahore (UOL)	Environmentalist

*Only the main roles of the team members are given. However, their role was not restricted to these, rather it also includes many other studies in their respective fields in the context of this EIA study.

2 SCREENING OF THE PROJECT

Based on the Punjab Environmental Protection Act 2012 and the Review of IEE & EIA Regulations, 2022 for filing, reviewing, and approving environmental assessments, the present project is classified under Schedule II Series B (2). Following list shows the projects included in Series B.

B. Manufacturing and Processing

1. Cement Plant
2. Chemical manufacturing units, including pharmaceuticals and cosmetic
3. Sugar mills and Distilleries
4. Food processing industries including beverages, milk and dairy products with total Cost More Than 200 million.
5. Paper and paperboard, paper pulping, paints and dyes,
6. Textile units comprising of dyeing & printing
7. Pesticides and fertilizer manufacturing units
8. Poultry waste processing units / rendering units
9. Tannery and leather units
10. Rubber projects with total cost more than Rs. 100 million
11. Battery Manufacturing and Recycling Plants
12. Ceramics and glass units
13. Electro plating and nickel/chrome plating including Surgical Units
14. Cutlery units
15. Slaughterhouse
16. Iron and steel rolling mills
17. Steel Furnaces
18. Smelting plants
19. Auto mobile manufacturing and assembling units
20. Resource Recovery Units

3 SCOPING OF THE PROJECT

Scoping is a critical initial phase in the EIA process, serving as a roadmap for the comprehensive evaluation of potential environmental effects associated with a project. It is pivotal in defining the boundaries, objectives, and methodology of the EIA study. The scoping process allows for the identification and prioritization of key environmental issues, ensuring that the assessment focuses on the most relevant aspects of the project. This early stage engagement with stakeholders, including the public, governmental bodies, and experts, promotes transparency and inclusivity in decision-making. By clearly delineating the scope, the EIA process becomes more efficient, cost-effective, and targeted, streamlining the subsequent data collection and analysis phases. Ultimately, scoping enhances the overall effectiveness of the EIA, enabling a thorough examination of potential impacts, facilitating informed decision-making, and promoting sustainable development practices by integrating environmental considerations into the planning and decision-making processes.

3.1 SPATIAL AND TEMPORAL BOUNDARIES OF ENVIRONMENTAL ASSESSMENT

Spatial boundaries define the geographical extent of the assessment, allowing for the identification and consideration of potential impacts on ecosystems, biodiversity, and local communities. A precise delineation of these boundaries is crucial for capturing both direct and indirect effects, preventing oversight of critical environmental factors. Simultaneously, temporal boundaries establish the timeframe over which impacts are assessed, enabling the examination of short-term and long-term consequences. This consideration is vital for understanding the dynamic nature of environmental processes and the potential cumulative impacts over time. By addressing spatial and temporal boundaries, environmental assessments can provide decision-makers with a nuanced understanding of a project's overall impact, supporting the development of sustainable practices and fostering responsible development that aligns with environmental conservation and community well-being.

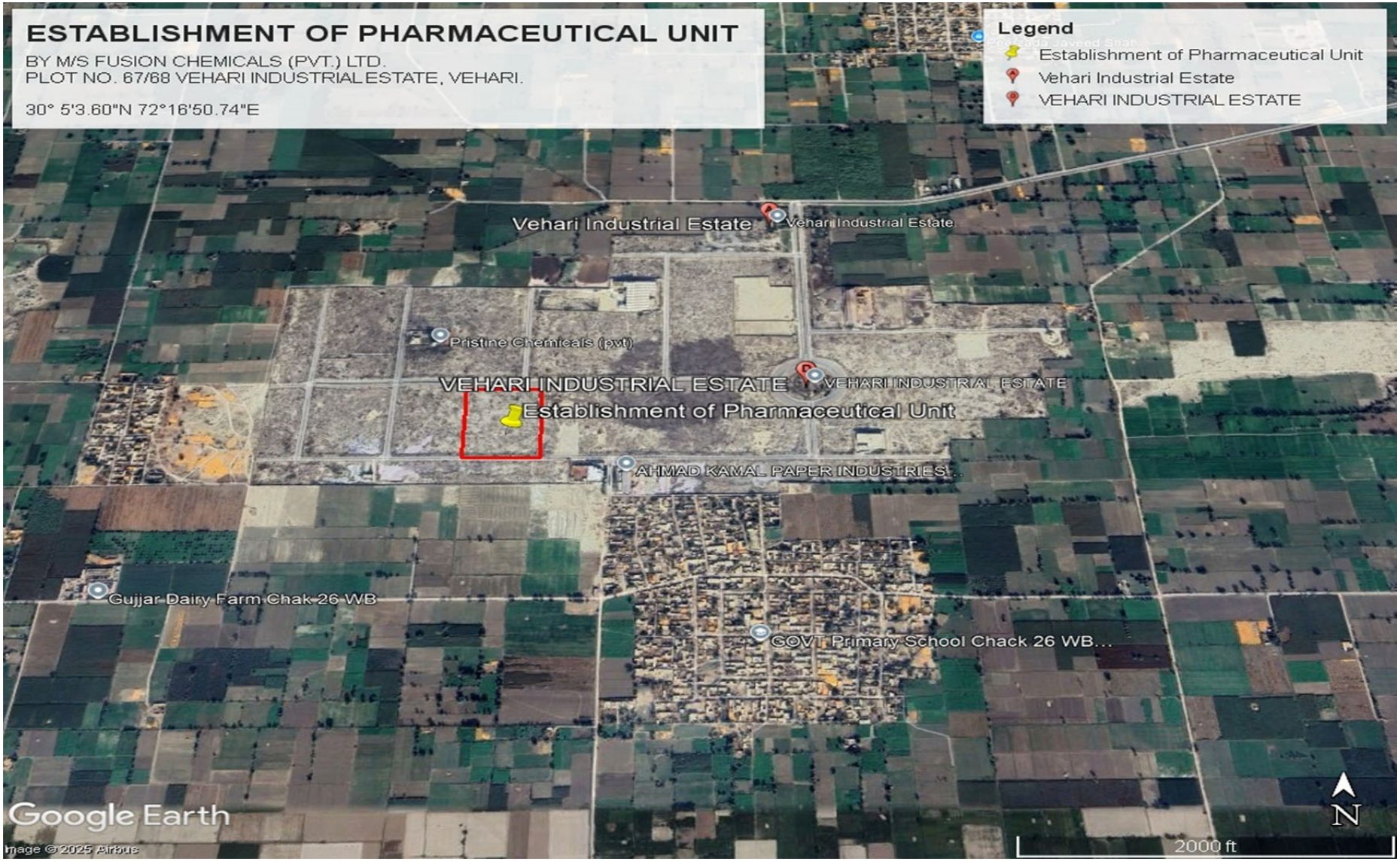


Figure 3-1 Spatial and Temporal Boundaries of the Proposed Project

3.2 IMPORTANT ISSUES AND CONCERNS RAISED DURING CONSULTATION

The EIA for the proposed project incorporates a meticulously planned two-stage consultation process, with a primary focus on one-on-one meetings. During the initial stage, targeted consultations were directed at engaging with local government authorities, affected individuals, and communities in close proximity to the project site. The primary objective of this stage was to comprehensively assess both short-term and long-term impacts anticipated from the early stages of project development. By soliciting insights and perspectives from key stakeholders, including local residents and authorities, the goal was to gain a nuanced understanding of potential environmental, social, and economic implications.

The second stage of consultations, if deemed necessary, is designed to adopt a more expansive approach through public participation. This phase aims to facilitate a broader outreach to the public, fostering a comprehensive engagement process to capture additional feedback, concerns, and insights from a diverse cross-section of the community. This inclusive approach ensures that a wide range of stakeholders has the opportunity to contribute their perspectives, concerns, and suggestions, thereby enriching the EIA process and refining it in accordance with the valuable input received from the community.

3.3 SIGNIFICANT IMPACTS AND FACTORS TO BE DETERMINED

The construction of a pharmaceutical unit involves various significant impacts and factors that necessitate thorough consideration and planning for successful implementation. Firstly, regulatory compliance stands as a paramount concern, with adherence to stringent safety, environmental, and quality standards being imperative for obtaining necessary permits and approvals. Additionally, selecting an appropriate site is crucial, considering factors such as proximity to transportation, availability of utilities, and compliance with zoning regulations. Environmental impact assessments must be conducted to identify and mitigate potential environmental impacts associated with construction and operation. Engaging with local communities and stakeholders ensures transparency, addresses concerns, and fosters positive relationships. Technological requirements, workforce development, supply chain management, risk management, and financial planning are also critical considerations to ensure efficient operations and long-term sustainability. By meticulously addressing these factors, pharmaceutical companies can navigate the construction process effectively and establish facilities that contribute positively to healthcare advancements while mitigating potential risks and impacts.

3.4 DEVELOPMENT OF AN ENVIRONMENTAL MANAGEMENT PLAN

The EIA of a pharmaceutical industry is a critical process that evaluates potential environmental effects associated with the construction and operation of the facility. An Environmental Management Plan (EMP) plays a significant role within the EIA framework, serving as a roadmap for identifying, mitigating, and managing environmental impacts throughout the project lifecycle. In the context of a pharmaceutical industry, the EMP holds particular importance due to the unique environmental challenges and risks inherent in pharmaceutical formulation.

Firstly, the pharmaceutical industry often utilizes various solvents, and raw materials in its manufacturing processes, posing risks of air and water pollution, soil contamination, and hazardous waste generation. An EMP helps identify these potential environmental impacts and specifies measures to minimize or eliminate them. This may include implementing pollution control technologies, such as wastewater treatment through septic tank, air emission controls, and hazardous waste management practices, to ensure compliance with environmental regulations and protect surrounding ecosystems and communities.

Secondly, pharmaceutical manufacturing facilities are often subject to stringent regulatory requirements aimed at safeguarding public health and the environment. An EMP provides a framework for ensuring regulatory compliance by outlining specific monitoring, reporting, and mitigation measures to address environmental concerns identified during the EIA process. This helps pharmaceutical companies demonstrate their commitment to environmental stewardship and sustainability, thereby enhancing their reputation and credibility with regulatory authorities, stakeholders, and the public.

Moreover, an effective EMP contributes to the overall sustainability and long-term viability of the pharmaceutical industry by promoting resource efficiency, waste reduction, and responsible environmental management practices. By integrating environmental considerations into the design, construction, and operation of pharmaceutical facilities, companies can minimize their ecological footprint, reduce operational risks, and enhance operational efficiency. This not only helps protect the environment and public health but also ensures the continued success and profitability of the pharmaceutical industry in the long run.

These key parts of EMP include a clear description of the project, an outline of potential environmental impacts and risks, specific mitigation measures tailored to address these impacts, a comprehensive monitoring and reporting system to track environmental indicators, protocols for emergency response and contingency planning, details on stakeholder engagement and communication strategies, and a framework for ongoing review and updates to ensure the plan's adaptability and effectiveness over the course of the project. Together, these components form a comprehensive EMP designed to guide environmental practices, minimize adverse impacts, and maintain compliance with regulations and best practices in environmental management.

4 ALTERNATIVES OF THE PROJECT

The consideration of alternatives in an EIA provides a comprehensive understanding of the potential impacts associated with various project options. Evaluating alternatives allows decision-makers to assess not only the environmental implications but also the social and economic consequences of different project scenarios. This process aids in identifying the most sustainable and least impactful option, promoting responsible decision-making. Alternatives analysis helps to avoid or minimize adverse effects, contributing to the overall goal of sustainable development. In essence, the careful examination of alternatives in an EIA serves as a robust decision-support mechanism, guiding the selection of projects that align with environmental conservation, community well-being, and long-term sustainability.

Project Alternatives

- No project option/worst scenario option.
- Site Alternative

4.1 NO PROJECT OPTION/WORST SCENARIO OPTION

Analysis

- **Strength and Opportunities**

The Pharmaceutical industry offers a multitude of benefits, including improved healthcare outcomes, better preventative care, cost savings, and economic growth. This sector significantly contributes to economic development by creating jobs and adding to the global GDP. Moreover, pharmaceutical companies play a crucial role in research, discovery, and development of new medicines, leading to advancements in medical science that positively impact millions of lives worldwide. Additionally, careers in the pharmaceutical industry provide opportunities for scientific discovery, innovation, access to cutting-edge technology, competitive salaries, stability, diverse career paths, international exposure, and a strong commitment to sustainability.

- **Weakness and Threats**

If a Pharmaceutical unit is not established, several disadvantages can arise. Firstly, the lack of a local pharmaceutical industry can lead to limited access to essential medicines, potentially affecting healthcare outcomes and the well-being of the population. Without a Pharmaceuticalunit, a region may become dependent on imported medications, which can be costly and may not always meet local healthcare needs efficiently. Additionally, the absence of a pharmaceutical unit can result in a lack of employment opportunities in the pharmaceutical sector, hindering economic growth and development within the region. Furthermore, without a local pharmaceutical industry, there may be challenges in ensuring quality control, regulatory compliance, and timely access to new and innovative medicines, impacting both healthcare delivery and the overall economy of the area.

Conclusion

Having a Pharmaceutical unit in a community offers numerous advantages that positively impact both the local population and the region as a whole. Firstly, it ensures easier access to essential medications, improving healthcare outcomes and overall well-being. By having a local pharmaceutical industry, communities can reduce their reliance on imported drugs, leading to cost savings and a more tailored approach to healthcare needs. Moreover, the establishment of a pharmaceutical unit creates job opportunities, stimulating economic growth and enhancing the socio-economic fabric of the community. Additionally, having a pharmaceutical unit locally promotes research and development, fosters innovation, and ensures regulatory compliance, all of which contribute to advancing healthcare standards and promoting a healthier society. Overall, a pharmaceutical unit in a community not only enhances healthcare accessibility but also boosts economic prosperity and fosters scientific advancement, making it a valuable asset for any locality.

5 DESCRIPTION OF THE PROJECT

5.1 GENERAL

The "Description of the Project" chapter within an EIA serves as the foundational narrative that intricately outlines the key facets of the proposed project. This pivotal section provides a comprehensive overview, delineating the project's purpose, scope, location, design, and methodologies. It lays the groundwork for the subsequent environmental evaluation by offering a detailed understanding of the project's intricacies, helping stakeholders, authorities, and the public grasp the potential implications. In essence, this chapter acts as the entry point, guiding readers through the project's fundamental characteristics and setting the stage for the thorough analysis of its environmental, social, and economic impacts in the subsequent sections of the EIA.

5.2 OBJECTIVES OF THE PROECT

The objective of the project is to establish a pharmaceutical manufacturing facility by M/S Fusion Chemicals (Pvt.) Ltd. to produce high-quality medicinal syrups and pharmaceutical powders in compliance with Good Manufacturing Practices (GMP). The project aims to meet the increasing domestic demand for safe, effective, and affordable medicines, reduce reliance on imported pharmaceutical products, and strengthen the local healthcare supply chain. Additionally, the project seeks to contribute to regional economic development by creating employment opportunities, supporting allied industries, and promoting industrial growth within Vehari Industrial Estate.

5.3 LOCATION AND LAYOUT OF THE PROECT

The project is located at Plot No. 67/68 Vehari Industrial Estate, Vehari**.**

GPS Coordinates: 30° 5'3.60"N, 72°16'50.74"E

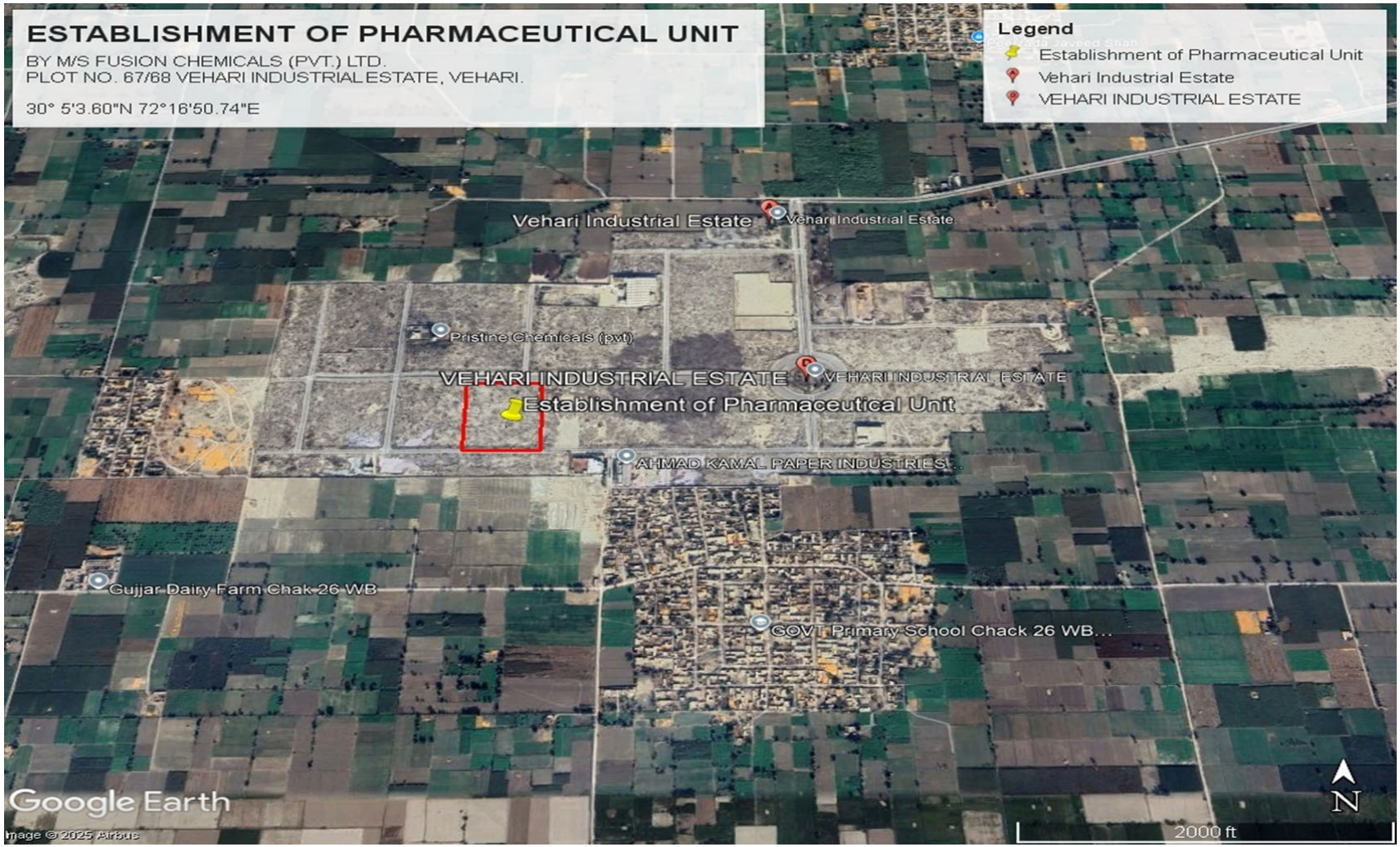


Figure 5-1Location of the Proposed Project

5.4 PRODUCTS

The proposed pharmaceutical unit by M/S Fusion Chemicals (Pvt.) Ltd. is designed with the following annual production capacity:

I. **Medicinal Syrups:**404,352 liters (Annually)

II. **Pharmaceutical Powders:**269,568 kilograms (Annually)

Table 5-1 Raw Products

Sr. No	Name
1	Chloride
2	Copper Sulphate
3	Benzalkonium
4	Ammonium Chloride
5	Octyldecyl dimethyl
6	Dioctyl dimethyl ammonium
7	Gltaraldehyde
8	Iodine
9	Ortho Phenyl Phenol
10	Hydro Oxy Benzane
11	Iso Propyl Alcohol
12	Diazinon
13	Chlorhexidine Gluconate
14	Citrimid
15	Alkyl dimethyl benzyl
16	Ammonium Chloride
17	Glutraldehyde
18	Lysol
19	Sodium Citrate
20	Sodium Maleate
21	Blue Color Pigment
22	Phenyl Solution
23	Calcium Chloride
24	Calcium Oxide
25	Calcium Carbonate
26	Sodium Chloride
27	Sodium Carbonate
28	Sodium Chlorite
29	Carbolic Acid
30	Inositol
31	Nicotinamide
32	Potassium Chloride
33	Sodium Benzoate
34	Thymol
35	Formic Acid

Table 5.2: Source of Raw Materials

S. No	Raw Material Name	Origin / Source
1	Inositol	No.9 Longxiang Avenue, High-Tech Industrial Park Zigong City, Sichuan Province, China
2	Nicotinamide	Red Sun Life Science Industrial Park, Dangtu Economic Development Zone, Maanshan City, Anhui Province, China
3	L-Carnitine	No.100 Xianghuai Road, Benxi Economic Development Zone, Liaoning, China
4	Pyridoxin Hydrochloride	East of Huafeng Road, South of Beiwaihuan, Kenli Development Zone, Dongying City, Shandong Province, China
5	Vitamin E Acetate	No. 428 XinchangDadao West Road, Qixing Street, Xinchang County, Zhejiang Province, China
6	Vitamin B2	Overpass West, Ruzhou City, Henan Province, China
7	L-Threonine	Mulitu Town, Keerqin District, Tongliao, Inner Mongolia, China
8	L-Lysine Sulphate	West Yunhai Street, South Zhujiang Road, Baicheng Industrial Park, China
9	Vitamin E Acetate Powder	No. B Binjiang South Road, Yuilin Street, Xinchang County, Zhejiang Province, China
10	Isoleucine	No. 188 Fangzheng East Street, Gn Quan Pu Economic and Technological Development Zone, Urumqi City, Xinjiang Province, PRC, China

5.5 MACHINERY REQUIRED

5.5.1 Imported Machinery Details

5.5.1.1 General Equipment

Sr. No.	Name / Type of Machinery	Quantity	Country of Origin
1	Thermal Printer	1	U.S.A
2	Top Loading Balance (5 gm–45 kg)	2	China
3	Top Loading Balance (5 gm–200 kg)	2	China
4	Jack Trolley	1	China
5	Drum Trolley	1	China
6	Plastic Trolley (Raw Material)	1	China
7	Carton Trolley	1	China
8	MS Worker Locker	2	China

5.5.1.2 Laboratory Equipment

Sr No.	Name / Type of Equipment	Quantity	Country of Origin
12	HPLC (Shimadzu)	1	Japan
13	UV Spectrophotometer (Shimadzu)	1	Japan
14	Moisture Analyzer (Radwag)	1	Poland
15	pH Meter (Jenco)	1	U.S.A
16	TDS Meter (Jenco)	1	U.S.A
17	Hot Plate with Stirrer	1	Korea
18	Sonicator	1	China
19	Desiccator	1	China
20	Precision Balance (Shimadzu)	1	Japan
21	Hot Oven (Memmert)	1	Germany
22	Incubator	1	China
23	Water Bath	1	U.K
24	Stability Chamber	1	China
25	Viscometer	1	China
26	Melting Point Apparatus	1	Korea

Sr No.	Name / Type of Equipment	Quantity	Country of Origin
27	Centrifuge Machine	1	China
28	Autoclave (Sanyo)	1	Japan
29	Colony Counter	1	China
30	Laminar Air Flow Hood	1	China
31	Microscope	1	U.K
32	TLC Apparatus	1	China
33	TLC Plates	1	China
34	Soxhlet Apparatus	1	China
35	Glass Distillation Apparatus	1	China
36	Manometers	5	U.K
37	Anemometer	1	Taiwan
38	Hygrometers	25	U.K
39	Fume Hood	1	U.K
40	Glass Filtration Assembly	1	U.K
41	Vacuum Pump	1	China

5.5.2 Local Machinery Details

Sr No.	Name / Type of Machinery	Quantity
1	Mixing Tank with Silver Son's 1000 Lit	1
2	Mixing Tank with Silver Son's 500 Lit	1
3	Storage Tank 1000 Lit	1
4	Storage Tank 500 Lit	1
5	Storage Tank 250 Lit	1
6	Storage Tank 100 Lit	1
7	Colloidal Mill	1
8	Liquid Transfer Pump	1
9	Liquid Transfer Pipes with Aluminum Curtain	5
10	Liquid Filling Machine (2 Nozzles, 100 ml–1000 ml)	1
11	Liquid Filling Machine (1 Nozzle, 1000 ml–5000 ml)	1
12	Turn Table with Belts	2
13	Packing Table with Conveyor Belt (18 Feet)	3
14	Utensils Racks SS	3
15	MS Racks for Raw Material (Adjustable, 8 Feet)	6
16	MS Racks for Packing Material (Adjustable, 10 Feet)	3
17	MS Racks for Finished Material (Adjustable, 10 Feet)	3
18	MS Racks for Cans, Bottles & Jars (Adjustable, 10 Feet)	4
19	SS Scoops Set	2
20	SS Raw Material Trolley	1
21	SS Carton Trolley	2
22	SS Trays	30
23	SS Step Over Bench	3
24	Bottle Blowing Machine	1

Sr No.	Name / Type of Machinery	Quantity
25	Alu Sealer (Bottle)	1
26	Alu Sealer (Jar)	1
27	SS Stools for Workers	15
28	Air Handling Unit (Liquid Production)	1
29	Air Handling Unit (Liquid Filling)	1
30	Air Handling Unit (Powder Section)	1
31	Air Handling Unit (Raw Material)	1
32	Air Handling Unit (Microbiology)	1
33	Air Handling Unit (Entry Protocol)	1
34	Dispensing Hood	2
35	Sampling Hood	1
36	SS Pallets	10

5.6 PROCESS FOR SYRUP PRODUCTION

The production process of syrup in a Pharmaceutical industry involves several sequential steps to ensure the quality, safety, and efficacy of the final product.

5.6.1 Preparation of Syrup Base

The syrup base will be prepared by mixing water, sweeteners, and other excipients in appropriate proportions. Heating will be required to dissolve solid ingredients and ensure homogeneity of the mixture. The syrup base will serve as the foundation for the addition of active ingredients and other components.

5.6.2 Addition of Active Ingredients

Once the syrup base will be prepared, the active ingredients will be added in precise quantities. This step will require careful measurement to ensure accurate dosing and uniform distribution of the active ingredients throughout the syrup.

5.6.3 Mixing and Homogenization

The syrup mixture will undergo thorough mixing and homogenization to achieve uniformity. This process will ensure that all ingredients are evenly distributed, and that the final product meets specifications for content uniformity. Mixing will be facilitated using specialized equipment such as mixers or homogenizers.

5.6.4 Adjustment of pH and Viscosity

The pH and viscosity of the syrup will be adjusted as necessary to meet the desired specifications. pH adjustments will be made using acids or bases, while viscosity adjustments will involve the addition of viscosity-modifying agents such as hydroxyethyl cellulose or

xanthan gum. These adjustments will help optimize the stability, palatability, and flow properties of the syrup.

5.6.5 Filtration

The syrup mixture will be filtered to remove any particulate matter or impurities. Filtration will help ensure the clarity and purity of the final product by removing any solids or contaminants that may be present. This step will be crucial for maintaining the quality and appearance of the syrup.

5.6.6 Sterilization or Pasteurization

Depending on the intended use and regulatory requirements, the syrup will undergo sterilization or pasteurization to eliminate microbial contaminants. This step will particularly be important for oral medications to ensure their safety and efficacy. Sterilization methods will include heat sterilization, filtration, or chemical sterilization using antimicrobial agents.

5.6.7 Packaging

Once the syrup will be prepared and quality control testing will be completed, it will be filled into appropriate containers such as bottles or plastic containers. Labels containing product information, dosage instructions, and safety warnings are applied to the containers. Packaging will be done under controlled conditions to prevent contamination and ensure product integrity.

5.6.8 Quality Control Testing

Finished syrup batches will undergo comprehensive quality control testing to verify compliance with specifications for identity, potency, purity, uniformity, and microbiological quality. Testing will include assays, dissolution testing, microbial limit testing, and stability testing. Only batches that meet all quality requirements will be released for distribution.

5.7 YEARLY PROPOSED CAPACITY FOR SYRUPS

The proposed pharmaceutical unit by M/s Fusion Chemicals (Pvt.) Ltd. is designed to produce 404,352 liters of medicinal syrups annually**.** This production will be carried out in a controlled environment, ensuring compliance with Good Manufacturing Practices (GMP). The capacity is based on projected market demand and is aligned with the company's objective to supply high-quality liquid formulations to both the domestic and potential export markets. The syrup production will include a variety of therapeutic categories such as antibiotics, antipyretics, anti tussives, and nutritional supplements.

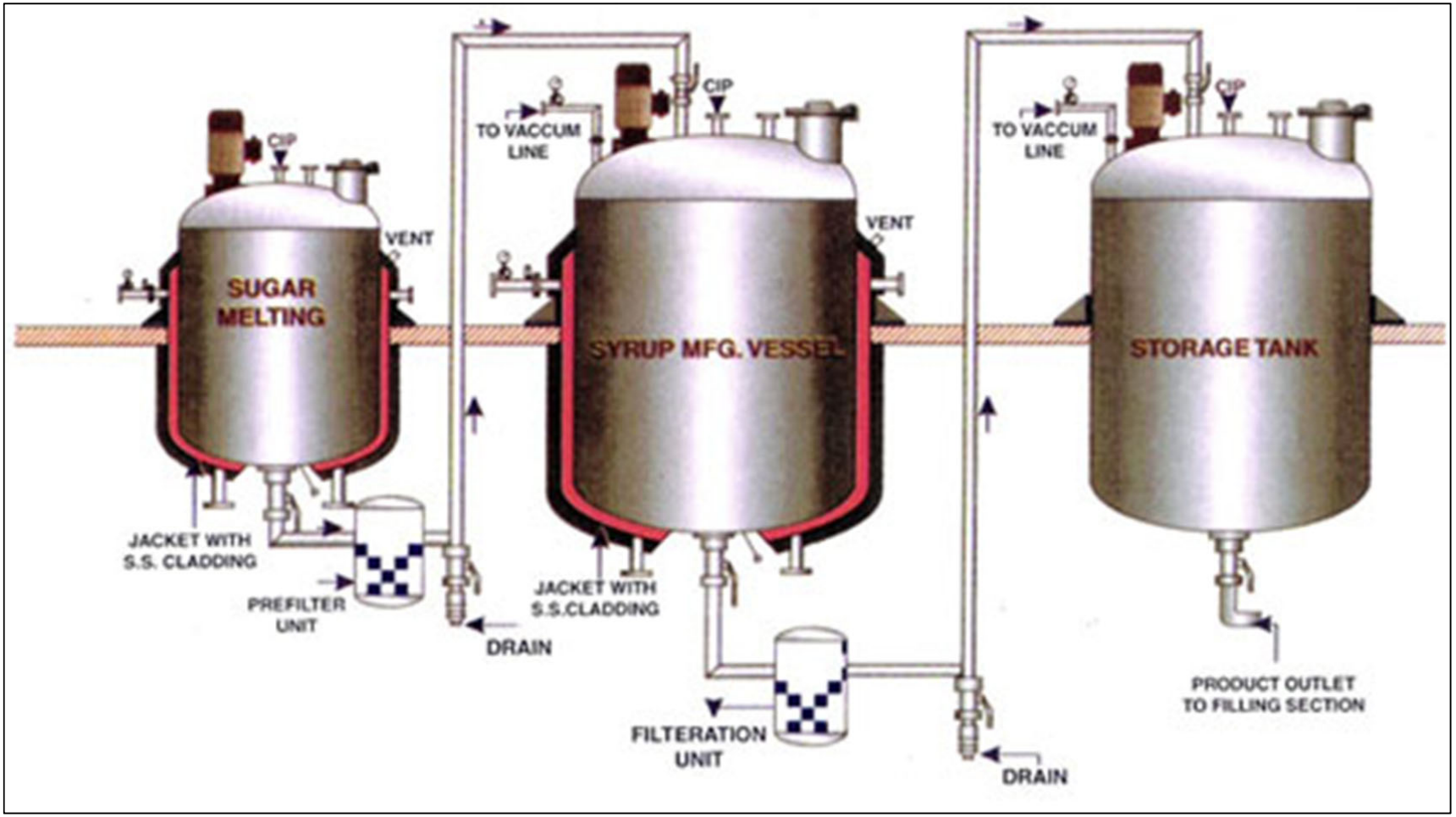


Figure 5-2 Process for Syrup Production

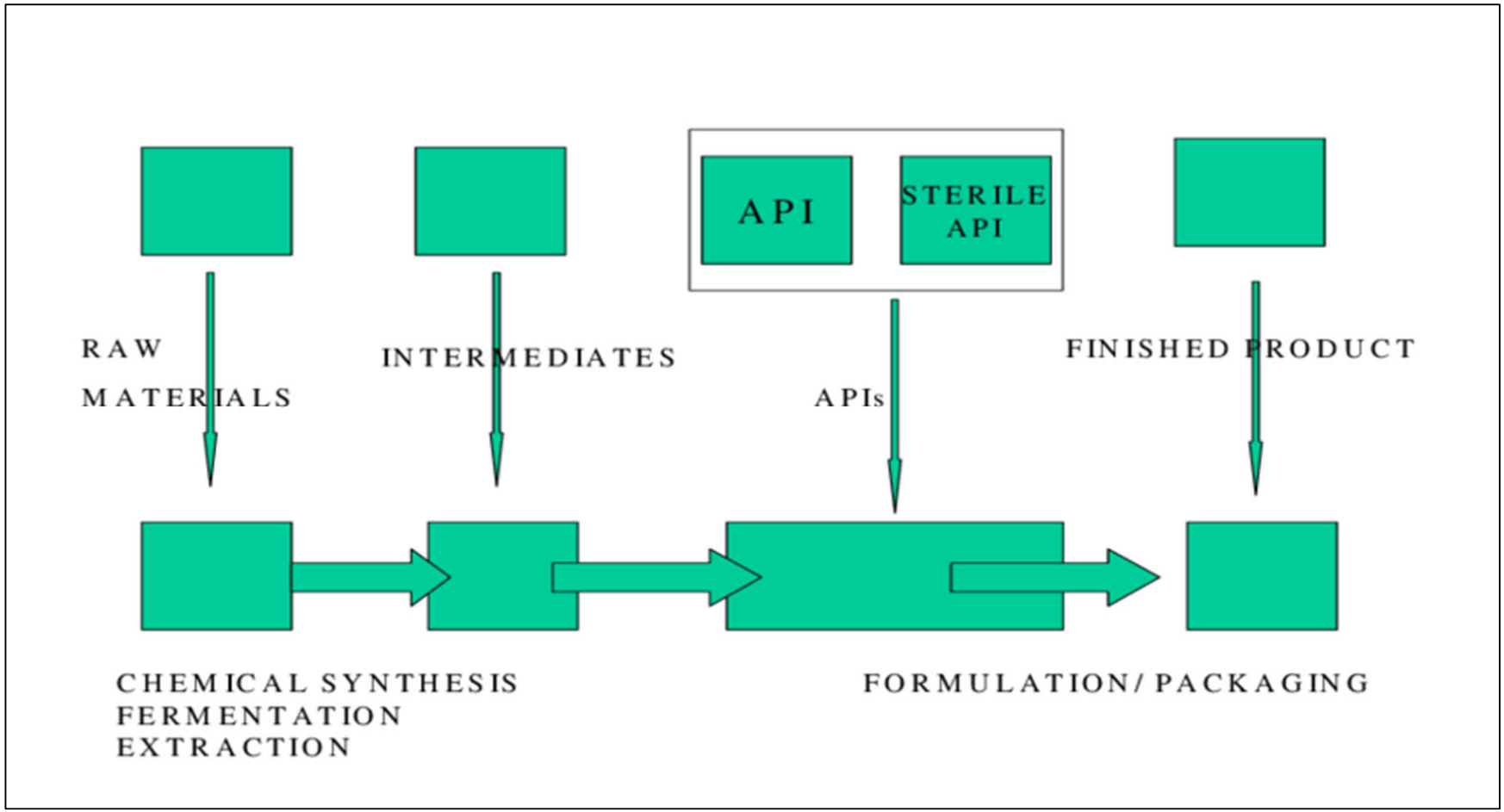


Figure 5-3 Process flow

5.8 PROCESS FOR THE SYNTHESIS OF POWDER

The production process of powdered medicine in a Pharmaceutical industry involves several key steps to ensure quality, safety, and efficacy.

5.8.1 Blending and Mixing

The powdered ingredients will be weighed and mixed in appropriate proportions using blending equipment. This step will ensure uniform distribution of the APIs and excipients throughout the powder mixture, facilitating consistent dosing and efficacy.

5.8.2 Granulation

In some cases, granulation will be performed to improve flow properties, compressibility, and uniformity of the powder mixture. Granulation will involve the agglomeration of powder particles using binders or granulating agents, followed by drying to remove moisture.

5.8.3 Milling and Screening

The blended or granulated powder mixture will undergo milling to reduce particle size and ensure homogeneity. Additionally, screening will be performed to remove any oversized particles or aggregates, further refining the powder's consistency.

5.8.4 Compression

For certain types of powdered medicines, such as tablets or capsules, compression may be necessary to form the final dosage form. Powdered mixture will be compressed into tablets using tablet press machines, or filled into capsules using encapsulation equipment.

5.8.5 Coating

In some cases, tablets or granules will undergo coating to improve stability, taste masking, or modify drug release characteristics. Coating formulations are applied using coating pans or fluidized bed equipment.

5.8.6 Quality Control Testing

Throughout the production process, samples will be collected and subjected to rigorous quality control testing to verify compliance with specifications for identity, potency, purity, uniformity, and dissolution. Testing will include assays, content uniformity testing, disintegration testing, and friability testing.

5.8.7 Packaging

The final powdered medicine will be filled into appropriate containers, such as bottles, blister packs, or sachets, using automated packaging equipment. Labels containing product information, dosage instructions, and safety warnings are applied to the containers.

5.9 PROPOSED YEARLY CAPACITY FOR POWDER PRODUCTION

The proposed pharmaceutical unit by M/S Fusion Chemicals (Pvt.) Ltd. is projected to produce 269,568 kilograms of pharmaceutical powders annually**.** This includes a range of therapeutic products such as antibiotic powders, oral rehydration salts, and nutritional formulations. The production will be carried out using advanced equipment under strict quality control measures in compliance with Good Manufacturing Practices (GMP). This capacity is planned to meet the rising demand for effective and affordable powdered medications in the local market and support future opportunities for export.

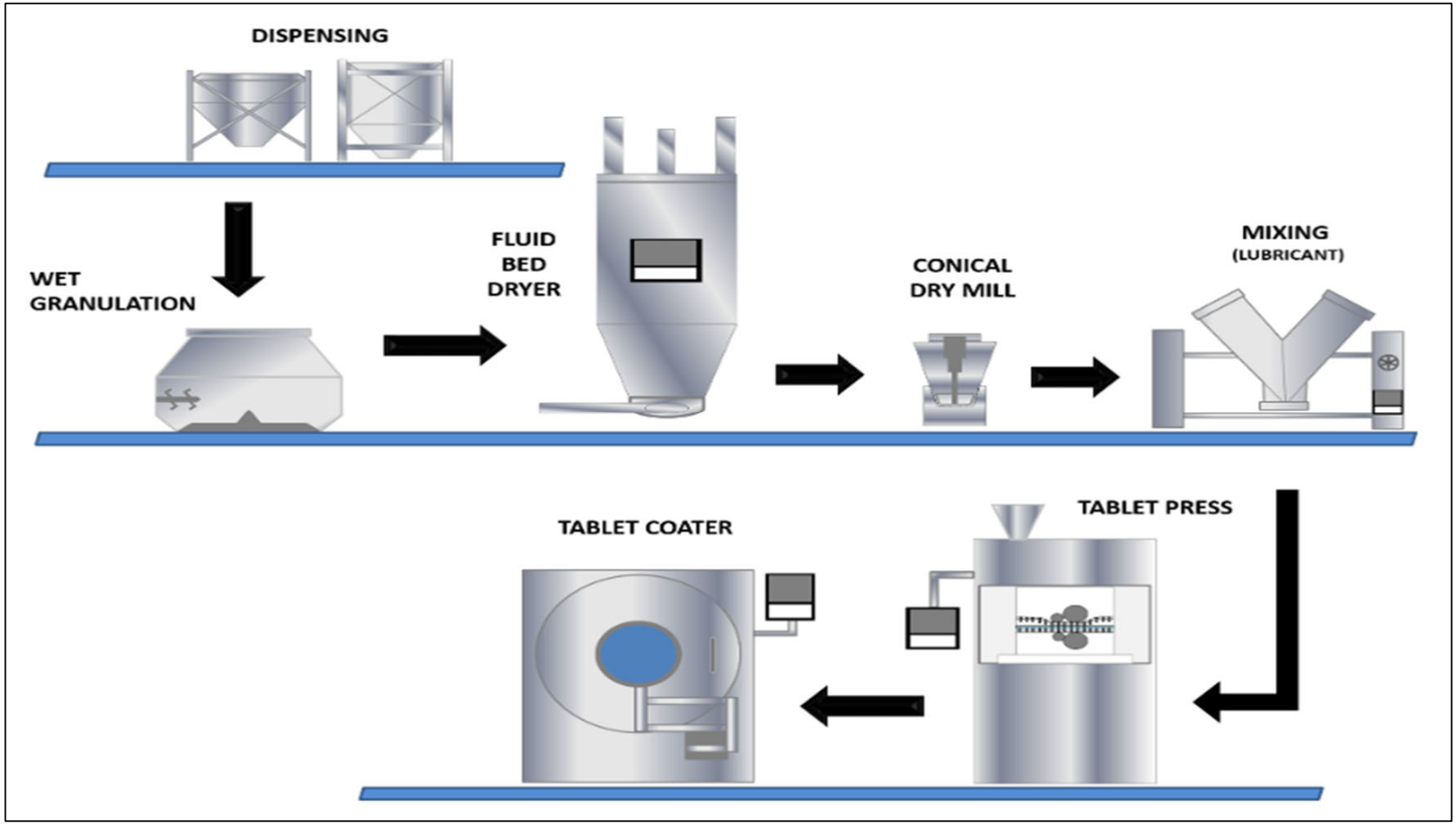


Figure 5-4 Process for Powder Production

5.10 DESCRIPTION OF EMPLOYMENT

Table 5-2 Description of Employment

Male Skilled	Male Unskilled	Female Skilled	Female Unskilled	Total Employees
13	15	7	5	40

5.11 HOURS OF OPERATION

The daily hours of operation span an eight-hour window.

5.12 CURRENT LAND USE

The current land designated for the Pharmaceutical unit is open and classified as agricultural land, the land is suitable for the establishment of the pharmaceutical unit without conflicting with agricultural practices or land use regulations.

5.13 AREA OF THE PROJECT

The total area of the proposed project is 0.984 Acres.

5.14 ROAD ACCESS

The site is accessible via Vehari kacha Khuha Road, is paved and in good condition, facilitating excellent connectivity to the nearby areas. This road plays a crucial role in ensuring smooth transportation and accessibility to the pharmaceutical unit and surrounding areas

5.15 COST OF THE PROJECT

The proposed cost for the construction and installation of the pharmaceuticalunit is proposed as 100 Million PKR.

5.16 SCHEDULE OF IMPLEMENTATION

The outlined project implementation schedule is intended to be followed, contingent upon smooth execution as per the plan and the absence of significant obstacles. The implementation stages of the project activity include:

1st Stage

The stage –1 comprises the onsite contouring studies and soil investigations and the finalization of designs.

2nd Stage

The stage –2 comprises the following task:

- Digging the ground to lay foundation and starting to build or put together the structure.
- Building support structures and foundation work.

- Beginning construction, electrical and mechanical tasks.
- Establishing essential infrastructure.
- Fitting of instrumentation

3rd Stage

The stage –3 comprises the following task

- Commercial building civil structure erection completion.
- Completion of the basic infrastructures water supply system, electricity supply etc.

4th Stage

The last stage will be the commencement of regular use of the unit.

5.17 SITE SUITABILTY:

The proposed site at Plot No. 67/68, Vehari Industrial Estate, is well-suited for pharmaceutical manufacturing. It is located within a designated industrial zone with access to essential utilities, transportation, and infrastructure. The area complies with zoning regulations, poses no environmental or residential conflicts, and offers suitable topography and labor availability, making it ideal for safe and efficient project execution.

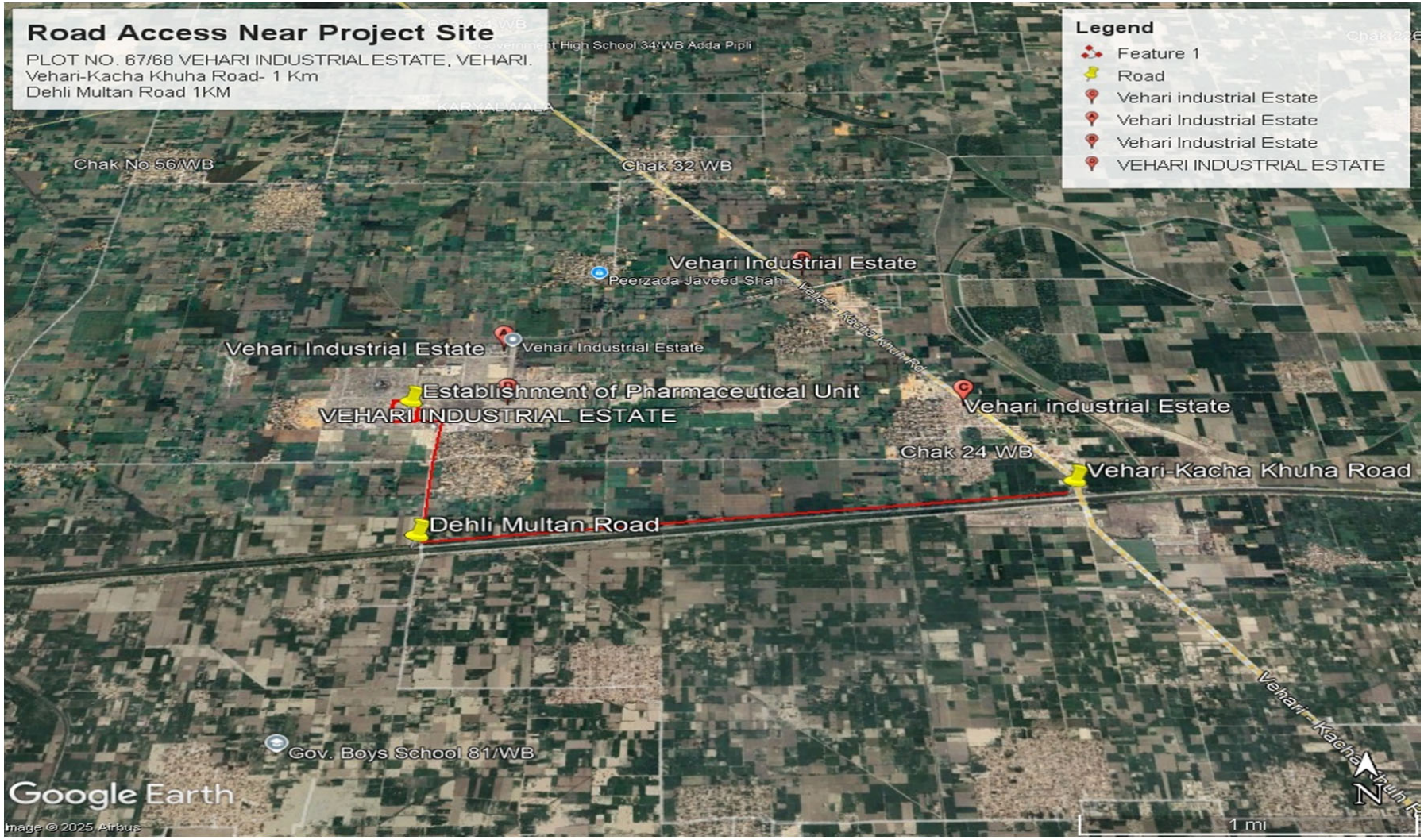


Figure 5-5 Road Access near Project Site

6 DESCRIPTION OF ENVIRONMENT

6.1 INTRODUCTION

This chapter describes the baseline conditions, which cover the existing physical, ecological, and socio-economic environment of the Study Area. Information on these aspects has been derived from the desk study of available data, field visits to the project area as well as information obtained through visits to the Government departments and other agencies namely Irrigation Department, Meteorological Department, Forest offices and prevailing environmental laws and environmental quality standards etc.

6.2 GENERAL

District Vehariis one of the southern districts of Punjab, located at the right bank of River Satluj-one of eastern tributaries of River Indus. Word 'Vehari' literally means a low lying settlement by a flood water channel. Vehari makes part of Nili Bar. Lying at is bounded on the north by Districts of Khanewal and Sahiwal, on the west by Lodhran and Multan, on the south by Bahawalplur and Bahawalnager separated by River Satluj, and on the east by Pak Pattan. District Vehari is a smaller district in terms of area. It is spread over an area of 4364 sq.km and makes 2.12% area of Punjab and 0.5% area of Pakistan. Administratively District Vehari is divided into three tehsils, 89 union councils and 774 Mauzas. Vehari is part of Multan Division along with the districts of Sahiwal, Pakpattan, Multan, Lodhran and Khanewal. Prior to getting the status of a district in June 1976, Vehari was part of Multan district. The three tehsils of Vehari are somewhat of equal size each covering 1/3rd area of the district. All the three tehsil, on their south neighbor river Satluj. The district is 93 km in length and 47 km in breadth. It slopes gently from north east to south west.

6.3 PHYSICAL ENVIRONMENT

6.3.1 TOPOGRAPHY

There is not much diversity in the physical features of the district and the area appears to be monotonous. Geologically the lands constituting Vehari are made of sedimentary rocks of quaternary types. The district is rich in sweet underground water that is fit for both agriculture and human consumption. The water table at most of the locations is 30-40 meters deep. In the areas lying closer to river Satluj, the water table is found to be much higher. The natural vegetation found throughout the district is thorny. The soils of the district are quite fertile. This fertility is reflected in the vast agricultural lands that dominate the scenes in the district. The soils in the district have been deposited by the rivers- River Beas which used to flow in the northen part of the area which now forms the district and River Satluj that flows in the south. The soils lying in the belt that borders River Satluj are those which are found in the active or young flood plains. The soils in the rest of the district are those that are found in the older flood plains. In terms of use of land, much of the district is now composed of arable lands dotted with human settlements. The district is covered with a vast network of canals. Two main canals, Mailsi and Pakpattan with their networks irrigate the district. Total number of canals including their minors in the district are 119 with total length of 1380 km approximately.

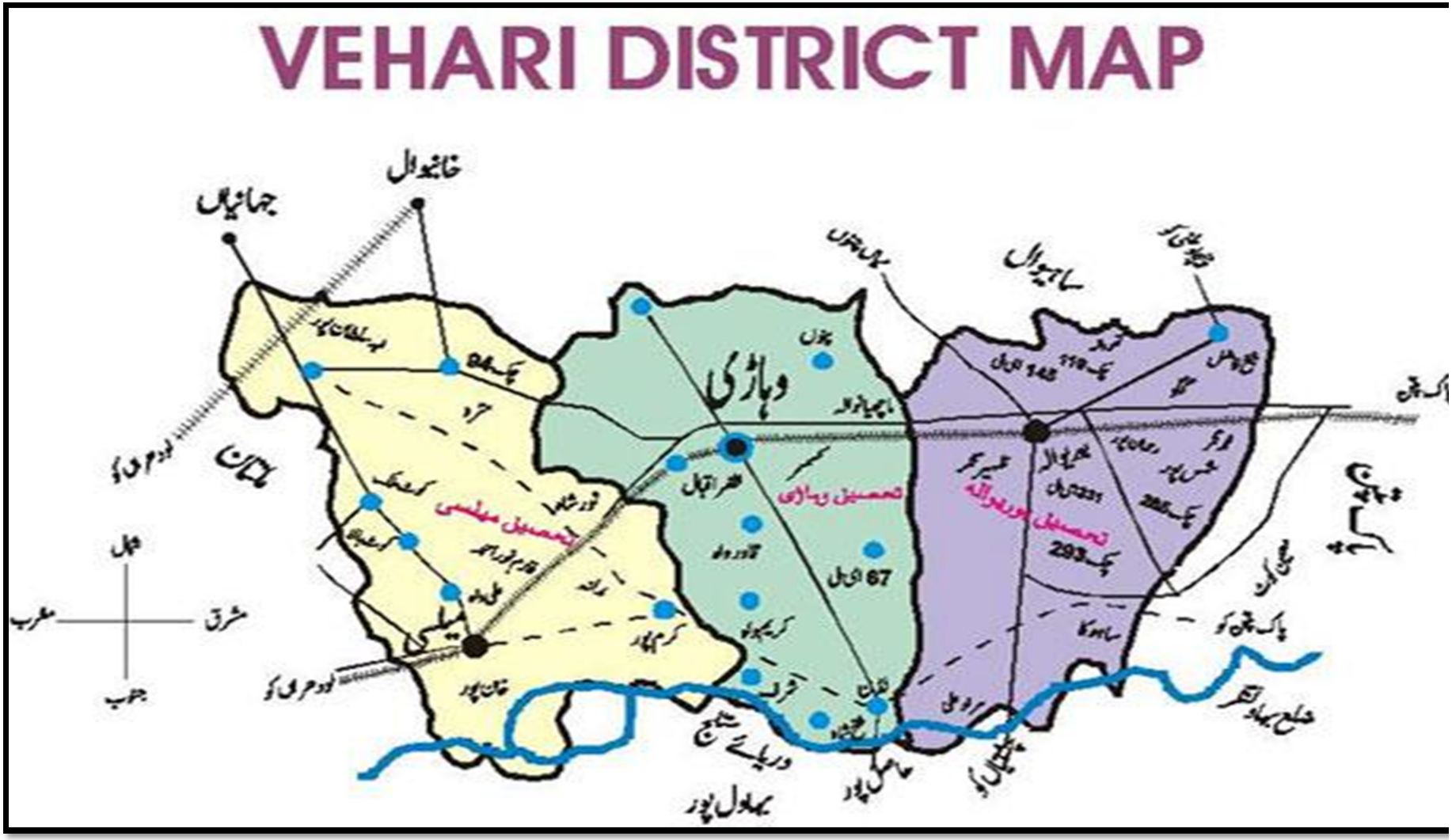


Figure 6-1 Project District

6.3.2 SOILS

There is an important relation between soils and environment. Environment is greatly influenced by soils. Soils also provide food, clothes or housing population and lumber products, medicinal plants etc. Soil is not a lifeless residual layer rather it is a very dynamic element of environment in which complicated physical, chemical and biological activities are constantly proceeding. It is dynamically developing and changing body. Soil scientists restrict the word soil or solum merely to the surface material, which has come to have distinct layers or horizon over the extended period of time. Soils mean differently for different people. While for a soil scientist it means the upper a few layers created through weather effect in which plants are grown the solid portion of soil is both organic and inorganic. The organic part consists of both living and decayed plant and animal materials.

Geographically, Pakistan is highly diversified in environment and landscape. Lofty snow-clad mountains, extensive rivers, piedmont plains and vast sandy deserts have resulted in variations of soil forming elements. Accordingly, in order to have a generalized account of various kinds of soils which are available in Pakistan, the country has been divided into nine broad ecological zones.

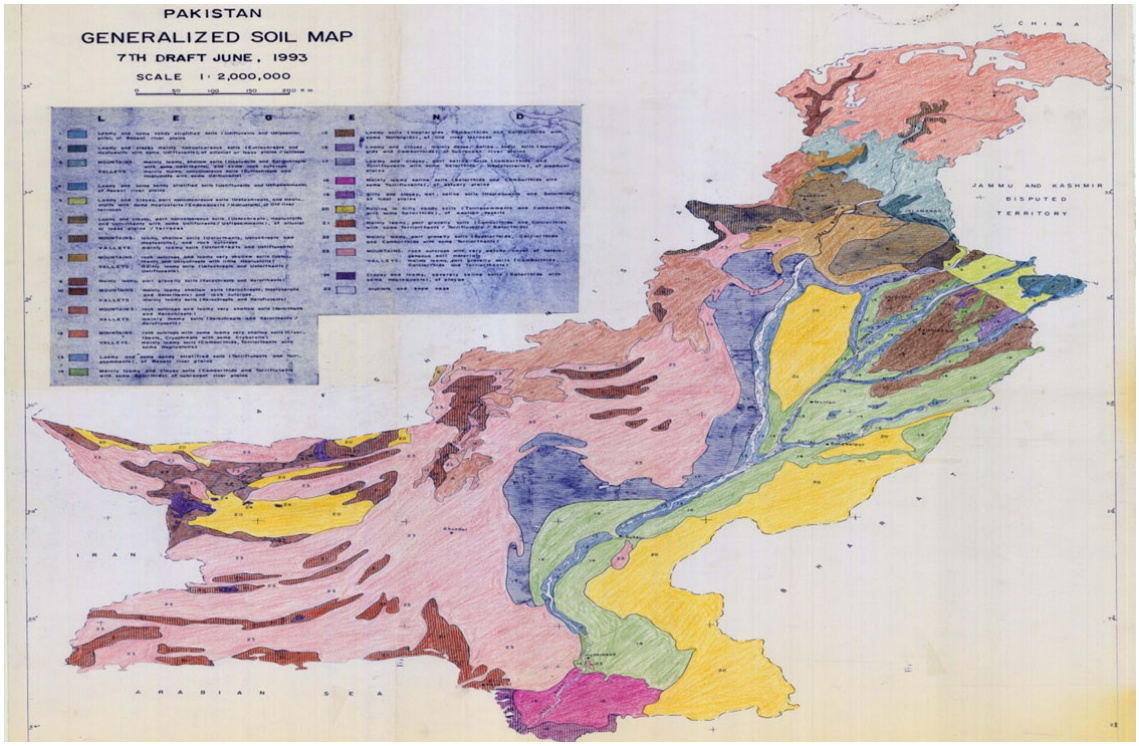


Figure 6-2 Soil Map of Punjab

6.4 CLIMATE AND METEOROLOGY

The climate of Vehari is generally semi-arid, with hot summers and mild winters. Rainfall is moderate and mostly occurs during the monsoon season. The area experiences dry weather for most of the year, with occasional dust storms and variable wind patterns. Overall, the climatic conditions are stable and suitable for

industrial operations, including pharmaceutical manufacturing, with standard environmental controls in place. Vehari experiences a semi-arid climate characterized by hot summers and mild winters. Summer temperatures can exceed 40°C, while winter temperatures may drop to around 5°C. The region receives moderate rainfall, primarily during the monsoon season from July to September. Average annual precipitation ranges between 150–300 mm. Winds are generally dry, with occasional dust storms in summer. These climatic conditions are suitable for pharmaceutical operations, provided appropriate environmental controls (e.g., HVAC systems) are implemented to maintain product quality and ensure worker comfort.

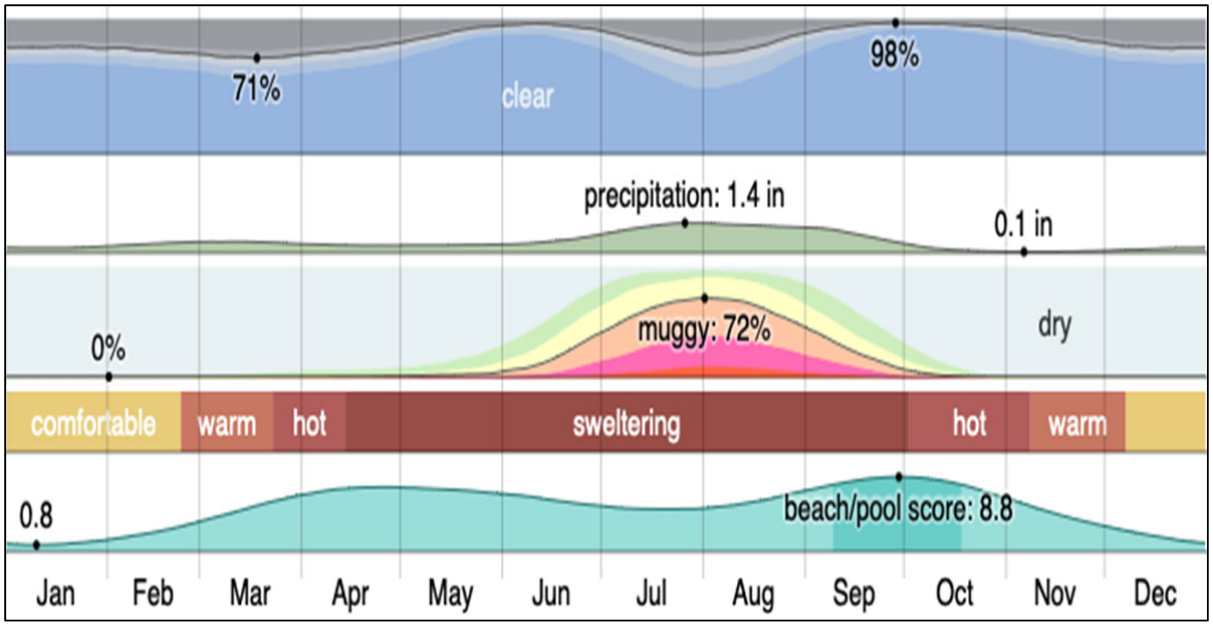


Figure 6-3: Climate in Vehari

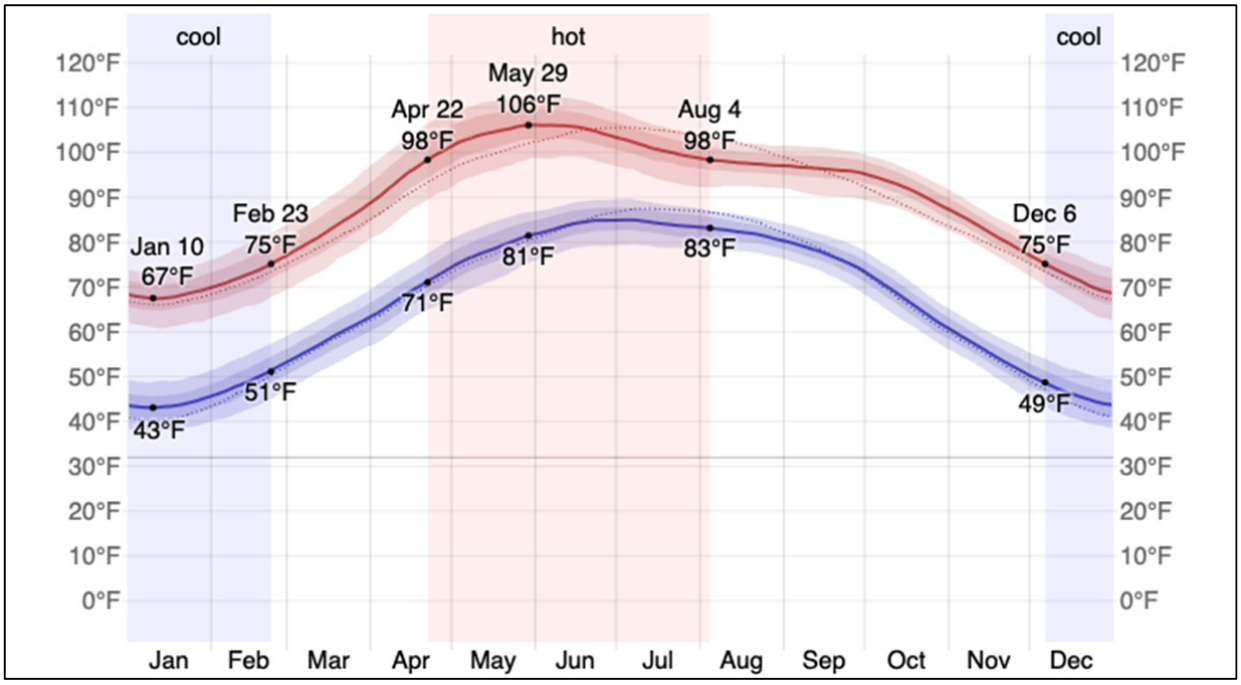


Figure 6-4: Average Temperature in Vehari

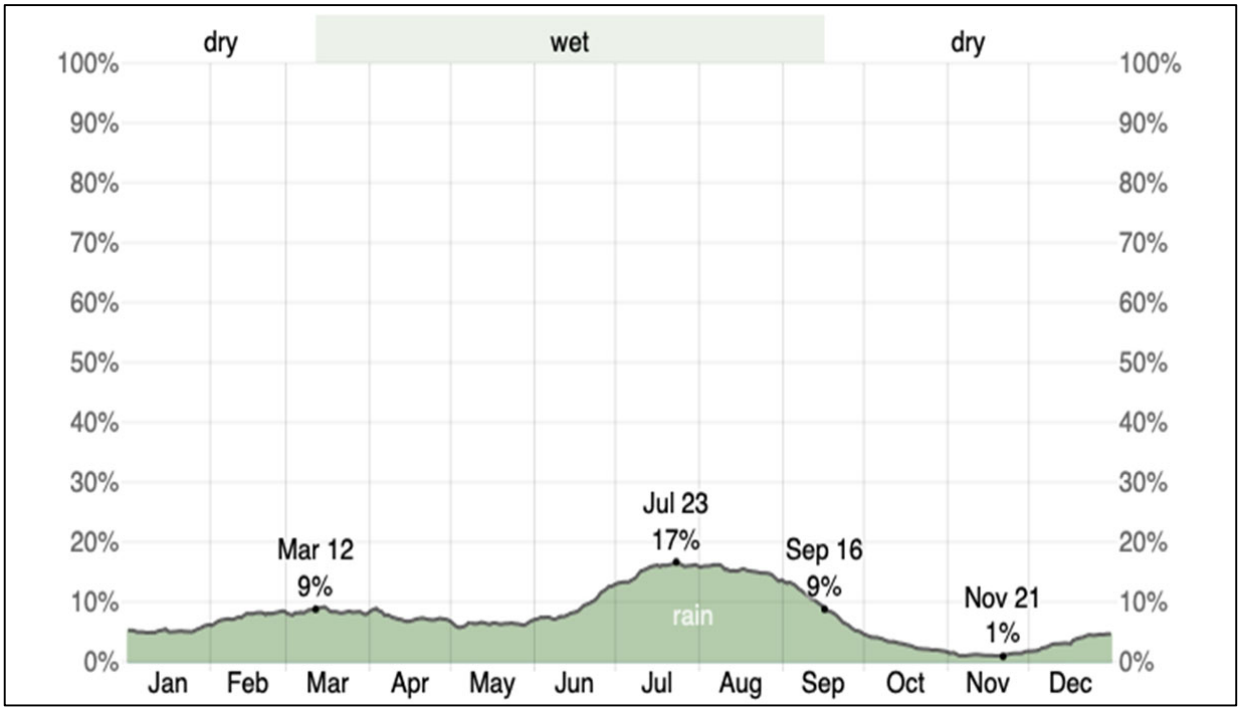


Figure 6-5: Daily Chances of Precipitation in Vehari

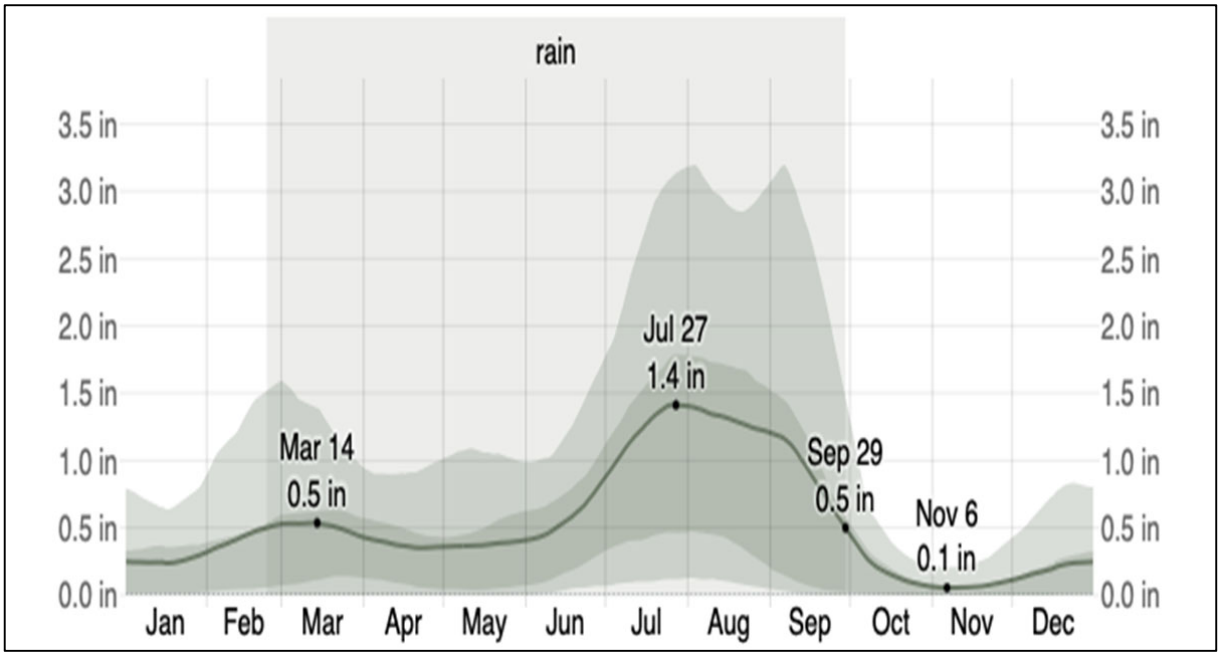


Figure 6-6: Average Monthly Rainfall in Vehari

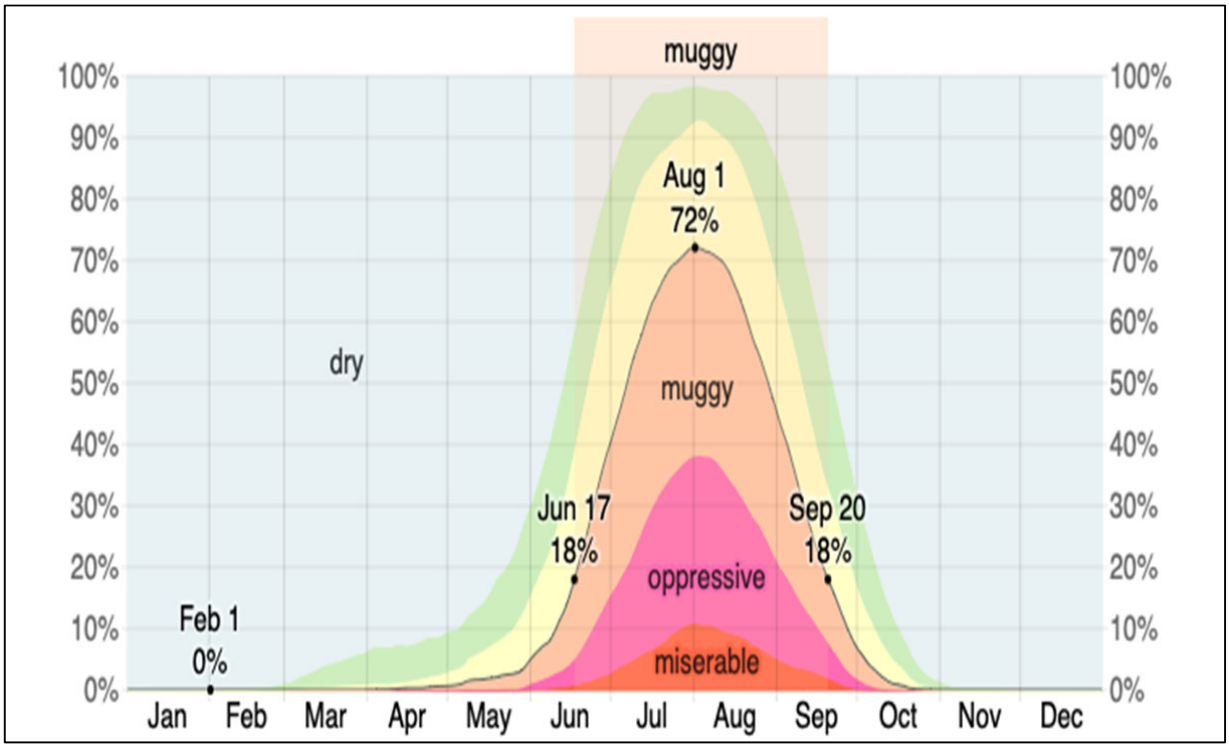


Figure 6-7: Humidity Comforts Level in Vehari

6.5 BIOLOGICAL ENVIRONMENT

6.5.1 ECOLOGICAL RESOURCES FISHERIES, AQUATIC BIOLOGY, WILDLIFE, FORESTS, RARE OR ENDANGERED SPECIES

Vehari is situated on the Dehli Multan Road. Sutlej River crosses near the towns Kachi Pakki, Jamlera and Sahuka. Shrine of Hazrat Baba Haji Sher Dewan Chawli Mashaikh is also situated in Dewan Sahib at a distance of 18km. from Burewala. Prior to its settlement the area was a jungle which was 'humanized' by the Dhuddi tribe. When the Pakpattan canal operating in this area, people started to settle in villages as agriculture developed, resulting in jungles being cut to make way for cultivation fields. As this area was in 'Eastern Canal Division' so it was named village no. 122/EB (EB = Eastern Bar). In the northern side of Burewala, there are still signs of an old water canal which is now called Sukh Bias. It is 35 km east of District Capital Vehari on main Dehli Multan Road. Burewala is the second biggest tehsil of Punjab.

6.5.2 AVES

The project area supports a diverse range of avian species, reflecting the region's ecological richness. Commonly observed bird species include the Budgerigar, Chukar Partridge, Common Pheasant, and Demoiselle Crane. Larger waterfowl such as the Great White Pelican and Greylag Goose are also found in the vicinity, likely attracted by nearby water bodies. The Indian Peafowl, Rock Pigeon, and Rose-ringed Parakeet are frequently seen in both natural and semi-urban habitats. Additionally, species like the Silver Pheasant, Western Crowned Pigeon, and Wild Turkey contribute to the biodiversity of the area. The presence of these species highlights the need for environmentally responsible project development to minimize potential impacts on local avifauna.

Budgerigar (*Melopsittacus undulatus*).

Chukar Partridge (*Alectoris chukar*)

6.5.3 MAMMALS

The project area supports a rich variety of mammalian species, highlighting the ecological diversity of the region. Among the notable species present are the Chinkara (Indian Gazelle), commonly found in the arid plains and hills of Punjab, Sindh, and Balochistan, and the Hog Deer, which inhabits floodplains and wet grasslands in the Himalayan foothills. The Chital (Spotted Deer) and Sambar are also part of the local fauna, thriving in forested and semi-wooded environments. The Rhesus Macaque, native to various parts of Pakistan, including the Murree Hills, is often seen in mixed forest habitats. The Blackbuck, once abundant in the Cholistan Desert, is now primarily confined to protected areas and wildlife reserves. Large carnivores like the Bengal Tiger, historically found in parts of Sindh and Bahawalpur, are now considered extinct in the wild within Pakistan. Similarly, the Himalayan Brown Bear is restricted to high-altitude habitats such as the Deosai National Park. Other notable species include the Asian Black Bear, Nilgai (Blue Bull), Red Deer, Small Indian Civet, Red-necked Wallaby, Plains Zebra, Llama, and Mouflon—some of which are maintained in managed habitats or wildlife parks.

Blackbuck

Chinkara (Indian Gazelle)

6.5.4 REPTILES

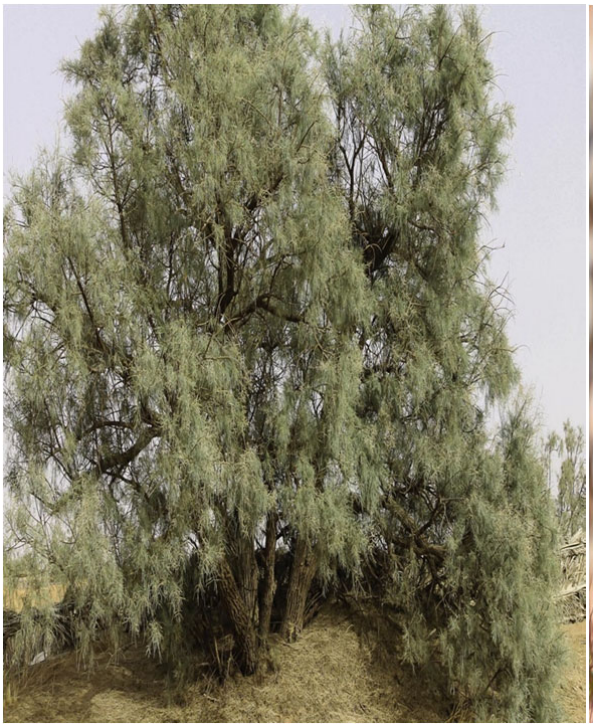
The project area is home to a limited yet ecologically important population of reptilian species. Among them, the Mugger Crocodile (*Crocodylus palustris*) is notable for inhabiting freshwater bodies such as rivers, lakes, and marshes. It is a native species and plays a vital role as an apex predator in aquatic ecosystems. Additionally, the Spur-thighed Tortoise (*Testudo graeca*) is also found in the region, typically residing in dry, open areas with sparse vegetation. Both species are

indicators of a relatively healthy environment and emphasize the need for careful ecological planning to protect their habitats during the project's development.

Mugger Crocodile (*Crocodylus palustris*). **Spur-thighed Tortoise** (*Testudo graeca*)

6.6 FLORA

The flora of Vehari consists mainly of drought-tolerant and xerophytic species, including Acacia nilotica (Kikar), Prosopis juliflora (Mesquite), and Tamarixaphylla (Farash). Native grasses and shrubs are found along canal banks and uncultivated areas. The region is also agriculturally rich, with extensive cultivation of wheat, cotton, sugarcane, maize, and orchards of mango, guava, and citrus. While agriculture dominates the landscape, sustainable practices are needed to preserve remaining natural vegetation.



Tamarixaphylla (Farash).

Cenchrus ciliaris (Buffel Grass)

6.7 SOCIOECONOMIC ENVIRONMENT

6.7.1 DEMOGRAPHY

Vehari is a populous district. It is estimated that by the year 2006, the population of the district had reached 2.5 million. Like the uniformity in the area, the population within the district also appears to be somewhat evenly distributed among the three tehsils of this district. During last one decade the population growth rate is estimated to have reduced from 2.7% recorded for the period 1981-98 to 2.23% during the period 1998-2006. However, despite this reduction in the population growth, the rate is still higher than the national and provincial level population growth rates (Pakistan: 2.14% and Punjab: 2.0% for the period 1998-2006). Since 1981, there has been an increase of 87.7% in the population of Vehari and from 1951 to 2006, there was 347% increase in the population. In terms of population balance or male female sex ratio, an improvement has been made. From a male-female sex ratio of 112 recorded in Census 1981, the ratio was noted to has improved to 108 in 1998.

Vehari is rural in nature as the vast majority of its population lives in rural areas. In 1998, the population living in the urban settlements of the district was recorded to be 16% of the total population of the district. Burewala is the most urbanized (urban population 21%) and Mailsi is the least urbanized (12% urban population).

According to population Census of 2017, population of district Vehari and their Tehsils are as follows.

Administration, Units/ Area	Population 2017	Population 1998
Vehari District	2,897,446	2,090,416
Vehari Tehsil	928,166	654,955
Burewala Tehsil	1,015,385	730,583
Mailsi Tehsil	953,895	704,878

Vehari is one of those southern districts of Punjab which despite being part of the so-called Seraiki belt, has most of the Punjabi speaking population thanks to canal colonization and arrival of Punjabi settlers with the institution of Nili Bar colony project in 1925. Before the introduction of canal irrigation, the populated areas were found only at or near the banks of river Satluj where seasonal inundation permitted some cultivation. The rest of the area was a vast sandy scrap land at best affording pastures itinerant herdsmen.

6.7.2 HOUSING AND LIVING CONDITIONS

Like most of the districts of Pakistan and Punjab, the housing or living conditions in Vehari district have improved over last one decade. In 1998, 77.3% urban and 42.8% rural houses had pacca walls. These proportion for urban and rural housing in 2006-07 were recorded to be 89% and 68% respectively. The RCC/RCB roofs are still not a preference for or affordable to a majority of the households. In 1998, 30% urban and 16% rural houses had a pacca (RCC/RCB) roof. These proportions changed to 36% and 31% respectively in 2006-07. A considerable proportion of urban households (1/3rd) do not own the housing units they are living in. rd 1/3 houses in the urban areas are provided with a piped water supply whereas the proportion of rural hoseholds enjoying this facility is quite small-6%. The motor pumps have become quite common in both the urban as well as rural areas of the district. More than half of the urban and 40% rural households have installed these pumps replacing the traditional hand pump-based water supply. rd Almost 1/3 housing units both in the urban and rural areas are single room dwellings. Almost 6 in every 10 urban and rural households are living in the housing units having 2-4 rooms the About 1/10 of urban and half of the rural households still defecate in open as they do not have a latrine facility inside their dwellings.

Natural gas, considered to be a cleaner fuel is out of the reach for majority of the urban and rural households. Only the 1/10 of urban households are found to be using gas as a fuel for cooking and heating. Majority of the rural households (88%) use crop residues (especially cotton sticks) and cow dung as the cooking fuel while 1/3 of the urban households also use these fuels. Fuel wood is the fuel option for more than half of the urban and 1/10 of the rural households.

6.7.3 EDUCATION

In the education sector the major trends and issues prevailing in the Vehari District include: - More than half (56%) of the adult population aged 15 years or above is unable to read or write. Almost same proportion of the population aged 10 years or above is also illiterate. - The literacy figures for the females aged 10+ and 15+ are half of those for males of same age groups. th - 1/4 of rural women (aged 15+ and

10+) compared to half of urban women/girls of same age group are literate. - Less than half of the population has ever attended any school. rd - Half of the urban and 1/3 of the rural population has completed primary or higher levels of education.

The government schools are quite valuable especially for the rural population as 85% of the primary school going children attend government primary schools. In urban areas the private and government schools have almost equal role in providing the primary level education. - Vehari is one of those luckier districts of Pakistan where number of elementary educational institutions for girls are equal or more than those for boys. The number of primary schools for girls in the district is a little less than that for boys while the number of middle schools for girls is almost double than that for boys. This trend reverses in case of high schools where number of boys high schools is double than that for girls. These trends are also reflected in the school enrolments of boys and girls. The disparity gap between boys and girls appears to diminish in case of higher level educational institutions as there are equal number of intermediate and degree colleges both for boys and girls in the Vehari District.

Educational Institutions in Vehari

Category	Total	Number Boys	Number Girls
Govt. Primary Schools	1128	588	540
Govt. Middle Schools	247	87	160
Govt. High School	103	66	37

6.7.4 HEALTH

A somewhat balanced distribution of public health facilities among the tehsils of Vehari is apparent. However, the misbalance also exists. For instance, according to the statistics of 2004-05, each of the three tehsils had 1 hospital, almost equal number of Basic Health Units and Sub Health Centres, and none of them had a TB clinic. Compared to this situation, tehsil Vehari appears to be ahead of other two tehsil in having some of the health facilities like number of hospital beds (125 compared 60 in Burewala and Mailsi), Dispensaries (17 compared to 13 in Mailsi and 9 in Burewala), and Rural Health Centres (6 compared to 2 each in Burewala and Mailsi)

The PSLM 2006-07 reveals some important health sector trends prevailing in the Vehari District. These trends and issues include: - Of those fall sick, three out of four are taken to or consult a private health facility. Compared to this 22% patients in urban and 15% in rural areas consult a public health facility. - The private health facilities and practitioners have an important role in taking care of people's health needs. - 18% male and 12% female children are yet to be fully immunized. - 10% urban and 29% rural pregnant women do not receive tetanus toxoid injection.

Most of the deliveries continue to take place at home both in urban as well as rural areas. -More than half of both urban and rural women do not receive any pre-natal care form a formal health facility. - Almost 9 out of 10 women do not receive any post-natal care/advice from a formal health facility.

Types of Health Consultations in Diarrhea Cases

Category	Urban (%)	Rural (%)	Total (%)
Private Dispensary/Hospital	73	74	74
Govt. Hospital/Dispensary	19	19	19
RHC/BHU	3	2	3
LHW	0	0	0
LHV/Nurse	0	0	0
Chemist/Pharmacy	3	5	5

6.7.5 LIVELIHOODS

The Census 1998 important facts about the livelihood options available to and strategies adopted by the residents of Vehari. According to the Vehari District Census Report 1998: 1/4 of the total population of the district was economically active, - Of the population aged 10 years or above, 35.7% was economically active, - Almost half or 46.6% male population of the district was noted to be economically active, - Of the total population, 1.4% population was recorded to be working as domestic workers, - The unemployment rate among the economically active population was recorded to be on the higher side. 17.5% economically active population was found to be unemployed. The unemployment rate in the urban areas was higher (22%) than in rural areas (16.9%). The unemployment rate was higher among men (17.9%) compared to women (5.6%). The female unemployment rate was recorded to be higher in rural (6.3%) than in the urban areas (3.5%),

Agriculture sector was noted to have engaged majority of the economically active population of the district (42%). The elementary profession engages a considerable proportion of urban (43%) and rural (34%) population of Vehari. - The construction sector absorbed a considerable proportion of the economically active population- 21% rural and 30% urban population.

Land Utilization in the District

Category	Area (000 Hectares)
Reported Area	437
Cultivated Area - Total	393
Cultivated Area - Net Sown	385
Cultivated Area - Current Fallow	8
Uncultivated Area - Total	44

6.7.6 AGRICULTURE

Vehari being part of a zone where agriculture activity is extensive, hold an extremely important place in country's agriculture sector. This is evident from the fact that in 1988, the district contributed 15.3% to the total cotton production of Pakistan. The agriculture and livestock zoning maps (Oxford Atlas of Pakistan) reveal District Vehari's contributions in the agriculture sector as:

According to Census 1998, more than 80% area of the district was under cultivation. The Punjab Development Statistics 2005 reveals that out of the total area surveyed, 90% has been put under the cultivation. The document also shows that almost all the lands that can be put under the cultivation has been utilized for this purpose since 9% area of the district is not available or fit for cultivation (area

under settlements/built environment, water bodies etc). The extensive agricultural activity in the district is being fueled by the extensive use of chemical fertilizers and pesticides and their use is on rise. From 2000 to 2004-05, 35% increase in the use of chemical fertilizers had happened.

Cotton production, the identity of Vehari is facing some serious issues. For instance, the production appears to be either static (has reached the saturation point) or declining. For instance, the data available for the period 2000-01 to 2004-05 shows that out of 5 years, the production declined during 3 years (2001-02, 2002-03, 2003-04).

6.7.7 ECONOMIC CONDITIONS

The PSLM 2006-07 throws some light on the economic situation of households and communities in the district. Almost 1/4th of urban and 14% rural households were found to have reported that their economic conditions improved compared to the previous year. Compared to them, 9% urban and 13% rural households opined that their economic situation worsened compared to the previous year.

6.8 SITE SUITABILTY:

The proposed site at Plot No. 67/68, Vehari Industrial Estate, is well-suited for pharmaceutical manufacturing. It is located within a designated industrial zone with access to essential utilities, transportation, and infrastructure. The area complies with zoning regulations, poses no environmental or residential conflicts, and offers suitable topography and labor availability, making it ideal for safe and efficient project execution.

7 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

7.1 GENERAL

The importance of impact assessment in EIA cannot be overstated, as it serves as a fundamental tool for evaluating and understanding the potential effects of a proposed project on the environment. Impact assessment systematically identifies, predicts, and evaluates the anticipated positive and negative consequences of a project, considering various environmental aspects such as air and water quality, biodiversity, soil health, and community well-being. This process is pivotal in informed decision-making, enabling stakeholders to assess the trade-offs and make choices that balance development with environmental conservation. The impact assessment phase provides a comprehensive understanding of the project's potential impacts, allowing for the development of effective mitigation measures and strategies to minimize or eliminate adverse effects. Additionally, it fosters transparency and accountability by providing a basis for public consultation and engagement, ensuring that the concerns and perspectives of affected communities are considered. Overall, impact assessment in EIA is essential for promoting sustainable development practices, preventing environmental degradation, and fostering responsible and informed decision-making in the planning and execution of projects

7.2 PROJECT AREA OF INFLUENCE

Before commencing the environmental analysis of the project, its essential to define the specific area of influence. While the primary construction activities will be contained within predetermined boundaries, there are certain aspects where construction-related tasks may extend beyond these confines. These include

- Establishment of construction camps and erection of material grinding plants on temporarily acquired land
- Borrowing soil material from temporarily acquired land
- Quarrying aggregate material; and Construction of haul tracks for transportation of construction material, etc.

Environmental impacts have been identified within the Project Area of Influence, which lies within 0.5 km boundary of the proposed project site. Therefore, the identification of Project impacts and recommendations of mitigation measures will be limited within this area.

7.3 METHODOLOGY FOR IMPACT ASSESSMENT

In conducting the impact assessment for the project, a comprehensive methodology was adopted, encompassing both qualitative and quantitative assessments to provide a well-rounded understanding of potential effects. The qualitative assessment involved a systematic and in-depth analysis of the project's potential impacts on various environmental and social aspects. This included considering factors such as air and water quality, biodiversity, community health, and cultural

heritage. Qualitative data, often derived from expert opinions, literature reviews, and consultations, were employed to evaluate the significance of these impacts. Simultaneously, a quantitative assessment was carried out to provide a numerical representation of specific parameters, allowing for a more precise measurement of the potential consequences. This involved data collection through field measurements, modeling, and statistical analyses to quantify environmental and social variables. The combination of qualitative and quantitative assessments ensured a holistic and rigorous evaluation, enabling a more nuanced understanding of the project's potential impacts and contributing to the formulation of effective mitigation strategies.

7.4 IMPACTS DURING CONSTRUCTION PHASE

The detailed risk Matrix of Construction phase is shown in the table.

Table 7-1Screening of Possible impacts during Construction Phase

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
Soil Erosion	Likely	Minor	Low
Land Contamination	Likely	Minor	Low
Soil Contamination	Likely	Minor	Low
Solid Waste	Likely	Minor	Low
Contractor Camp	Likely	Minor	Low
Ground Water	Likely	Minor	Low
Dust	Likely	Moderate	Low
Noise	Likely	Minor	Low

7.4.1 Land Contamination

The construction machinery, including cranes, trucks, loaders/dumpers, and batching plants, used during the construction period can release or spill lubricants, oil, chemicals, and toxic materials, contaminating the land. Paints used in the construction phase can also pose threats to both the environment and human health.

Mitigation Measures

Land contamination will be controlled by the following measures:

- Vehicles and other equipment will be maintained only in designated areas with concrete slabs.
- Prevent the release of contaminated effluent into the environment.

- Direct machinery wash and other potentially contaminated effluents will be drain to a mud pit.
- Proper Handling and storage of fuels, oils, and other hazardous substances according to standard safety practices, such as using secondary containment will be ensured.
- Fuel tanks will be properly labeled and have impervious linings and dykes.
- Leakages during fuel and oil transfer operations will be prevented.
- Checking of fuel, oil, and chemical storage daily for leaks will be ensured.
- Shovels, plastic bags, sandbags, and absorbent materials will be available near fuel and oil storage areas.
- Vehicles will be properly maintained to avoid spills.
- Maintain a leak/spill record for each vehicle.
- Control of soil contaminated by moderate spills or leaks (up to 200 liters) using shovels, sand, and mud.

7.4.2 Soil Erosion

Soil erosion may occur in the construction area due to improper runoff management from equipment washing yards and inadequate construction management practices. This impact is considered negative of minor magnitude.

Mitigation Measures

Soil erosion will be controlled by using good engineering practices especially both at construction site and peripheral area. Following measures should be taken to avoid soil erosion due to runoff water:

- Ensuring that surface run-off controls are implemented and maintained so as to minimize erosion.
- Main drainage courses within the proposed project development site will be lined to avoid erosion.
- Plantation of indigenous grass which will flourish under project site conditions. This should be done for low road embankments.

7.4.3 Soil Contamination

Soil contamination during the construction phase can occur from waste generated from construction camps, such as garbage, putrescible waste, rubbish, and residues; discarded construction materials, such as wires, plastics, cut pieces of pipes, pieces of empty fuel and lubricant tins, and cardboard packing materials; and paint, varnishes, and other hazardous chemicals and toxic materials used in construction activities. This impact is considered negative of minor magnitude.

Mitigation Measures

- Chemical leakages will be controlled by storing these substances in special containers. Keep these containers away from unauthorized people and only allow authorized personnel to access them.
- Store other chemicals in adequate and appropriate places, depending on the type of material.
- Place safety equipment, such as fire extinguishers, near these storage areas, along with signs warning of danger and fire.
- Provide workers with Material Safety Data Sheets (MSDS) for each chemical, and take care when handling and storing these chemicals.
- Develop and implement a proper solid waste management plan to avoid waste problems.
- Collect solid waste by placing solid waste collection containers at various locations. Provide separate arrangements for organic and inorganic waste, and make workers aware of the solid waste management system in place at the site.

7.4.4 Impacts of Dust Emissions

Construction activities require machinery and equipment's such as transport vehicles, cranes, excavators, trucks for material excavation, dump/haul truck, etc. This machinery will generate air emissions that contain particulate matter (PM), smoke, dust, Carbon Monoxide (CO), and Oxides of Nitrogen (NO_2).

Mitigation Measures

- Vehicular emissions of NOx, oxides of sulfur, PM, and CO will be controlled by tuning and maintaining vehicles in good working condition.
- Dust emissions will be controlled by regularly sprinkling water and covering trucks carrying earth, sand, aggregate, and other materials.
- Cover all trucks hauling soil, sand and other loose materials.
- Tuning of all equipment, generators, and vehicles used during the construction phase.
- Ensuring that concrete mixers meet the requirements of zero emissions.
- Daily sweeping (with water sweepers) of all paved access roads, parking areas and staging areas at construction sites.
- Minimizing dust emissions due to vehicular traffic by reducing speed, minimizing traffic through good traffic management, and sprinkling water when required.
- Minimizing dust emissions at construction sites by implementing best management practices.

7.4.5 Impact of Noise

Construction activities may increase noise levels at active construction sites. Noise impact on construction workers/ labourers may be avoided in case of loud noise by provision of adequate. This impact is considered negative of moderate magnitude.

Mitigation Measures

Following measures should be adopted to minimize the noise levels.

- Noise barriers (paneled fencing) will be installed where possible to keep the noise levels within permissible limits.
- While replacing equipment, quieter alternatives will be purchased. New equipment may introduce a noise problem; therefore, a noise assessment will be carried out while installing new piece of equipment.
- Contractor obligation will be to use appropriate and fit machinery.
- Noise analysis will be done every month during construction phase.

7.4.6 Impact of Solid Waste and Sewerage Generation

The contractor camp is expected to generate waste. Improper disposal of this waste can lead to both land and water contamination. To address this, storage and collection system will be provided. This impact is considered minor but negative.

Mitigation Measures

- Solid waste will be collected and segregated.
- Material suitable for recycling will be stored separately and will be handed to vendor.
- It will be ensured that the dumping area having construction waste will be leveled properly after disposal of waste material.

7.4.7 Safety Hazard

The construction phase poses unique safety hazards that require vigilant management to ensure the well-being of workers and the surrounding community. Common hazards include falls from heights, particularly for workers on scaffolding or rooftops, emphasizing the need for proper fall protection measures. Heavy machinery operation poses risks such as collisions and equipment malfunctions, necessitating strict safety protocols and training. Dust and debris generated during construction can lead to respiratory issues, emphasizing the importance of dust control measures and personal protective equipment. Excavation activities may pose risks of cave-ins, demanding proper shoring and trenching practices. Electrical hazards and inadequate signage can contribute to accidents. Construction sites must adhere to rigorous safety standards, enforce proper training for workers, and implement comprehensive safety plans to mitigate these hazards and ensure a secure working environment during the construction phase.

Mitigation Measures

- Enforcement and proper use of PPE by all construction workers.
- Provision of appropriate tools, equipment, and machinery in sound working conditions to employees.
- Proper arrangement of lighting to reduce accidents.

7.5 IMPACTS DURING OPERATIONAL PHASE

Table 7-2 Screening of Possible impacts during Operational Phase

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
Noise	Likely	Minor	Low
Air Quality	Likely	Minor	Low
Solid Waste	Likely	Minor	Low
Safety Hazard	Likely	Moderate	Medium

7.5.1 Solid Waste

The generation of solid waste in the pharmaceutical industry has significant impacts on the environment and health. Pharmaceutical waste, particularly when improperly managed, can lead to the contamination of water sources, soils, and sediments with bioactive substances from expired or unused medications. This contamination poses risks to aquatic and terrestrial ecosystems, bio accumulates in biota, and can potentially harm human health through food and water consumption.

Mitigation Measures

- Solid waste of empty drums and paper waste will be disposed of through a third-party contractor.
- Kitchen waste of workers and other waste will be composed within the premises of the plant.
- Recycling, reusing, or safely disposing of Pharmaceutical waste through authorized channels will be ensured.
- Regular monitoring, training employees on proper waste handling procedures, and conducting audits to ensure compliance with regulations.

7.5.2 Noise Pollution

Common sources of noise pollution in pharmaceutical units include the operation of machinery and equipment used in the formulation process, and other industrial machinery. Additionally, activities like, ventilation systems, and alarms from monitoring devices can contribute to elevated noise levels within pharmaceutical

facilities, leading to noise pollution that can impact both workers and the surrounding environment

Mitigation Measures

- Proper maintenance of equipment and machinery.
- Enhanced management to reduce machinery noise and exhaust and its impact on the surrounding environment.
- Green belts around the project area, peripheral and internal areas

7.5.3 Air Pollution

The Pharmaceutical industry has a significant impact on air pollution, contributing to the emission of greenhouse gases and other pollutants. Pharmaceutical companies generate carbon dioxide emissions. These emissions worsen air quality, leading to respiratory illnesses like asthma and other health issues. Additionally, air pollution in pharmaceutical labs poses health risks to workers and the public, emphasizing the importance of reducing air pollution in these facilities to protect human health

Mitigation Measures

- Various types of pollution control devices including ventilation fans (to went out the Hot air), Fumes condensers.
- Vehicles and machinery will be regularly maintained and fitted with appropriate exhaust systems and devices.

7.5.4 Safety Hazard

Workers are also at risk of chemical hazards due to handling dangerous substances during manufacturing processes, requiring proper education, exposure time limitations, and safe disposal practices. Additionally, ergonomic hazards can arise from inadequate workplace design, impacting workers' movement and comfort, while physical hazards like cuts from sharp instruments and burns from equipment pose risks that can be mitigated through worker education and adherence to safety protocols.

Mitigation Measures

- Prepare a manual for labor accident prevention including safety education and training
- Installing fire extinguishers in fire handling places
- Providing appropriate personal protective equipment (PPE)
- Conducting regular training on safe handling procedures
- Establishing containment measures to prevent exposure.
- For chemical hazards, measures include proper labeling of hazardous substances, ensuring adequate ventilation systems, limiting exposure time through job rotation, and implementing safe disposal practices to minimize risks.

- To address ergonomic hazards, ergonomic assessments of workstations should be conducted to optimize worker comfort and reduce strain, while physical hazards can be mitigated by providing safety equipment, training on equipment operation, and maintaining a clean and organized work environment to prevent accidents.

7.5.5 Socio-Economic Impacts

The installation of a Pharmaceutical unit can have numerous positive socio-economic impacts on a region.

- Firstly, it creates employment opportunities, supporting job growth and contributing to economic development within the community.
- Additionally, the presence of a Pharmaceutical unit can stimulate research and innovation, fostering collaborations with research institutions and universities, thereby enhancing the knowledge economy of the area.
- Moreover, the Pharmaceutical industry's investment in research, manufacturing, and distribution functions can lead to increased local spending, infrastructure development, and indirect job creation in related sectors, further boosting the socio-economic landscape of the region.

7.6 POTENTIAL ENVIRONMENT MITIGATIONS

- A septic tank will be constructed during constructional phase to ensure wastewater treatment.
- A comprehensive tree plantation will be done.

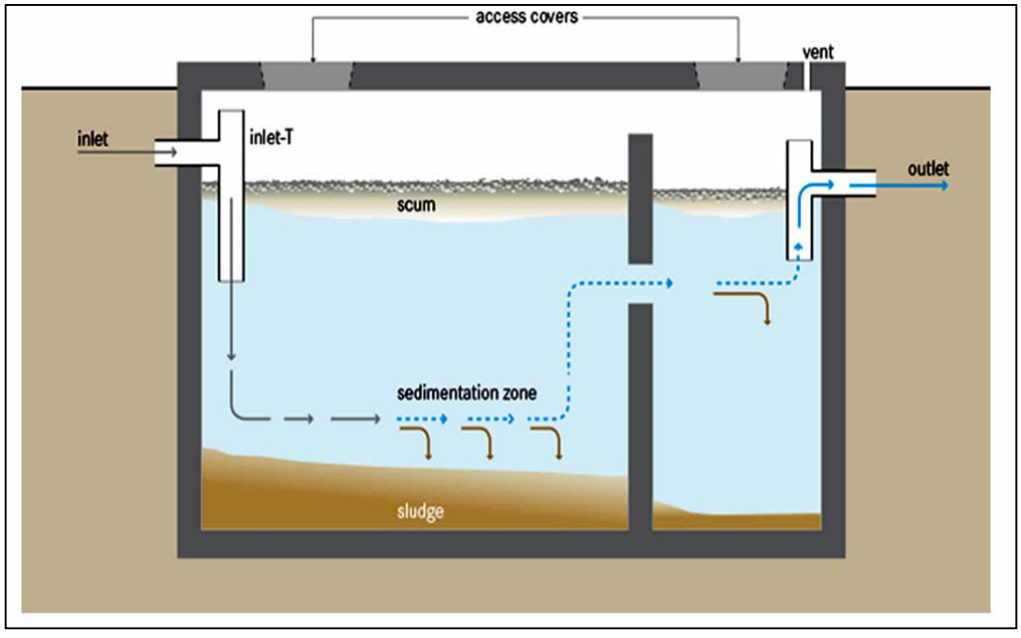


Figure 7-1Septic Tank Design

8 ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

An Environmental Management and Monitoring Program (EMMP) is a crucial component of an EIA because it serves as a systematic framework to ensure the effective implementation of mitigation measures and compliance with environmental regulations. The EIA process identifies potential environmental impacts of a proposed project, and the EMMP is designed to address and manage these impacts throughout the project's lifecycle. By establishing a comprehensive monitoring program, authorities can track the environmental performance of the project in real-time, allowing for timely identification and response to any unforeseen adverse effects. Additionally, the EMMP provides a mechanism for ongoing evaluation and adjustment of mitigation measures, contributing to adaptive management strategies. This proactive approach enhances environmental sustainability, helps prevent or minimize negative impacts, and fosters continuous improvement in environmental performance, thereby promoting responsible and sustainable development practices.

8.1 OBJECTIVES OF EMMP

The objectives of an Environmental Management Plan (EMP) in the context of a project or activity are multi-faceted, aiming to ensure the effective management and mitigation of environmental impacts. These objectives typically include:

- Ensure that the project adheres to local, national, and international environmental laws and regulations, thereby preventing any legal consequences and fostering a culture of environmental responsibility.
- Identify and implement measures to minimize or eliminate adverse environmental impacts associated with the project. This involves the prevention or reduction of pollution, habitat disruption, and other negative consequences.
- Promote the sustainable use of natural resources by incorporating practices that reduce resource consumption, promote recycling, and encourage the efficient use of energy and water.
- Safeguard and preserve biodiversity by implementing measures that prevent harm to ecosystems, habitats, and species. This may involve habitat restoration, conservation initiatives, and the protection of endangered species.
- Foster communication and collaboration with stakeholders, including local communities, NGOs, and governmental bodies, to ensure their concerns are considered and addressed. This contributes to transparency and the incorporation of diverse perspectives.
- Develop and implement strategies to respond effectively to environmental emergencies or accidents, such as spills or releases, to minimize the impact on the environment and human health.
- Establish a framework for ongoing monitoring, evaluation, and periodic review of the EMP to ensure its effectiveness. This includes adapting strategies as necessary to reflect changing conditions, emerging risks, and new information.

- Enhance the socio-economic well-being of local communities by considering their needs and providing opportunities for employment, training, or other community development initiatives.
- Raise awareness among project personnel and stakeholders about environmental issues, emphasizing the importance of responsible environmental stewardship and sustainable practices.
- Identify potential environmental risks associated with the project and develop strategies to manage and mitigate these risks effectively.

By addressing these objectives, an Environmental Management Plan contributes to the overall goal of achieving sustainable development while minimizing the environmental footprint of a project or activity.

8.2 INSTITUTIONAL CAPACITY

In the proposed monitoring and evaluation framework, the Project Proponent assumes a central role in overseeing the environmental aspects of the project. The Project Proponent will be responsible for the overarching Monitoring and Evaluation (M&E) process. This includes integrating environmental considerations into the main monthly reports of the project, emphasizing a holistic approach to project reporting.

To ensure a detailed and on-the-ground assessment of EMP implementation, the Project Proponent designates the Environment Consultant, who is part of the proponent's team. This consultant will be actively involved in field monitoring, observing the day-to-day activities related to environmental management, and reporting findings to the Project Proponent. This approach ensures a real-time understanding of the project's environmental performance.

For a comprehensive evaluation at the conclusion of the project, an Environment Specialist from the Supervision Consultant will conduct a final assessment. This specialist will review the overall effectiveness of the EMP throughout the project's lifecycle, providing valuable insights into the long-term impact and sustainability of environmental management measures.

Recognizing the importance of external validation, the Project Proponent commits to engaging an independent agency for 3rd party validation of EMP implementation. This external entity, whether an NGO, an academic institute, or an individual consultant, will provide an unbiased and objective evaluation, adding credibility to the environmental performance assessment.

At the district level, the District Office of the Environmental Protection Agency (EPA)will play a crucial role in monitoring the overall activity at the project site. This involvement ensures that the project aligns with regional environmental regulations and standards. The district-level monitoring adds an extra layer of oversight, promoting accountability and adherence to local environmental guidelines.

In summary, the proposed framework establishes a multi-tiered approach to environmental monitoring and evaluation. It leverages internal expertise, engages external validation for impartial assessments, involves EPA offices for regulatory compliance, and integrates findings into regular project reporting. This comprehensive strategy aims to ensure the effective implementation of the EMP, fostering environmental sustainability throughout the project's lifecycle.

8.3 SCHEDULE FOR IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PLAN

The implementation stages of the project activity include:

1st Stage

The stage –1 comprises the onsite contouring studies and soil investigations and the finalization of the project designs.

2nd Stage

The stage –2 comprises the following task:

1) Laying of foundations excavation and commencement of erection work.
2) Shoring and piling
3) Start of civil, electrical and mechanical work.
4) Development of basic infrastructure.
5) Fitting of instrumentation.

3rd Stage

The stage –3 comprises the following task:

1) Civil structure erection completion.
2) Completion of the basic infrastructures water supply system, electricity supply etc.

4th Stage

The last stage will be the commencement of regular use.

8.4 SCOPE OF ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) outlines a comprehensive approach to identifying, evaluating, and addressing the environmental impacts of a specific project or activity. It provides a structured framework comprising strategies, procedures, and assigned responsibilities aimed at ensuring environmental sustainability and regulatory compliance throughout the project's lifecycle. Key components within this framework include the assessment of baseline environmental conditions, implementation of mitigation measures to reduce adverse effects, monitoring of critical environmental indicators, and development of protocols for emergency response and contingency planning. Additionally, the EMP

extends its focus beyond the project site to encompass broader environmental considerations such as habitat conservation, waste management, energy efficiency, and pollution prevention. By encompassing these various elements, the EMP acts as a dynamic guide for integrating environmental factors into decision-making processes, facilitating ongoing improvement efforts, and safeguarding natural resources for the benefit of present and future generations.

8.5 ORGANOGRAM FOR IMPLEMENTATION ENVIRONMENTAL MANAGEMENT PLAN (EMP)

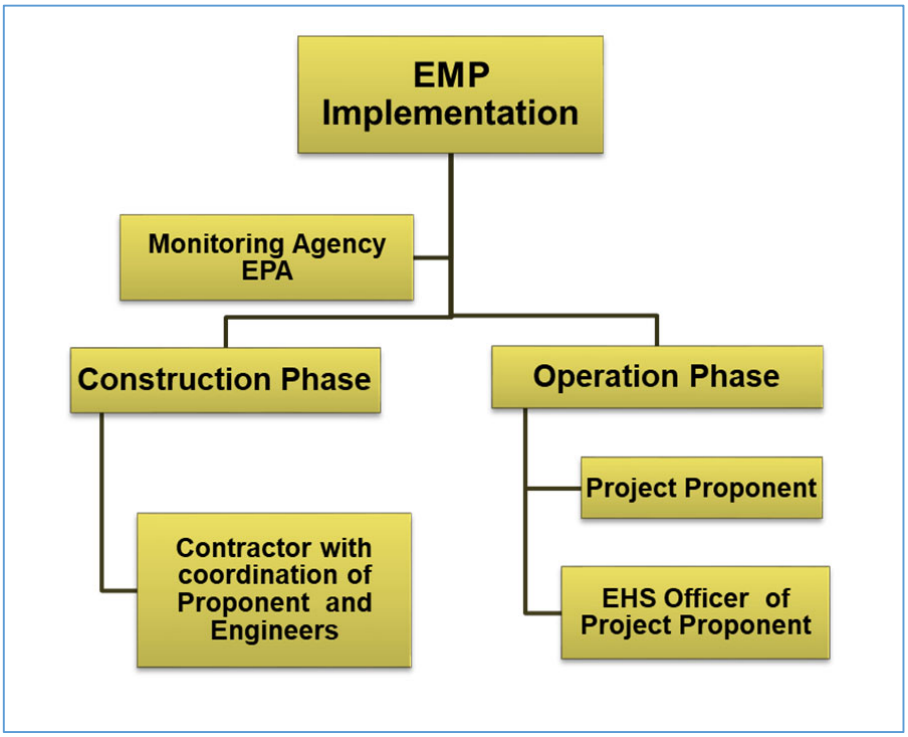


Figure 8-1Implementation of EMP

8.5.1 CONSTRUCTION PHASE

The EMP outlines crucial management principles tailored for the construction phase of the project. This section meticulously details environmental actions, procedures, and associated responsibilities vital during the construction phase. These specifications are not merely recommendations but are integral components of the contract documentation. Consequently, the contractor is bound to adhere to these specifications with precision. The compliance requirement is stipulated to ensure that environmental considerations are seamlessly integrated into the construction process. The satisfaction of both the Project Manager and the Environmental Control Officer is paramount, as their endorsement signifies the contractor's fulfillment of contractual obligations. The EMP serves as a comprehensive guide, fostering a proactive approach to environmental management within the construction framework. By embedding these specifications in the contract documentation, the project emphasizes its commitment to responsible and sustainable construction practices, aligning with regulatory standards and ensuring that environmental concerns are duly addressed throughout the construction phase.

The coordination between the Project Manager and the Environmental Control Officer is pivotal, underscoring the importance of effective communication and collaboration in enforcing and overseeing the adherence to environmental specifications by the contractor.

8.5.2 OPERATIONAL PHASE

During the operational phase of a Pharmaceutical unit, the EMP assumes a critical role in ensuring that manufacturing activities proceed in a manner that is both environmentally sustainable and compliant with regulatory standards. The scope of the EMP encompasses a range of strategies and measures aimed at minimizing environmental impacts while optimizing operational efficiency. This includes adherence to environmental regulations, efficient resource management practices, control of emissions and pollutants, effective waste management and pollution prevention strategies, conservation of water resources, implementation of energy-efficient technologies, monitoring of environmental performance indicators, and development of emergency preparedness and response protocols. By integrating these elements into its operational framework, the pharmaceutical unit can effectively mitigate environmental risks, reduce its environmental footprint, and demonstrate a commitment to environmental stewardship and sustainability.

8.6 MITIGATION PLAN FOR CONSTRUCTION AND OPERATION PHASE

Table 8-1Environmental Management plan for Construction Phase

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	Monitoring
Constructional Phase			
Air quality Dust and particulate matter resulting from construction activities. Use of heavy machinery will produce dust emissions	Water sprinkling on regular basis will be ensured to limit pollution from dust and particulate matter. Proper maintenance and management of all the construction machinery and vehicles. Tree plantation will be done to reduce air pollution.	During construction phase	Proponent and Contractor
Water quality Run-off water from construction area. Inappropriate storage of constructional waste can cause leakages contaminating ground water.	Use of impermeable sheets to avoid contamination of the groundwater/surface water. Proper disposal of waste material on dumping sites.	During construction phase	Proponent and Contractor
Waste Generation Construction waste will be	Conduct separate collection of construction and domestic waste to promote recycling and re-use.	During construction phase	Proponent and Contractor

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	**Monitoring**
produced from construction activities Domestic waste from workers camp	Proper disposal of waste to the authorized sites. The area to be leveled and contoured after disposing excess material. No waste or debris will be thrown in the nearest canal water or other water bodies.		
Noise Noise caused by construction machinery and vehicles used for mobilization of construction equipment and workers.	The contractor will strictly follow the PEQS Proper maintenance of vehicles and construction equipment. Minimize/avoid unnecessary use of drills and other noisy machinery. Unloading of constructional material will be done during day time. The personal protective equipment (PPE) will be provided to the construction workers and its usage will be made mandatory	During construction phase	Proponent and Contractor
Soil Quality	Chemical leakages will be controlled by storing these substances in special containers. Proper waste management will be ensured.	During construction phase	Proponent and Contractor
Materials Management	Stockpiles shall not exceed a particulate height.	During construction	Proponent and Contractor

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	**Monitoring**
	Stockpiles maybe exposed to windy conditions or heavy rain, so they will be properly covered with plastic sheets. Stockpiles may further be protected by the construction of low brick walls around their bases.	phase	
Workers Health & Safety	Personal protective equipment will be provided to the workers. Provision of first aid box at work site to deal with emergency situation. Safety training to the workers. Adequate safety signs on site will be ensured. Provide training regarding proper handling and use of chemicals/ paints Install fire extinguishers at fire handling places. Inspection that lifting devices, such as cranes, are appropriate for expected loads. Stagnant water at the project site will be prohibited to avoid the dengue larva production. Continuous monitoring will be carried out to ensure	During Construction Phase	Proponent

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	**Monitoring**
	that contractor is following safe working procedures and practices.		
Clearance of site from extra material and construction equipment	Regular removal of extra materials from the site to avoid congestion at work place. Construction waste will be collected and disposed of separately from other waste. Careful handling of waste will be ensured.	During Construction phase	Proponent and Contractor

Table 8-2Environmental Management plan for Operational Phase

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	**Monitoring**
Operational Phase			
Air Pollution	• Various types of pollution control devices including ventilation fans (to went out the Hot air), Fumes condensers. • Vehicles and machinery will be regularly maintained and fitted with appropriate	During Operational Phase	EHS officer

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	Monitoring
	exhaust systems and devices.		
Noise Pollution	• Proper maintenance of equipment and machinery. • Enhanced management to reduce machinery noise and exhaust and its impact on the surrounding environment. • Green belts around the project area, peripheral and internal areas.	During Operational Phase	EHS officer
Solid Waste	• Solid waste of empty drums and paper waste will be disposed of through a third party contractor. • Kitchen waste of workers and other waste will be compost within the premises of the plant.	During Operational Phase	EHS officer
Liquid Waste	• The formulation process in the pharmaceutical industry does not generate any industrial effluent. However, domestic wastewater will be treated using septic tanks		

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	Monitoring
	and then discharged into a nearby drain, ensuring proper management of domestic waste.		
Work Safety	• Prepare a manual for labor accident prevention including safety education and training • Provide workers with appropriate protective equipment • Installing fire extinguishers in fire handling places • Developing fire-fighting organization and implementing fire drills	During Operational Phase	EHS officer

8.7 ENVIRONMENTAL MANAGEMENT TEAM ALONG WITH THEIR ROLES AND RESPONSIBILITIES

The project proponent bears the responsibility for overseeing all the project activities. To cater to the varying requirements during operational phase, the proponent will hire personnel specifically dedicated to environmental management at the project site. This step is crucial to ensure the effective implementation and operations of the Environmental Management Plan (EMP).

Assigning the responsibilities to designated individuals is paramount to uphold accountability in the event of any oversight or mishap. Each appointed person will have specific duties outlined within the EMP. These responsibilities will be tailored to their roles, ensuring they are accountable for the successful execution of environmental protocols and procedures.

By delineating and assigning these responsibilities to individuals, the project proponent establishes a framework where each person understands their role and obligation within the broader context of environmental management. This structuring allows for a more efficient response to any environmental issue. This approach aims to create a clear chain of accountability, ensuring that the implementation of EMP is conducted diligently and that there are identifiable points of contact for any concerns or queries related to environmental management during the project's operational phase.

8.8 ENVIRONMENTAL MONITORING PROGRAM

An Environmental Monitoring Program (EMP) is a structured system designed to consistently observe, assess, and record the environmental conditions and impacts associated with the project. It involves systematic data collection related to air quality, water quality, soil conditions, and biodiversity. This collected data is analyzed to detect any deviations from the PEQs.

It also involves impact assessments, communication of findings to stakeholder, and adaptive management –making necessary adjustments to mitigate environmental risks and issues. The program's goal is to ensure sustainable environmental practices, minimize adverse impacts, and maintain compliance with set standards, contributing to better environmental management and long-term sustainability.

The objectives of the Environmental Monitoring Plan are given below;

- Detecting environmental changes to prevent and minimize potential negative impacts on the environment.
- Ensuring compliance with environmental laws, permits, and regulations by regular monitoring and reporting environmental parameters. This helps in meeting legal requirements and avoiding penalties or sanction.
- Assessing and managing potential risks to the environment caused by human activities. This involves evaluating the impact of these risks and implementing strategies to mitigate or manage them effectively.

- Monitoring and managing the use of natural resources such as water, air, soil, and biodiversity. The goal is to conserve these resources and maintain ecological balance.
- Assessing the impact of specific actions, projects, or processes on the environment to understand their consequences and make informed decisions regarding future actions.
- Using collected data to improve environmental performance, refine strategies, and adapt measures to achieve better outcomes over time.
- Establishing protocols and responses for emergencies or unexpected environmental incidents, ensuring a rapid and effective reaction to minimize damage.

Table 8-3 Environmental Monitoring

Sr. No.	Monitoring Parameters	Monitoring Mechanism	Frequency	Responsibility
DURING INSTALLATION				
1.	Dust Emissions	Ambient Particulate Matter Monitoring System.	Will be carried out on quarterly basis.	• Proponent • Site Supervisor
2.	Noise Levels	Noise meter	On quarterly basis by a third party	• Proponent • Site Supervisor
3.	Gaseous Emissions	Emissions monitoring system. Monitoring of ambient air quality.	Will be carried out on quarterly basis.	• Proponent • Site Supervisor
4.	HSE Plan	Health, safety and Environmental will be monitored on daily basis	Daily	• Proponent • Site Supervisor
DURING OPERATION				
1.	Noise Levels	Noise meter	On quarterly basis by a third party	• Proponent • Project Manager
2.	Water Quality	Discrete grab sampling and laboratory testing of	As described by SMART	• Proponent • Project Manager

Sr. No.	Monitoring Parameters	Monitoring Mechanism	Frequency	Responsibility
		water samples.		
3.	Emissions	Emissions monitoring system. Monitoring of ambient air quality.	Will be carried out on quarterly basis.	• Proponent • Project Manager
4.	Security	Security arrangements will be made	Daily	• Proponent
5.	HSE Plan	Health, safety and Environmental will be monitored on daily basis	Daily	EHS officer of Project Proponent
6.	Production Management	Production unit will be monitored on daily basis to control bacterial contamination of products.	Daily	• Proponent • Project Manager

8.9 ENVIRONMENTAL BUDGET

An environmental budget is essential in EIA as it provides a structured financial framework for the implementation of environmental management and mitigation measures identified during the assessment process. By allocating resources specifically to address environmental concerns, the budget ensures that adequate funds are available for the proper execution of mitigation strategies, monitoring activities, and other environmental protection measures throughout the project's lifecycle. This financial planning helps to integrate environmental considerations into the overall project budget, emphasizing the commitment to sustainable practices. The environmental budget serves as a tool for accountability, allowing stakeholders to track and assess the financial resources dedicated to environmental protection, thereby promoting transparency and responsible resource management in the pursuit of environmentally sustainable development.

Table 8-4Environmental Budget

Environmental Component	Quantity	Approximate Cost (PKR)
(i) Tree Plantation	1000	250,000.0
(ii) Health and Safety Measures and Provision of PPEs	L.S.	500,000.0
(iii) Air and Water Quality & Noise Monitoring	L.S.	200,000.0
(iv) Environmental Trainings	L.S	350,000.0
Total Environmental Management and Monitoring Cost		1,300,000.0

9 TREE PLANTATION PLAN

The incorporation of a tree plantation plan within an EIA is of paramount importance for several compelling reasons. Trees play a pivotal role in environmental sustainability, acting as natural carbon sinks, enhancing biodiversity, and mitigating the impacts of climate change. A well-designed tree plantation plan contributes significantly to offsetting carbon emissions associated with a project, thereby fostering a more balanced and ecologically friendly footprint. Beyond their role in carbon sequestration, trees contribute to soil stabilization, preventing erosion and promoting water retention. They also provide habitat for diverse wildlife, supporting biodiversity conservation. Moreover, trees contribute to the improvement of air quality by filtering pollutants and releasing oxygen, thereby enhancing the overall health and well-being of surrounding communities. Integrating a tree plantation plan into the EIA showcases a commitment to ecological stewardship and reflects a proactive approach toward environmental sustainability, aligning the project with broader conservation goals and community well-being.

9.1 OBJECTIVES OF TREE PLANTATION

The following objectives of tree plantation helps to clarify its basic purpose.

- Trees in urban areas provide shade and heat reduce heat, mitigation the urban heat island heat.
- Trees store carbon in their biomass, helping and reduce the atmospheric carbon dioxide levels.
- Trees contribute to visual appeal of urban and rural landscapes, making areas more attractive.
- Trees yield valuable resource such as timber, fruits, nuts, and medicinal plants.
- Trees plantations create employment opportunities for the people living in the vicinity of the project area.
- Trees act as a natural air filters by trapping airborne pollutants and particulate matter.
- Trees release oxygen during photosynthesis, improving air quality.
- Trees help maintain healthy watersheds, reducing the risk of floods and ensuring a consistent water supply.
- Trees help prevent soil erosion by anchoring soil with roots.
- Trees planted strategically can safeguard against landslides and protect roads and buildings.
- Trees absorb carbon dioxide and release oxygen, helping reduce greenhouse gas level and circumvent climate change.
- Trees can efficiently serve as windbreaks.

9.2 BENEFITS OF TREE PLANTATION

A well-executed tree plantation plan offers numerous advantages, covering all the environmental, economic and soil aspects. Some of the key benefits of tree plantation are enlisted below;

- Plants absorb carbon dioxide (CO_2) from the atmosphere and store this carbon in the biomass helping to circumvent climate change by reducing greenhouse gas emissions.
- Roots of the trees help to stabilize soil and prevent soil erosion.
- Trees act as a natural air filter, by trapping particulate matter which leads to healthier living environments.
- Trees can provide habitat and food residues to birds contributing to local biodiversity.
- Trees act as a natural buffer that helps to control and purify water entering into the streams and rivers reducing the risks for the contamination of water.
- Well-maintained tree plantation enhances the visual appeal of the landscapes, making area more attractive.
- Tree roots can improve soil quality by increasing its organic matter content and nutrient availability.
- Tree plantation contribute to climate resilience by moderating temperature extremes, reducing the risk of heatwaves, and providing shelter from extreme weather events.
- Trees can help to enhance the mental and physical well-being of the people living around the project area.

A well-designed tree plantation plan serves as a long-term investment in the environment and the future, as they continue to provide benefits for generations to come.

9.3 TREE CUTTING

The proposed land for the is identified as barren, non-agricultural terrain, eliminating the need for any tree cutting or uprooting during the construction phase.

9.4 AREA ENHANCEMENT PLAN

The tree plantation plan for the project area has been meticulously prepared, taking into consideration the specific characteristics and requirements of the project site. This strategic plan involves a thorough assessment of the area's ecosystem and aims to enhance environmental sustainability. The selection of tree species, their placement, and the overall design of the plantation plan are based on the best possible estimations derived from ecological studies and expert consultations.

It is important to note that the tree plantation plan is designed to be adaptable, allowing for modifications at the execution stage. This flexibility is essential to

accommodate any unforeseen factors that may arise during implementation. It reflects a commitment to responsiveness and ensures that the tree plantation aligns seamlessly with the evolving needs and conditions of the project area.

The plan's adaptability is a proactive measure that acknowledges the dynamic nature of environmental conditions and the potential for unforeseen challenges. By remaining open to adjustments, the tree plantation plan demonstrates a commitment to optimizing its ecological impact and ensuring the long-term success of the afforestation efforts. This thoughtful and flexible approach not only reflects a commitment to environmental conservation but also underscores a dedication to continuous improvement and sustainable practices throughout the project's lifecycle.

9.5 TREES RECOMMENDED

Tree species are recommended for the plantation are the indigenous species of Vehari.

Table 9-1Recommended Trees

Sr. No.	Common Name	Scientific Name
1	*Dalbergia sissoo*	Shisham
2	*Acacia Arabica*	Kikar
3	*Albizzia lebbeck*	Siris

Figure 9-1 Recommended Trees

9.6 TREE PLANTATION COST

A 250,000 PKR budget for tree plantation and maintenance will be implemented. These funds will be utilized to cover the costs associated with procuring and

planting trees, as well as sustaining their well-being through regular maintenance practices. This investment signifies a proactive approach to fostering a healthier and more aesthetically pleasing living environment, aligning with the community's long-term commitment to environmental stewardship.

10 OCCUPATIONAL HEALTH AND SAFETY PLAN

The Occupational Health and Safety (OHS) plan holds paramount importance within the framework of an EIA. This plan is a comprehensive document that outlines strategies and protocols to safeguard the well-being of workers involved in the project. Beyond the ethical imperative of ensuring a safe working environment, the OHS plan is integral to regulatory compliance and risk management. It identifies potential occupational hazards associated with the project, establishes preventive measures, and details emergency response procedures. By incorporating an OHS plan into the EIA, not only is the health and safety of the workforce prioritized, but it also contributes to the overall success and sustainability of the project. A well-executed OHS plan minimizes the likelihood of accidents, injuries, and occupational health issues, fostering a workplace culture that values the welfare of its personnel. In essence, the OHS plan, as part of the EIA process, aligns with responsible and ethical project management, ensuring that occupational health and safety considerations are seamlessly integrated into the project's design, implementation, and ongoing operations.

10.1 OBJECTIVES OF OHS PLAN

The Occupational Health and Safety (OHS) plan for any industry is designed to prioritize the well-being and safety of workers, contractors, and all individuals involved in the construction process. The primary objectives of an OHS plan during the construction phase include:

- Identify potential hazards and assess risks associated with the construction activities.
- Implement measures to eliminate or control hazards to prevent accidents and injuries.
- Ensure strict adherence to local and international safety regulations and standards.
- Stay updated on relevant legal requirements and ensure the project complies with all safety guidelines.
- Develop and communicate emergency response plans for various potential scenarios.
- Conduct regular drills to ensure all workers are familiar with emergency procedures.
- Implement measures to protect workers from exposure to hazardous substances, dust, noise, and other health risks.
- Provide necessary personal protective equipment (PPE) and ensure its proper use.
- Provide comprehensive safety training to all personnel involved in the construction phase.
- Ensure workers are aware of potential risks, safe work practices, and emergency procedures.
- Establish and enforce security measures to control access to the construction site.

- Prevent unauthorized entry and mitigate the risk of theft or vandalism.
- Conduct regular inspections to identify and rectify potential safety issues.
- Perform periodic safety audits to assess the overall effectiveness of the safety management system.
- Establish clear communication channels for reporting safety concerns and incidents. Ensure timely reporting and investigation of accidents or near misses.
- Collaborate with contractors and subcontractors to align safety procedures and expectations.
- Ensure that all entities working on the construction site adhere to the established safety standards.
- Establish a feedback loop for continuous improvement of safety measures.
- Review incidents, identify lessons learned, and implement changes to enhance safety.

By focusing on these objectives, an OHS plan for the construction phase aims to create a safe and healthy work environment, prevent accidents, and ensure regulatory compliance throughout the construction process.

10.2 PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment (PPE) plays a crucial role in a project, serving as a fundamental component of occupational health and safety measures. The importance of PPE in construction cannot be overstated, and here are several key reasons why it is essential:

- PPE is designed to protect workers from potential hazards and risks present in the construction environment, such as falling objects, electrical shocks, noise, and exposure to harmful substances.
- PPE serves as a barrier against injuries and accidents, reducing the likelihood of physical harm. Items like hard hats, safety glasses, and steel-toed boots are examples of PPE that prevent injuries from falling objects and impacts.
- Many occupational health and safety regulations mandate the use of specific PPE in construction settings. Adhering to these regulations ensures legal compliance and helps avoid penalties.
- Construction sites often involve various hazards, such as dust, chemicals, and noise. PPE, including respirators, gloves, and ear protection, helps mitigate these hazards, safeguarding the health of workers.
- The use of PPE reinforces a safety culture within the construction industry. It encourages workers to adopt safe work practices, as they are more likely to be

mindful of potential risks and take precautions when equipped with the necessary protective gear.

- PPE minimizes the risk of injuries and illnesses, which can result in reduced downtime, worker compensation claims, and associated costs. This, in turn, contributes to the overall efficiency and productivity of the construction project.
- In emergency situations, such as fires or chemical spills, PPE can be crucial in providing immediate protection to workers while they evacuate or address the emergency. For example, flame-resistant clothing can be vital in fire-related incidents.
- PPE safeguards workers from long-term health issues caused by prolonged exposure to construction-related hazards. This includes protection from respiratory issues, skin disorders, and hearing loss.
- PPE is particularly essential when working in environments with high-risk factors, such as confined spaces, heights, or areas with heavy machinery. Helmets, fall protection equipment, and safety harnesses are critical in these situations.

Providing appropriate PPE demonstrates an employer's commitment to the well-being of their workforce. This, in turn, fosters a positive work environment, enhances employee morale, and contributes to higher job satisfaction.

10.3 PPE REQUIRED FOR CONSTRUCTION PHASE

During the construction of a project, a comprehensive set of Personal Protective Equipment (PPE) is necessary to safeguard the health and safety of workers involved in various tasks. The specific PPE requirements may vary based on the nature of construction activities, potential hazards, and regulatory standards. Here is a general list of PPE commonly required during construction:

Head Protection: Hard hats to protect against falling objects, impact, or head injuries.

Eye and Face Protection: Safety glasses or goggles to shield the eyes from dust, debris, or other airborne particles. Face shields for additional protection during tasks with a higher risk of facial exposure.

Hearing Protection: Earplugs or earmuffs to reduce exposure to loud noises, especially in areas with heavy machinery or construction equipment.

Respiratory Protection: Dust masks or respirators to protect against inhalation of dust, particulates, or hazardous substances.

Hand Protection: Safety gloves appropriate for the specific tasks, such as cut-resistant gloves, leather gloves, or chemical-resistant gloves.

Body Protection: High-visibility vests or clothing to enhance visibility, especially in areas with moving equipment. Reflective clothing for nighttime or low-visibility construction activities. Protective clothing, such as coveralls, for tasks involving exposure to hazardous substances.

Foot Protection: Steel-toed safety boots or shoes to protect against crushing injuries, falling objects, or punctures.

Fall Protection: Safety harnesses, lanyards, and other fall protection systems for workers operating at heights or in elevated areas.

Hand and Arm Protection: Elbow and knee pads for tasks that involve kneeling or crawling. Wrist support or braces for tasks with repetitive motions.

Weather Protection: Weather-appropriate clothing, such as rain gear, insulated clothing, or sunscreen, depending on the climate and weather conditions.

First Aid Kit: Access to a well-equipped first aid kit to provide immediate care for minor injuries.

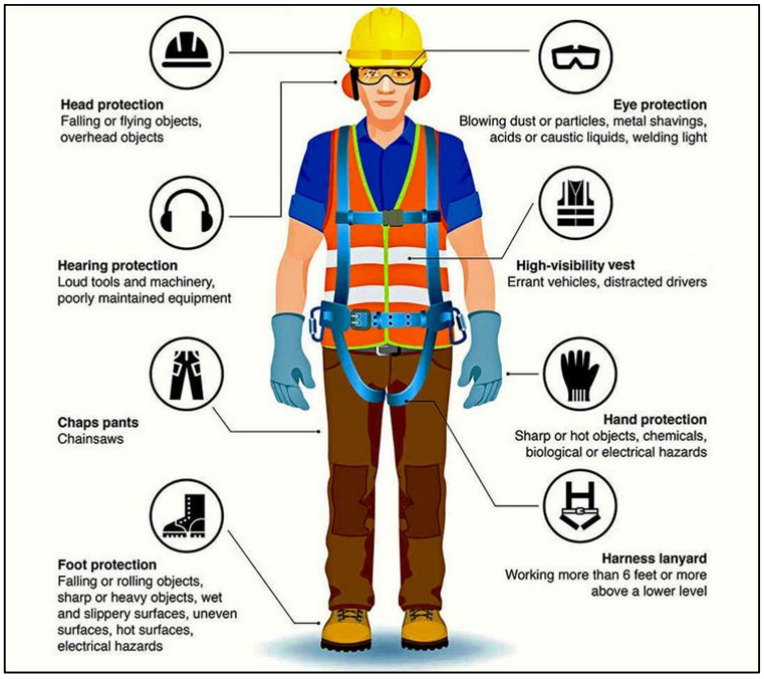


Figure 10-1PPEs for Construction Phase

It is essential for the construction project management to conduct a thorough hazard assessment to identify the specific risks associated with each construction activity and determine the appropriate PPE for the workers involved. Regular training, monitoring, and enforcement of PPE usage contribute to a safer construction environment.

10.4 SAFETY SIGNS DURING CONSTRUCTION PHASE

Safety signs serve as critical elements in maintaining a secure and hazard-free environment at construction sites. Their importance lies in their ability to effectively communicate potential risks and hazards to workers, visitors, and contractors. By providing clear information about safety procedures, required personal protective equipment, and safe work practices, these signs play a pivotal role in preventing accidents and injuries. Moreover, safety signs contribute to regulatory compliance, ensuring adherence to local regulations and occupational health and safety standards. They also serve as essential tools for emergency response by indicating the location of emergency exits, first aid stations, fire extinguishers, and other emergency equipment. In addition to their role in risk reduction, safety signs assist in site navigation, guiding individuals to specific areas and enhancing overall organization. Beyond practical benefits, safety signs contribute to fostering a culture of safety awareness among the workforce. They communicate important safety policies, promote compliance with site-specific regulations, and reduce the project's liability by showcasing a commitment to responsible construction practices. Ultimately, safety signs are integral components in creating a safe, compliant, and organized construction site conducive to the well-being of all involved parties.

Figure 10-2Safety signs for Constructional Phase

10.5 SAFETY SIGNS

Fire safety signs play a pivotal role in enhancing safety protocols within a pharmaceutical industry setting. These signs serve as visual cues that communicate critical information regarding fire hazards, emergency procedures, and the location of firefighting equipment to employees, visitors, and emergency responders. In a pharmaceutical facility where the presence of flammable materials, chemicals, and intricate machinery increases the risk of fire incidents, clear and

prominent fire safety signs are essential for ensuring swift and effective responses in emergency situations.

Firstly, fire safety signs help to identify the location of fire exits, emergency evacuation routes, and assembly points, enabling individuals to evacuate the premises safely and efficiently in the event of a fire. This is particularly important in pharmaceutical facilities where the layout may be complex, and unfamiliar visitors or new employees need clear guidance during emergencies.

Secondly, fire safety signs indicate the location of fire extinguishers, fire alarms, fire blankets, and other firefighting equipment, facilitating quick access for personnel trained in fire response procedures. By promptly locating and using these resources, individuals can suppress small fires before they escalate, minimizing damage and potentially preventing injuries or loss of life.

Furthermore, fire safety signs often include warnings about specific fire hazards, such as flammable materials storage areas or chemical spill risks. These warnings serve as reminders to handle hazardous substances with care and to adhere to safety protocols to prevent fire incidents.

Overall, fire safety signs in a pharmaceutical industry not only promote awareness of fire hazards and emergency procedures but also contribute significantly to the overall safety culture of the facility. By ensuring that fire safety signs are clearly visible, well-maintained, and regularly updated to reflect any changes in the facility layout or procedures, pharmaceutical companies can enhance fire prevention measures and better protect the well-being of their employees and assets.

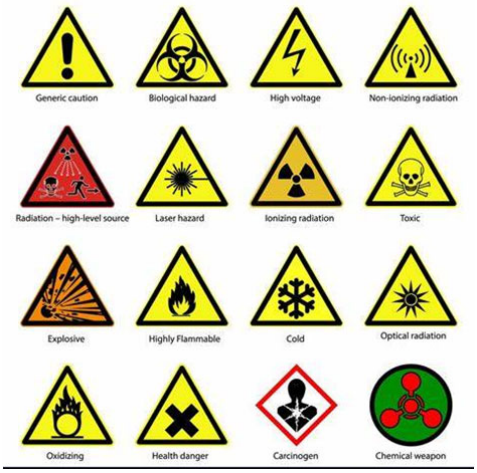


Figure 10-3Safety Signs

10.6 FIRE SAFETY

Fire extinguishers play a critical role in maintaining safety within a pharmaceutical industry setting. Given the presence of various flammable materials, such as solvents, chemicals, and packaging materials, as well as electrical equipment and machinery, the risk of fire in pharmaceutical facilities is considerable. In the event of a fire outbreak, rapid response is paramount to prevent the escalation of flames and

minimize damage to property, equipment, and most importantly, to safeguard the lives of employees. Fire extinguishers provide a first line of defense, allowing trained personnel to quickly suppress small fires before they spread uncontrollably. Moreover, having strategically placed fire extinguishers throughout the facility ensures accessibility and readiness in emergency situations. Regular maintenance and inspection of fire extinguishers further enhance their effectiveness, ensuring they are in proper working condition when needed. Ultimately, the presence of functional fire extinguishers serves as a crucial component of the pharmaceutical industry's overall fire safety strategy, contributing to a safer work environment and mitigating the potential impact of fire-related incidents.

Figure 10-4 Fire Extinguishers

10.7 PPES DURING OPERTAIONAL PHASE

In the pharmaceutical industry, PPE is essential to ensure the safety and well-being of workers involved in various processes. Here are some of the key PPE required in the pharmaceutical industry:

Lab Coats: Lab coats provide protection against chemical spills, splashes, and contamination during laboratory work, ensuring the integrity of experiments and preventing exposure to hazardous substances.

Safety Glasses/Goggles: Safety glasses or goggles shield the eyes from potential hazards such as chemical splashes, flying particles, or liquid droplets, safeguarding against eye injuries in laboratory or manufacturing environments.

Disposable Gloves: Disposable gloves are crucial for preventing cross-contamination and protecting hands from exposure to chemicals, biological agents, and pharmaceutical ingredients during handling, processing, and packaging activities.

Respiratory Protection: Respiratory protection, including masks or respirators, is necessary when working with airborne contaminants, particulates, or hazardous fumes to maintain respiratory health and prevent inhalation of harmful substances.

Face Shields: Face shields provide additional protection for the face and neck against splashes, sprays, or flying debris, particularly during tasks that pose a higher risk of exposure to hazardous materials.

Protective Clothing: Protective clothing, such as coveralls or aprons, offers full-body coverage to shield against chemical spills, contamination, or exposure to potentially harmful substances during manufacturing, cleaning, or maintenance tasks.

Footwear: Chemical-resistant or closed-toe footwear with non-slip soles is essential to protect against spills, punctures, and foot injuries in pharmaceutical manufacturing facilities.

Hearing Protection: In environments where noise levels exceed safe limits, hearing protection such as earplugs or earmuffs helps prevent hearing damage and maintain auditory health among workers.

Hair Nets/Bonnets: Hair nets or bonnets prevent contamination from hair and scalp particles, ensuring product purity and compliance with hygiene standards in pharmaceutical production areas.

Safety Shower/Eye Wash Stations: Emergency safety showers and eye wash stations should be readily available in case of accidental exposure to hazardous chemicals or substances, providing immediate decontamination to minimize injury or adverse health effects.

Figure 10-5 PPEs during Operational Phase

11 STAKEHOLDER CONSULTATION

Stakeholder consultation is of paramount importance in the EIA process as it facilitates inclusive decision-making, fosters transparency, and enhances the overall quality of the assessment. Involving stakeholders, including local communities, governmental bodies, non-governmental organizations, and affected parties, ensures that diverse perspectives, concerns, and local knowledge are taken into account. This inclusive approach contributes to the identification of potential environmental and social impacts that might not be evident from a solely technical or regulatory standpoint. Stakeholder consultation is a way to involve both the primary and secondary stakeholders in making decisions about the project. Stakeholder engagement builds trust, allows for the exchange of valuable information, and empowers communities by giving them a voice in the decision-making process. Moreover, it helps to align the project with the needs and expectations of the local population, minimizing conflicts and fostering a sense of shared responsibility for environmental stewardship. In essence, stakeholder consultation transforms the EIA into a more robust and credible tool, enhancing the sustainability and social acceptance of proposed projects.

11.1 OBJECTIVES OF STAKEHOLDER CONSULTATION

In 1992, the United Nations Conference on the Environment and Development (UNCED) supported the idea of involving the public in decision-making, and this was outlined in one of the key documents of the conference called Agenda 21.

Agenda 21 is a comprehensive plan for global actions focused on sustainable development and deals with how people interact with the environment. It highlights the importance of including the public in making decisions about the environment to achieve sustainable development.

The objectives of stakeholder consultation in the context of EIA are multi-faceted, aiming to foster meaningful engagement, inclusivity, and informed decision-making. Some key objectives include:

- Ensure the inclusion of diverse stakeholder perspectives in the decision-making process, promoting a more comprehensive understanding of potential environmental and social impacts.
- Provide a platform for stakeholders to express their concerns, values, and local knowledge related to the project, contributing to a more nuanced understanding of potential impacts and benefits.
- Gather valuable insights and feedback that can be integrated into the project design, helping to address and mitigate potential adverse impacts and enhance positive contributions.
- Establish trust among stakeholders by being transparent, responsive, and open to dialogue. Building trust is essential for the successful implementation of the project and its long-term acceptance by the community.

- Fulfill regulatory requirements by actively engaging with stakeholders, demonstrating a commitment to compliance with environmental and social standards, and addressing concerns raised during the consultation process.
- Facilitate an open and inclusive dialogue to build understanding and acceptance of the project within the affected communities, minimizing potential conflicts and fostering a sense of shared responsibility.
- Integrate local knowledge and community input to enhance the overall sustainability of the project, aligning it with the needs and aspirations of the affected stakeholders.
- Disseminate accurate and accessible information about the project, its potential impacts, and proposed mitigation measures to ensure that stakeholders are well-informed and can actively participate in the decision-making process.
- Consider the needs and interests of all affected parties, including vulnerable or marginalized groups, to ensure that the benefits and burdens of the project are distributed equitably.
- Create a platform for addressing conflicts and disputes, allowing for the resolution of issues through open communication and negotiation.

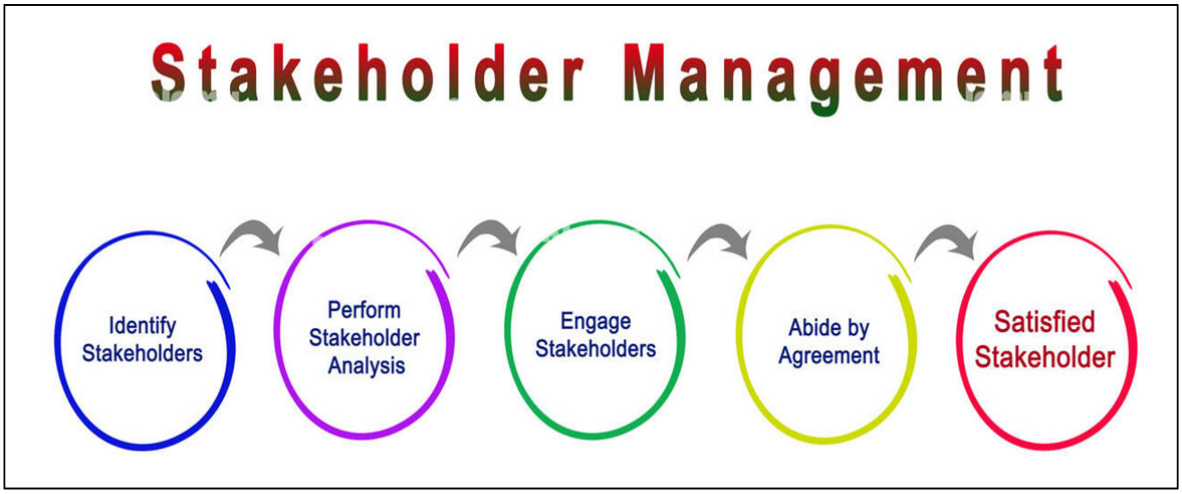


Figure 11-1Stakeholder Management

By achieving these objectives, stakeholder consultation contributes to the overall success and sustainability of the project, enhancing its social, environmental, and economic outcomes while fostering positive relationships with the communities it impacts.

11.2 PROPONENT ENVIRONMENT MANAGEMENT TEAM

A comprehensive discussion on all conceivable impacts and corresponding mitigation measures related to the project was conducted with both the proponent and project management. In this collaborative dialogue, a thorough examination of potential environmental, social, and economic implications of the project took place. The proponent and management, demonstrating a proactive commitment to

responsible practices, assured the incorporation of all suggested mitigation measures to effectively control and address any discrepancies that may arise during the project's implementation. Their pledge to embrace these measures underscores a dedication to environmental stewardship and sustainable practices. By actively engaging in this discourse, the proponent and management not only exhibit a commitment to regulatory compliance but also demonstrate a broader responsibility to the well-being of the community and the preservation of the surrounding environment. This collaborative approach ensures that the project aligns with best practices, fostering a positive impact on the environment and minimizing any potential adverse effects.

11.3 THE RESPONSIBLE AUTHORITY

The Proponent assumes the crucial role of the responsible authority, pledging to undertake all necessary measures both prior to the commencement of the project and throughout its operational phases. This commitment encompasses a comprehensive approach to project management, ensuring that all regulatory requirements, environmental standards, and best practices are diligently adhered to. Before project initiation, the Proponent commits to conducting thorough assessments and implementing necessary preparatory measures to mitigate potential impacts. This includes adopting robust environmental management strategies, obtaining required permits, and addressing any concerns raised during stakeholder consultations. Throughout the operational phase, the Proponent maintains an ongoing commitment to environmental sustainability and regulatory compliance. This involves continuous monitoring, prompt response to emerging issues, and the implementation of adaptive management practices. By assuming the mantle of responsibility, the Proponent not only safeguards the project's integrity but also prioritizes the well-being of the environment, local communities, and all stakeholders involved. This proactive stance ensures that the project operates within the parameters of environmental and ethical standards, reflecting a dedication to responsible and sustainable project execution.

11.3.1 Other departments and agencies

A comprehensive impact analysis was conducted in collaboration with key stakeholders, including project management, the local community, educational institutes, health institutions, hospitals, and non-governmental organizations (NGOs). This inclusive approach sought to gather diverse perspectives and insights related to the implementation of the project. The engagement process involved scoping sessions, focused group discussions, and wayside consultations, providing a multifaceted platform for dialogue and information exchange. Through these forums, all pertinent issues associated with the project were thoroughly examined, including potential environmental, social, and economic impacts. The proactive involvement of stakeholders, representing various sectors of the community, ensured that a holistic understanding of the project's implications was achieved. This collaborative effort not only fostered transparency but also allowed for the incorporation of valuable local knowledge and concerns into the impact analysis. By actively engaging with stakeholders through diverse communication channels, the

project management demonstrated a commitment to responsible and inclusive decision-making, setting the stage for a well-informed and socially accepted project implementation process.

11.4 ENVIRONMENTAL PRACTITIONERS AND EXPERTS

Our dedicated team undertook a comprehensive site visit, engaging in extensive discussions with a broad spectrum of project stakeholders. This inclusive approach involved reaching out to residents from nearby villages and beyond, ensuring a diverse representation of perspectives to assess the socio-economic impacts of the project. The community demographic was richly diverse, encompassing individuals from various professions, such as those employed in different fields, business owners, doctors, expatriates, military personnel, and educators. In a conscious effort to ensure gender inclusivity, consultations with women were prioritized to gather their unique perspectives on how the project could contribute to the improvement of the area. While some women openly shared their thoughts, it was evident that social norms in the area made many feel hesitant, creating discomfort with speaking or being photographed. This nuanced understanding allowed our team to respect and navigate the cultural sensitivities of the community. The local community, nonetheless, proved to be a wellspring of information, offering valuable insights into the project and expressing predominantly positive views regarding its potential for development. This holistic approach to stakeholder engagement not only highlights the diverse fabric of the community but also underscores the importance of cultural sensitivity in ensuring meaningful and respectful interactions during the assessment of socio-economic impacts.

Table 11-1Stakeholders and Their Roles and Responsibilities

Stakeholders	Roles
Proponent/Responsible Authority	The discussion with the proponent proposed the mitigation measures and alternatives to control any disparity in the project.
Environmental Expert	The consultants from the Integrated Environment Consultants survey the project site to gather relevant information and to record the local community stance and behaviors regarding the project. And also the evaluation of socio-economic impacts of the project has been done.
Government Departments	The consulted government department includes Environmental protection agency, wildlife, planning, and development. The departments overviewed the proposed projects and its socio-economic impacts.

Local affected communities	The surveys determined the extent of community that could be affected and their verdict about the proposed project.

11.5 DISCUSSED POINTS

The points that have been kept in view while consulting stakeholders are as follows:

- Activities of the project and their consequences.
- Requirements of the people likely to be affected.
- Mitigation measures or compensation strategies.
- Role of the affected people in the implementation and development of the project.

11.6 AFFECTED AND WIDER COMMUNITY

In the vicinity of the proposed project, there is no identified affected community; however, the proactive engagement of the proponent with inhabitants from various villages has been instrumental in understanding and addressing local perspectives. The absence of a distinct affected community does not diminish the importance of comprehensive consultations. The proponent has undertaken conscientious efforts to reach out to residents across different villages, fostering a dialogue to assess the community's sentiments towards the project. Remarkably, the feedback from these consultations has been overwhelmingly positive, with residents expressing favorable views regarding the proposed endeavor. This positive reception is indicative of the proactive communication and collaborative approach adopted by the proponent, establishing a foundation of mutual understanding and support within the broader community. While the absence of an affected community streamlines certain aspects of the engagement process, the commitment to inclusive consultations with diverse stakeholders remains integral to building a harmonious relationship with the local population.

12 GRIEVENCE REDRESS MECHANISM

A Grievance Redress Mechanism (GRM) is a structured system established to address and resolve complaints, concerns, or issues raised by individuals or entities regarding their experiences or interactions. This mechanism typically involves clear channels for lodging complaints, whether through written communication, online platforms, or dedicated grievance officers. Once a grievance is registered, the mechanism ensures a systematic and fair investigation of the matter, taking into account all relevant information and perspectives. Timely resolution and effective communication with the aggrieved party are essential components, helping to restore trust and rectify any perceived injustices. An efficient Grievance Redress Mechanism not only safeguards the rights and interests of individuals but also contributes to organizational transparency, accountability, and continuous improvement in service delivery.

12.1 OBJECTIVES OF GRIEVANCE REDRESS MECHANISM

The objectives of a GRM are designed to provide an effective and transparent process for addressing and resolving complaints or grievances raised by individuals or entities affected by a project or organization. The key objectives of a Grievance Redress Mechanism include:

- Ensure that the grievance redress process is easily accessible to all stakeholders, providing a straightforward means for individuals or communities to voice their concerns.
- Promote a fair and impartial mechanism that treats all grievances with equal consideration, regardless of the stakeholder's background, status, or affiliation.
- Establish a system that addresses grievances in a timely manner, minimizing delays and providing prompt resolution to concerns to prevent prolonged dissatisfaction.
- Foster transparency in the grievance redress process, ensuring that stakeholders are informed about the status of their complaints and the steps taken to address them.
- Hold the organization or project accountable for addressing and resolving grievances in accordance with established policies and procedures.
- Utilize the grievance redress process as an opportunity for organizational learning, collecting feedback to identify areas for improvement in project implementation or organizational practices.
- Empower affected individuals or communities by giving them a voice in the decision-making process and acknowledging the importance of their concerns.
- Serve as a mechanism for resolving conflicts and disputes in a constructive manner, minimizing the potential for escalation and promoting harmonious relationships.

- Use insights gained from the grievance redress process to enhance project design, implementation strategies, and overall organizational practices for continuous improvement.
- Ensure that the grievance redress mechanism aligns with legal requirements, industry standards, and the principles of social responsibility.
- Strengthen community engagement by demonstrating a commitment to addressing concerns and maintaining open communication channels.

By achieving these objectives, a Grievance Redress Mechanism contributes to building trust, fostering positive relationships with stakeholders, and enhancing the overall social and environmental sustainability of a project or organization.

12.2 COMPONENTS OF GRM

GRM typically involves several basic steps to address and resolve complaints or grievances effectively. While specific procedures may vary depending on the organization or context, the following are common steps in a basic GRM:

- Individuals submit their grievances through designated channels, which may include online platforms, written communication, or direct contact with a grievance officer.
- The received grievance is formally registered in the system, assigning a unique identifier. This step ensures proper tracking and documentation of each complaint.
- A preliminary assessment is conducted to determine the nature and severity of the grievance. This step helps in categorizing grievances and prioritizing them based on urgency.
- A thorough investigation is carried out to gather relevant information and facts related to the grievance. This may involve interviews, document reviews, or other means of inquiry.
- Clear and timely communication is maintained with the aggrieved party throughout the process. Regular updates and feedback are provided to keep them informed about the progress of the investigation.
- Once the investigation is complete, appropriate measures are taken to address the grievance. This may involve corrective actions, policy changes, compensation, or other forms of redress, depending on the nature of the complaint.
- The resolution is communicated to the aggrieved party, and feedback is sought to ensure their satisfaction. Follow-up may be conducted to confirm that the resolution has been implemented and to monitor any lingering concerns.
- The entire process, from grievance registration to resolution, is documented for record-keeping and reporting purposes. This documentation aids in analysing trends, identifying systemic issues, and improving the overall grievance-handling process.

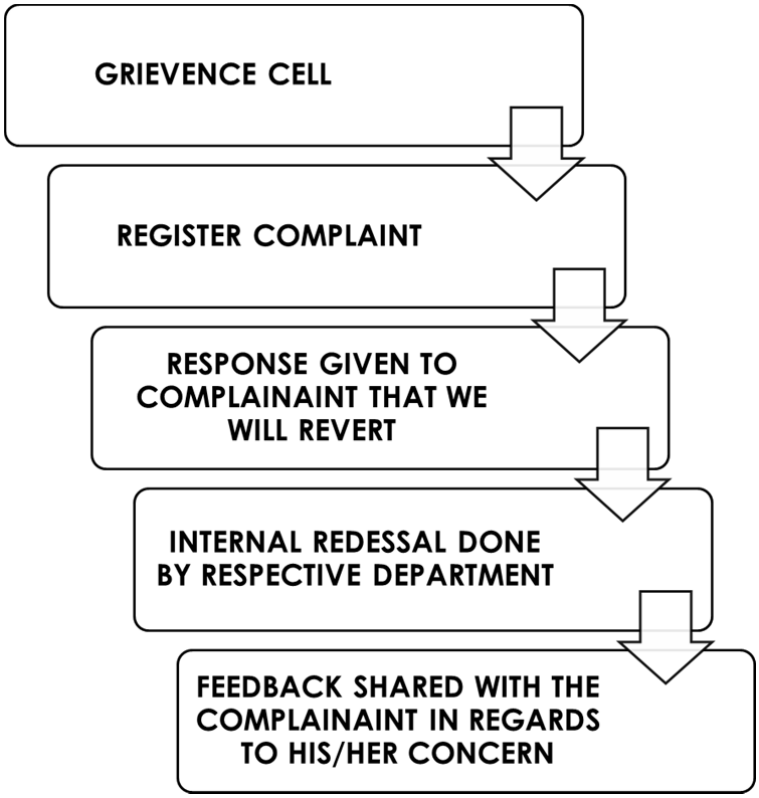


Figure 12-1 Grievance Redress Mechanism

CONCLUSION AND RECOMMENDATION

Based on the study conducted for EIA of the project, the following recommendations are made:

- Plantation as far as permissible and within the scope of the project to be carried out.
- Sustainable development approach through conservation of natural environment is followed.
- Environmental aspects of the project should be well taken care through implementation of the Environmental Management Plan as recommended in this report.
- The project management may adopt “cleaner and greener environment” as its motto and this will make the project more environment friendly.

On the basis of the findings of the EIA, it is concluded that the project will not pose any adverse impact on the local population and the environment. Therefore, it is recommended that the competent authority may please be issues Environmental Approval for the construction and operation of this project.

GLOSSARY

Air Quality	Measurement of the pollutants in the air; a description of healthiness and safety of the atmosphere.
Area	Area is the quantity that expresses the extent of a two-dimensional figure or shape, or planar lamina, in the plane.
Compensation	Includes cash payment, deferred payment, a bond, an insurance policy, stipend, payment in kind, rendition of services, grant of privileges and disturbance money, entitlement to special treatment by government and semi government entities, grant of alternative land, grant of import licenses and business, trade and commercial facilities in addition to the rehabilitation and resettlement of an affected person.
Consultation	Consultation refers to two-way transfer of information or joint discussion between project staff and the affected population. Systematic consultation implies a sustained and rigorous sharing of ideas. Bank experience shows that consultation often yields the best resettlement alternatives, fruitful procedures for continued participation, and independent information on actual conditions for implementation.
Coordinates **Contaminate**	Each of a group of numbers used to indicate the position of a point, line, or plane to make impure, pollute
Disclosure	The action of making new or secret information known
Disruption	Disturbance or problems which interrupt an event, activity, or process.
Environmental Management	Attempt to control human impact on and interaction with the environment in order to preserve natural resources
Evaluation	The making of a judgment about the amount, number, or value of something; assessment.
Geology	A science that studies rocks, layers of soil, etc., in order to learn about the history of the Earth and its life

Ground Water	Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solid content of 10,000 milligrams per liter or less, and are not "exempted aquifers.
Hazardous	Substance or material, which could adversely affect the safety of the public, handlers or carriers during transportation
Impact	Effect on someone or something
Land Acquisition	The process whereby a person is compelled by a public agency to cede all or part of the land a person owns or possesses, to the ownership and possession of that agency, for public purpose in return for compensation.
Mitigation	The action of reducing the severity, seriousness, or painfulness of something
Occupational Health	Maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs
Project Area	The area specified by the funding and/or implementing agency according to the Official Gazette Notification and includes the areas within the administrative limits of the Federal or a Provincial Government.
Proponent	A person who advocates a theory, proposal, or course of action.
Pharmaceutical	A pharmaceutical is any kind of drug used for medicinal purposes, like cough syrup or sleeping pills. You may have heard of a pharmacy, which is a place where you can buy medicinal drugs, or a pharmacist, which is a person who prepares those drugs.
Rehabilitation	Include all compensatory measures to re-establish; at least lost incomes, livelihoods, living and social systems. It does not include the payment of compensation for required assets.

Resettlement	Means all measures taken to mitigate all adverse impacts, resulting due to execution of a project on the livelihood of the project affected persons, their property, and includes compensation, relocation and rehabilitation.
Social Environment	It includes the culture that the individual was educated or lives in, and the people and institutions with whom they interact.
Scope	The extent of the area or subject matter that something deals with or to which it is relevant
Stakeholders	Include affected persons and communities, proponents, private and public businesses, NGOs, host communities and EPA.
Topography	Details of the surface features of land. It includes the mountains, hills, creeks, and other bumps and lumps on a particular hunk of earth.

List of Abbreviation

CO	**Carbon Monoxide**
CO_2	Carbon Dioxide
DHQ	District Headquarters
EA	Environmental Approval
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
GRM	Grievance Redress Mechanism
Gop	Government of Punjab
IEE	Initial Environmental Examination
M & E	Monitoring and Evaluation
NGO	Non-Governmental Organizations
OHS	Occupation Health and Safety
PEPA	Punjab Environmental Protection Act
PEQs	Punjab Environmental Quality Standards
PM	Particulate Matter
PPE	Personal Protective Equipment
TDS	Total Dissolved Solid
UNCED	United Nations Conference on the Environment and Development

REFERENCES

Listed below are some of the documents, reports and other references consulted during the preparation of this report:

1. Information and data provided by project proponents.
2. Project Pre-Feasibility Study Report;
3. Technical Design Data related to the project.
4. Information gathered through discussions with the project related persons of the project proponent;
5. Information collected from the Technical documents of various suppliers of machinery/equipment.
6. Punjab Environment Quality Standards for Ambient Air August 2016;
7. Punjab Environment Quality Standards Noise Levels August 2016;
8. Punjab Environment Quality Standards for Drinking Water August 2016:
9. Pakistan Environmental Protection Act, 1997;
10. The Punjab Environmental Protection (Amendment) Act 2012 covers aspects related to:
    - The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development.
    - Establishing complete regulatory and monitoring bodies, policies, rules, regulations and national environmental quality standards; and
    - To ensure enforcement, the act establishes regulating bodies i.e. Punjab Environmental Protection Council (PEPC) and responsible bodies i.e. Punjab Environmental Protection Agency (Punjab EPA) at Provincial level.

i. Environment related Laws in Pakistan and the Province of Punjab.
ii. Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review and Approval of Environmental Assessment, 2022;
iii. Google earth, maps.
iv. Guidelines for Public Consultations - These guidelines cover:
    - Consultation, involvement and participation of Stakeholders
    - Techniques for public consultation (principles, levels of involvements, tools, building trust)
    - Effective public consultation (planning, stages of EIA
    - where consultation is appropriate)
    - Consensus building and dispute resolution.

1. workplace safety and health act 2011
2. Land Acquisition Act (LAA) of 1894
3. The forest Act 1927
4. Pakistan Penal Code, 1860
5. Provincial Wildlife Act, 1974
6. Drugs Act 1976

TERM OF REFERENCES

1. The Consultant is required to carry out an Environment Assessment Study of the Project as required under section 12 of Pakistan Environmental Protection Act 1997/ Punjab Environmental Protection Act 2012.
2. The Study should be comprehensive and should cover all aspects which are envisaged under the relevant national and provincial's laws & regulations including but not limited to:

    - Identification and recommendation for suitable solution/treatment/mitigation measures of emissions and effluents such as wastewater and sludge etc. in accordance with Punjab Environmental Quality Standards (PEQS).
    - Identification and recommendation for suitable solution/treatment/mitigation measures of solvents, oils (tar), hazardous waste, organic compounds, steam, flue gases, particulate matter and chemical compounds harmful for the environment and other substances leading to air, noise, water and soil pollution in accordance with PEQS.

    The Study should be acceptable to the relevant national and/or provincial authorities (relevant authorities) in Punjab

ANNEXURES

CNIC OF PROPONENT

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
A Company setup under Section 42 of the Companies Ordinance, 1984 (now Companies Act, 2017)

PIEDMC/VIE/118/0678
April 07, 2025

M/s Fusion Chemicals (Pvt.) Ltd.
Through its CEO, Mr. Imran Shah,
House No. 11, Block-G, Shah Rukan-e-Alam Colony,
Multan.

POSSESSION OF INDUSTRIAL PLOT NUMBER 67 & 68 VEHARI INDUSTRIAL ESTATE, (VIE)

Dear Sir,

Please contact with the Project Director of Vehari Industrial Estate, Vehari in connection with the possession of the Plot No. **67 & 68** measuring **0.984** Acre situated at Vehari Industrial Estate, Vehari. Layout plan is enclosed.

Muhammad Ahmad Saeed
Company Secretary

A copy is forwarded to **Project Director,** Vehari Industrial Estate, Vehari with the request to please hand over the possession of Plot No. **67 & 68** to its Allottee **M/s Fusion Chemicals (Pvt.) Ltd.** The attached possession slip may please be returned to Marketing Department after doing the needful.

Note.
Please do not proceed with excavation of boundary wall without supervision of the site representative. Any damage done to the utilities without supervision will be borne by you.

Possession of Plot # 67, 68 having Area of 0.984 Acre done at site

Technical Officer (Civil)
Vehari Industrial Estate
(Muhammad Aamir)

Project Director 11/4/25
Vehari Industrial Estate
(Muhammad Waseem)

PUNJAB INDUSTRIAL ESTATES
DEVELOPMENT AND MANAGEMENT COMPANY
A Company setup under Section 42 of the Companies Ordinance, 1984 (now Companies Act, 2017)

PIEDMC/VIE/118/0679
April 07, 2025

M/s Fusion Chemicals (Pvt.) Ltd.
Through its CEO, Mr. Imran Shah,
House No. 11, Block-G, Shah Rukan-e-Alam Colony,
Multan.

ALLOTMENT LETTER

In pursuance of the approval of Zone Enterprises Entry Application No. PIE/VIESEZ/0363 vide dated **12-02-2025** it is notified and informed that **Plot No. 67 & 68** measuring **0.984** Acre situated in Vehari Industrial Estate, Vehari has been allotted to you.

The undersigned is pleased to notify that the payment due against you as sale price of the supra referred Plots have been completed and full payment has been received by the Company as per agreed price of the Plots per acre. However, if the area of the Plots is increased or decreased at the time of physical possession, the price of the Plots will be charged accordingly.

All the terms & conditions stated in the SEZ Act, 2012, SEZ Rules, 2013, SEZ Regulations, 2021 & any amendment made in SEZ Act & regulations hereafter and Vehari Industrial Estate Bye Laws remain binding. Kindly note that all duties, charges, taxes etc. imposed by the Federal/Provincial/City Government(s) from time to time shall be borne by the Allottee. All terms & conditions mentioned in the SEZ Zone Enterprise entry application remain binding.

The Sale Deed in your favour shall be issued after completion of the project.

Note: 1. This Allotment Letter is issued with the approval of Competent Authority of PIEDMC vide approval dated **07-03-2025.**

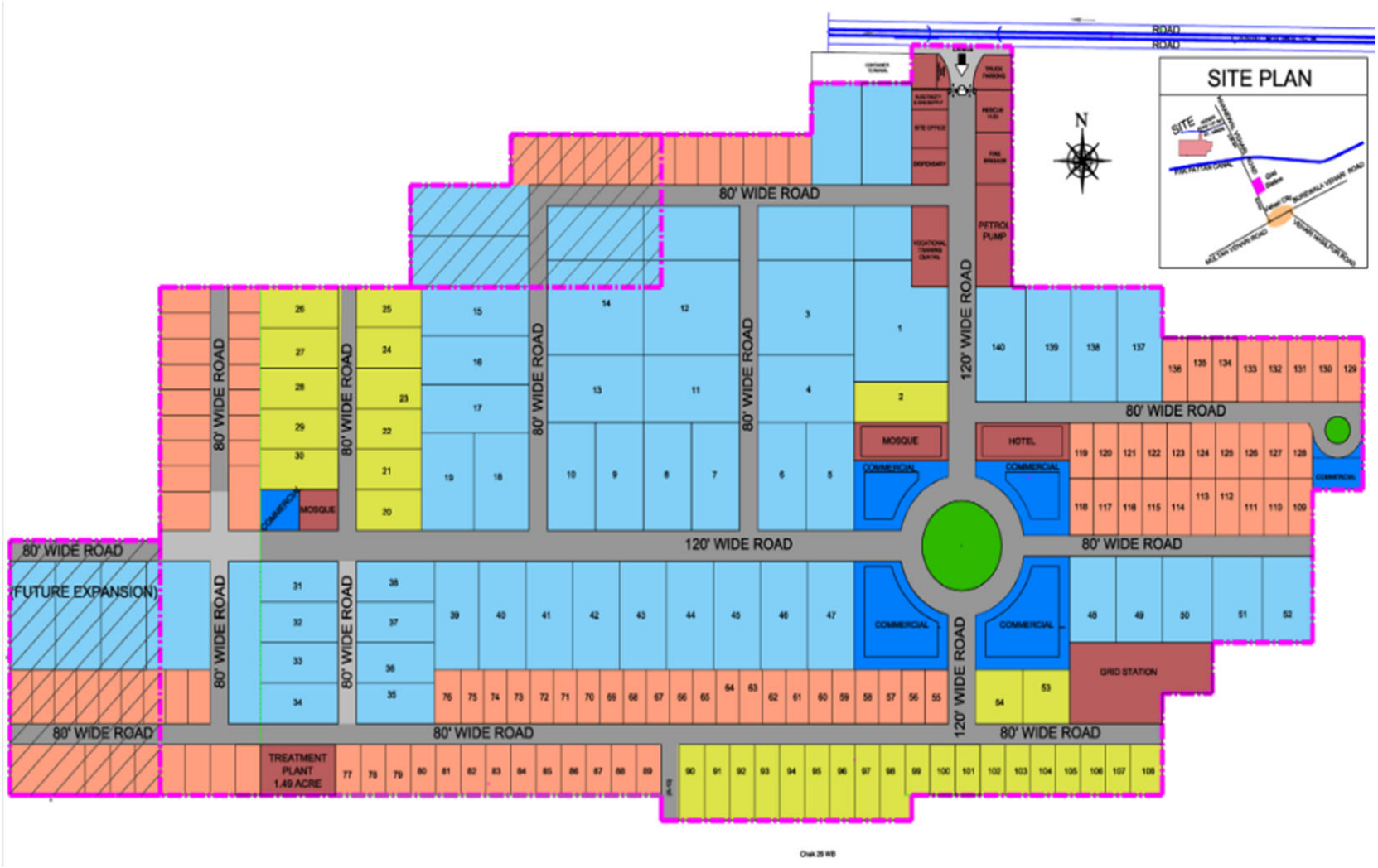
M. A Saeed 7/4/6

Muhammad Ahmad Saeed
Company Secretary

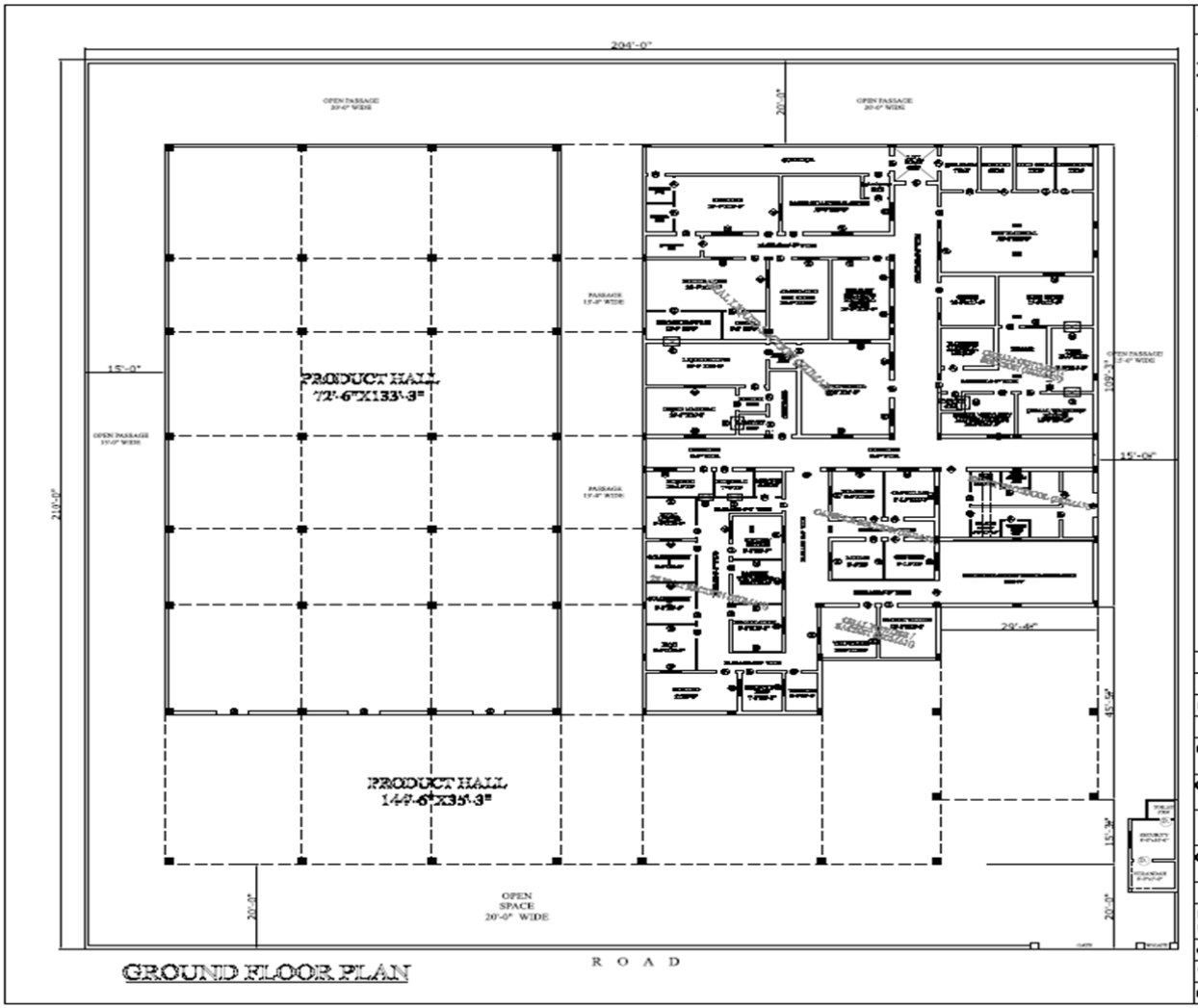
Head Office: Commercial Area (North) Sundar Industrial Estate, Sundar Raiwind Road, Lahore.
Tel: 042-35297203-6, Fax: 042-35297207, UAN: +92-42-111-743-743
Website: www.pie.com.pk E.Mail: info@pie.com.pk
An Approved Non Profit Organisation U/S 2(36) of Income Tax Ordinance 2001

ISO 9001:2015

VEHARI INDUSTRIAL ESTATE MASTER PLAN



LAYOUT PLAN OF PROPOSED PROJECT



TITLE

GROUND FLOOR PLAN OF FUSION CHEMICALS (Pvt.) Ltd. AT PLOT NO: 67-68 VEHARI INDUSTRIAL ESTATE, VEHARI, PAKISTAN.

DESCRIPTION	AREA	%
TOTAL AREA OF PLOT	42840 SFT	100%
COVAREA OF PRODUC HALL-1	9971 SFT	23.3%
COVAREA OF ORAL SECTION	3720 SFT	8.6%
COV AREA OF CREAM SECTION	2480 SFT	5.78%
COV AREA OF TABLET SECTION	1906 SFT	4.45%
COV AREA OF CAPSULS SECT	1329 SFT	3.10%
COV AREA OF ENTRY PROTOCO	322 SFT	1.50%
COVAREA OF PACKING HALL	429 SFT	1.00%
COV AREA OF VERANDAH CORRIDORS&COVERED	8731 SFT	20.38%
COVAREA OF GUARD ROOM	191 SFT	0.44%
TOTAL COVERED AREA OF PLOT	29105 SFT	67.94%
OPEN AREA OF PLOT	13735 SFT	32.06%

VIII

Source of Raw Material

S.No	Raw Material Name	Origin/ Source
1	Inositol	No.9 Longxiang Avenue,Huigh-Tech Industrial Park Zigong City Sichuan Province China
2	Nicotinamide	Red Sun Life Science Industrial Park Dangtu Economic Development Zone Maan Shan City Anhui Province China
3	L- Carnitine	No 100 Xianghuai Road Benxi Economic Development Zone Lianoning China
4	Pyridoxin Hydrochloride	East Of Huafeng Road South Of Beiwaihuan Kenli Development Zone Dongying City Shandong Province Of China
5	Vitamin E Acetate	No. 428 Xinchang Dadao West Road Qixing Street Xinchang Country Zhejiang Province China
6	Vitamin B2	Overpass West, Ruzhou City Henan Province China
7	L-Threonine	Mulitu town Keerquin Dis tongliao inner Mongolia China
8	L lysine sulphate	West Yunhai Street South Zhujiang Road Baicheng Industrial Park China
9	Vitamin E Acetate Powder	No B Binjiang South Road Yuilin Street Xinchang Country Zhejiang Province China
10	Isoleucine	No 188 Fangzheng East Street Gn Quan Pu Economic And Technological Development Zone Urumqi City Xinjiang Province PRC China