ESTABLISHMENT OF PHARMACEUTICAL MANUFACTURING FACILITY (GENERAL TABLETS, CAPSULES, AND ORAL LIQUIDS) BY M/S OLIVE LABORATORIES

PLOT NO. 52, S-6, NATIONAL INDUSTRIAL ZONE, RAWAT, RAWALPINDI

ENVIRONMENT IMPACT ASSESSMENT

(EIA)

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EXECUTIVE SUMMARY

The proposed industrial project by M/S Olive Laboratories, involves the establishment of a pharmaceutical manufacturing facility located on a 4 Kanal industrial plot located at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi. In strict compliance with regulatory requirements and licensing standards, this documentation is processed to support the facility's operations under its approved Drug Manufacturing Licence (Form-2 DML No. 000524). The industrial layout and infrastructure feature specialized production blocks, clean areas, quality control laboratories, and administrative spaces dedicated to pharmaceutical formulation. Furthermore, all operational processes covering the manufacturing of general tablets, capsules, and oral liquids (with key finished brand products including Omnidol NU Tablets, Ciprolive Tablets, Ovilox Tablets, and Azolive Tablets utilizing raw materials such as Paracetamol, Ciprofloxacin, Levofloxacin, and Azithromycin), alongside waste management protocols (such as twice-a-month pharmaceutical waste incineration via RECP Pakistan) are managed in compliance with established industrial standards, DRAP regulations, and ISO certifications (ISO 9001, ISO 14001, and ISO 45001). The total cost of the project is PKR 110 Million.

I. Objectives of the Project

The need for this pharmaceutical manufacturing facility project by M/S Olive Laboratories arises from the growing commercial demand for safe, high-quality medicines within the industrial and healthcare sectors. By systematically utilizing the industrial plot at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi, the project establishes a dedicated formulation unit equipped with specialized production blocks, clean areas, and quality control laboratories. Strategically situated within an established industrial zone, it ensures a reliable supply of essential medicines including general tablets, capsules, and oral liquids such as Omnidol NU, Ciprolive, Ovilox, and Azolive. Ultimately, this development provides a structured industrial model that complies with national drug regulations and environmental standards while boosting the local economy and creating employment opportunities.

II. Environment Category 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 class B (2) Chemical manufacturing units, including **pharmaceuticals** and cosmetic .Hence, it is subject to the preparation and submission of an EIA, therefore requires the submission of an Environment Impact Assessment (EIA) to the Punjab Environmental Protection Agency for environmental approval and the issuance of a formal No Objection Certificate (NOC).

III. Title and Location of the Project

Title: Establishment Of Pharmaceutical Manufacturing Facility (General Tablets, Capsules) by M/S Olive Laboratories.

Location: Plot No. 52, S-6, National Industrial Zone, Rawat, Rawalpindi.

IV. GPS Coordinates:

The Google image of the project is provided in Figure A1. The Google Coordinates of the project site are provided below:

Latitude	33°31'0.85"N
Longitude	73°14'49.78"E

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Figure 0-1: Location of the project site

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d

V. Name of the Proponent

Name	Ammar Amjad
CNIC	37405-4936096-7
Address	Plot No. 52, Street S-6, Industrial Area, Rawat, Rawalpindi

VI. Project Consultants

Integrated Environment Consultants
Office: 218 Upper Mall Scheme Lahore, Pakistan.
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VII. Brief outline of the Proposal

The project involves the establishment and operational execution of a modern pharmaceutical manufacturing facility by M/S Olive Laboratories on a 4 Kanal industrial plot located at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi. The facility is dedicated to pharmaceutical formulation, focusing on general tablets, capsules with key branded products including Omnidol NU, Ciprolive, Ovilox, and Azolive. Its structured infrastructure encompasses dedicated clean production zones, quality control laboratories, raw material and finished goods warehouses, and administrative blocks designed for smooth logistical workflows. Operating under a total project cost of PKR 110 Million, the facility strictly complies with national standards through its approved Drug Manufacturing Licence (Form-2 DML No. 000524), ISO 9001, 14001, and 45001 certifications, and a formal waste management agreement with RECP Pakistan to ensure full environmental and regulatory compliance.

Table 0-1: Area for each Amenity and Ground Coverage (Area Break-up)

Parameter	Details / Specifications
Name of Proponent / Chief Executive	Mr. Ammar Amjad (Chief Executive, M/S Olive Laboratories)
Developer / Entity	M/S Olive Laboratories
Name of Project	M/S Olive Laboratories Pharmaceutical Manufacturing Facility
Location / Address of the Site	Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi
Salient Features of the Project	Specialized production blocks, clean areas, quality control laboratories, raw material and finished goods warehouses, administrative office blocks, and main gate entry points
Major Processes During Construction & Operation	Civil infrastructural development, machinery installation, raw material mixing, wet/dry granulation, tablet compression and coating, capsule encapsulation, liquid compounding and filling, and rigorous quality testing
Estimated Cost of Project	110 million PKR
Plot Area of the Project	Total Area of 4 Kanal (approximately 21,780 Sft)

Electricity Connection Capacity	Industrial grid connection and dedicated power provisions as per approved National Industrial Zone regulations
Project Completion Duration	As per industrial establishment and regulatory approval schedules mandated by the relevant authorities

VIII. Project Impacts and Recommendations for their Mitigation

Table 1 shows the project impacts; related with construction and operation and accordingly mitigation measures have also been proposed to safeguard the environment and for sustainable development.

Table 0-2: Project Impacts and their Mitigations Measure

Screening of possible Impacts during Design/Pre- Construction phase

Potential Issue	Likelihood	Consequence	Risk Level	Residual Impact (After Mitigation)
Land ownership and site title verification	Low	Delay in regulatory approvals and NOC issuance	Medium	Negligible via verified legal allotment for M/S Olive Laboratories
Site preparation and soil disturbance	Medium	Loss of surface cover across the 4 Kanal plot	Medium	Minor via organized structural layouts and green buffers
Traffic movement from transport vehicles	Medium	Road congestion on internal estate corridors	High	Negligible via off-peak scheduling and dedicated entry gates

Screening of possible Impacts during Construction phase

Potential Issue	Likelihood	Consequence	Risk Level	Residual Impact (After Mitigation)
Land title and regulatory verification	Low	Delay in statutory approvals and licensing	Medium	Negligible via verified ownership for M/S Olive Laboratories
Site clearance and civil work	Medium	Minor disruption across the 4 Kanal plot	Medium	Minor via organized layout plans
Soil compaction and grading	High	Localized runoff and soil displacement	High	Negligible via proper grading and leveling
Dust emissions from construction activities	High	Air quality nuisance on industrial corridors	High	Negligible via regular water sprinkling

Noise and vibration from equipment setup	Medium	Disturbance to neighboring industrial units	Medium	Negligible via restricted working hours
Construction debris and packaging scrap	Medium	Blockage of internal drainage networks	Medium	Minor via prompt waste clearance and disposal protocols

Screening of possible Impacts during Operational Phase

Potential Issue	**Likelihood**	**Consequence**	**Risk Level**	**Residual Impact (After Mitigation)**
Pharmaceutical and hazardous solid waste	High	Contamination or improper disposal risks	High	Low via RECP Pakistan incineration agreement and safe segregation
Industrial and washing wastewater discharge	High	Drainage or water pollution risks	High	Low via proper effluent management and PEQS compliance
Fugitive emissions from formulation processes	Medium	Air quality impact from powder handling	Medium	Negligible via dust collection and HVAC filtration systems
Noise from generators and utility equipment	Medium	Disturbance to neighboring units	Medium	Negligible via acoustic enclosures and regular maintenance
Energy and water resource consumption	High	Strain on utility lines	Medium	Low via energy-efficient machinery and resource optimization
Worker health and safety hazards	High	Workplace injuries or chemical exposure	High	Low via mandatory PPE compliance and ISO 45001 protocols
Regional employment and economic boost	High (Positive)	Local economic development	Positive	Long-term positive via job creation and stable medicine supply

IX. Proposed Monitoring

The Monitoring Program (MP) for the proposed **M/S Olive Laboratories** Pharmaceutical Manufacturing Facility is systematically aligned with the environmental approval conditions to be awarded by the Punjab Environmental Protection Agency (Punjab EPA). The program will provide critical information for effective environmental management, enabling adaptive responses based on the assessment of mitigation measures implemented throughout the project cycle. Regular monitoring of key environmental and operational parameters during the pre-construction, construction, and operation phases will help assess the extent to which pharmaceutical formulation, processing, and allied activities may impact the surrounding environment. The program will ensure strict compliance with the Punjab Environmental Protection Act, 2012, the Review of IEE & EIA

Regulations, 2022, DRAP guidelines, and all relevant Punjab Environmental Quality Standards (PEQS).

Table 0-3: Environmental Monitoring Parameters

Sr. No.	Monitoring Parameters	Monitoring Mechanism	Frequency	Responsibility
During Construction Phase				
1	Dust Emissions	Ambient particulate matter (PM_{10} and $PM_{2.5}$) monitoring around the 4 Kanal active plot footprint and unpaved transit tracks.	Quarterly	Proponent & Contractor
2	Noise Levels	Noise meter testing at boundary line sensitive receptors, including nearby industrial units and internal estate access corridors.	Quarterly (Third-Party Lab)	Proponent & Contractor
3	Soil & Construction Solid Waste	Visual inspection of industrial excavation zones, foundation levelling areas, and mandatory record-keeping of masonry debris and packaging disposal.	Weekly	Proponent & Contractor
4	HSE Plan Implementation	Daily monitoring of site safety, proper PPE use during structural setup and equipment placement, scaffolding safety, and worker hygiene.	Daily	Proponent & Contractor
During Operational Phase				
1	Industrial Effluent Quality	Grab sampling and laboratory testing of treated industrial wastewater, washing outflows, and facility discharge parameters as per PEQS.	Quarterly (EPA-Certified Third-Party Lab)	Proponent & Facility Manager
2	Ambient Air Quality & Fugitive Emissions	Ambient PM_{10}, $PM_{2.5}$, and exhaust monitoring at property lines, focusing on areas adjacent to formulation and ventilation exhaust points.	Bi-annually / As per PEQS	Proponent & Facility Manager
3	Noise Levels	Noise meter readings at the plant boundary walls and near standby power generators and utility equipment.	Quarterly (Third-Party Lab)	Proponent & Facility Manager

4	Hazardous & Solid Waste Management	Inspection of pharmaceutical waste handling practices, secure indoor storage zones, and incineration tracking logs via RECP Pakistan.	Weekly	Proponent & Facility Manager
5	Water Conservation & Usage	Volumetric tracking and logs of water consumption drawn from industrial estate or localized supply sources to prevent resource depletion.	Monthly	Proponent & Facility Manager
6	EHS & Industrial Sustainability	Monitoring of perimeter green strip buffer zones, structural integrity checks of cleanroom and manufacturing floors, and fire safety compliance.	Daily	EHS Officer / Facility Manager

X. Environmental Management Cost

The cost for environmental management and monitoring will be integrated into the contracts of the Contractor and Consultants respectively. However, a lump sum amount will be allocated by the project proponent as a dedicated budget for environmental training and monitoring during the construction and operation of the project. The estimated total capital cost of the **M/S Olive Laboratories** Pharmaceutical Manufacturing Facility is **PKR 110 Million**. Out of this capital budget, a dedicated financial allocation (**PKR 110,000,000.00**) has been made to fulfil the environmental commitments, safety setups, and monitoring regimes as detailed below:

Table 0-4: Environmental Management Cost

Environmental Component	Quantity / Specification	Amount (PKR)
Tree Plantation & Green Belt Development	500 saplings (Native industrial zone species and perimeter green strip buffer shrubs tailored for boundary stabilization across the 4 Kanal plot)	350,000
Health, Safety & Environment (HSE) Measures	Lump Sum (First Aid Kits, site-wide Fire Extinguishers, specialized protective gear for cleanroom operations, chemical safety kits, and mechanical PPE for manufacturing crews)	300,000
Environmental Parameter Monitoring	Lump Sum (Quarterly EPA-certified third-party testing for pharmaceutical effluent quality, ambient air quality, PM2.5/PM10 around ventilation exhaust points, and noise levels near generator yards)	250,000

Environmental & Safety Sustainability Trainings	Lump Sum (Annual refresher training for factory management, plant operators, and technical staff on pharmaceutical waste handling via RECP Pakistan, water conservation, and emergency response protocols)	200,000
Total Environmental Management & Monitoring Cost	—	**1,100,000**

XI. Stakeholder Consultations

A comprehensive stakeholder consultation process was conducted for the M/S Olive Laboratories Pharmaceutical Manufacturing Facility, engaging key groups including project proponents, National Industrial Zone authorities, neighbouring manufacturing units, and potential workforce members. The consultations focused on sharing project details regarding the 4 Kanal pharmaceutical formulation plant, addressing potential concerns related to pharmaceutical waste disposal, effluent management, traffic movement, and local employment opportunities. Stakeholders expressed broad support for the initiative due to its localized economic benefits, healthcare contributions, and job creation, while emphasizing the importance of strict adherence to environmental controls, proper hazardous waste handling via RECP Pakistan, and compliance with Punjab Environmental Quality Standards (PEQS) throughout the construction and operational phases.

XII. Conclusion

The Environmental Impact Assessment (EIA) study was undertaken to thoroughly evaluate the potential environmental and social impacts of the proposed M/S Olive Laboratories Pharmaceutical Manufacturing Facility. All relevant environmental aspects have been systematically identified through comprehensive technical evaluations and stakeholder consultations, and appropriate mitigation measures have been embedded throughout the project cycle. The EIA has been prepared in full compliance with the Punjab Environmental Protection Act, 1997 (Amended 2012) and the Punjab Environmental Protection Agency (Review of IEE & EIA) Regulations, 2022.

Based on the baseline findings, impact evaluations, and proposed control mechanisms, it is concluded that the establishment and operation of this modern pharmaceutical facility will significantly contribute to regional economic growth, industrial advancement, and stable medical supply chains without generating unmanageable adverse impacts. Neighboring units and local industrial authorities have expressed strong support for the project. Furthermore, the mandatory adoption of advanced cleanroom filtration, proper wastewater management, secure hazardous waste protocols via RECP Pakistan, and perimeter green strip buffers guarantees strict adherence to Punjab Environmental Quality Standards (PEQS) and the long-term preservation of environmental integrity and public health.

1 INTRODUCTION

Planned industrial and manufacturing developments play a vital role in strengthening Pakistan's economic and healthcare sectors by ensuring a steady supply of locally produced essential goods and fostering employment. However, unmanaged industrial activities can pose environmental risks, such as pharmaceutical wastewater pollution, air emissions, and hazardous waste accumulation. In the National Industrial Zone, Rawat, Rawalpindi, the establishment of a systematically planned pharmaceutical facility is essential to drive economic productivity while ensuring strict environmental compliance. To address these needs, M/S Olive Laboratories has proposed the establishment of a modern pharmaceutical manufacturing facility located at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi. Led by Chief Executive Mr. Ammar Amjad and spanning an area of 4 Kanal, the facility features specialized production blocks, clean areas, quality control laboratories, and structured wastewater routing. The project incorporates sustainable environmental management practices, cleanroom filtration, and safe waste disposal protocols via RECP Pakistan. Ultimately, the project will contribute directly to regional economic growth and stable medicine production while aligning strictly with the Punjab Environmental Protection Act (Amended 2012), DRAP regulations, and Punjab Environmental Quality Standards (PEQS).

1.1 Objectives of the project

The main objective of the project is to establish a modern, structurally optimized, and environmentally sound pharmaceutical manufacturing facility under the name of M/S Olive Laboratories to meet the rising regional demand for high-quality, life-saving medicines while ensuring strict regulatory compliance. The project aims to achieve the following key targets:

- **Sustainable Industrial Technology**: Deliver an efficient cleanroom and operational layout across a 4 Kanal plot area located in the National Industrial Zone, Rawat, Rawalpindi, integrating specialized production blocks, quality control laboratories, and secure raw material warehouses.
- **Environmental & Regulatory Compliance:** Ensure full alignment with the Punjab Environmental Protection Act (Amended 2012), Review of IEE & EIA Regulations (2022), Drug Regulatory Authority of Pakistan (DRAP) standards, and Punjab Environmental Quality Standards (PEQS) through integrated pollution control systems and hazardous waste management via RECP Pakistan.
- **Logistical & Infrastructure Excellence**: Maximize regional industrial connectivity by utilizing dedicated main gate entry points and structured internal maneuvering tracks, balancing heavy raw material haulage and distribution transport flows within the plot boundary.
- **Socio-Economic & Regional Growth:** Generate steady technical, professional, and administrative employment opportunities while boosting regional healthcare manufacturing activity and economic growth in the Rawalpindi area.
- **Public Health & Environmental Safety**: Prevent resource depletion and operational hazards by installing advanced HVAC filtration systems, dedicated water storage units,

and maintaining strict Health, Safety, and Environment (HSE) protocols alongside ISO 9001/14001/45001 standards.

1.2 Need of the Project

The need for the project arises from rising healthcare demands and the growing regional need for affordable, high-quality pharmaceuticals (such as Omnidol NU, Ciprolive, Ovilox, and Azolive tablets), reducing reliance on imported alternatives. Many existing facilities struggle with modern regulatory requirements or lack integrated environmental management systems.

By establishing a modern pharmaceutical manufacturing plant on a 4 Kanal plot in the National Industrial Zone, Rawat, this project addresses these gaps. It provides an efficient, eco-friendly operation equipped with cleanroom technology, structured waste management via RECP Pakistan, and strict regulatory compliance. Ultimately, the facility boosts regional economic growth, ensures a stable medicine supply, and creates valuable local employment opportunities.

1.3 Location of the Project

The proposed pharmaceutical manufacturing facility, M/S Olive Laboratories, is strategically located at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi. Spanning a total plot area of 4 Kanal, the site is fully equipped for industrial and pharmaceutical operations, featuring specialized production blocks, clean areas, quality control laboratories, and storage yards with direct access to wide industrial estate roads for seamless transport and logistics. Situated within an approved industrial zone, the site provides a fully compatible setting that ensures proper isolation from sensitive receptors while utilizing established municipal and estate infrastructure. Backed by clear legal possession and full regulatory compliance, the location perfectly balances excellent transport connectivity with structured industrial zoning for sustainable and compliant medicine manufacturing.

Latitude	33°31'0.85"N
Longitude	73°14'49.78"E

1.4 Environment Category 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 class B (2) Chemical manufacturing units, including pharmaceuticals and cosmetic .Hence, it is subject to the preparation and submission of an EIA, therefore requires the submission of an Environment Impact Assessment (EIA) to the Punjab Environmental Protection Agency for environmental approval and the issuance of a formal No Objection Certificate (NOC).

1.5 Objectives of the EIA Report

The overall objective of this Environmental Impact Assessment (EIA) study is to thoroughly assess the potential environmental and social impacts of the proposed

pharmaceutical manufacturing facility under the name of M/S Olive Laboratories and to recommend appropriate mitigation measures to prevent or minimize any adverse effects on the surrounding industrial environment and the local community. This EIA has been prepared to ensure that environmental, social, and drug regulatory considerations are fully integrated into the planning, design, plant installation, and long-term operations of the facility. It establishes a practical framework to manage industrial and operational impacts through advanced cleanroom filtration, proper wastewater routing, secure hazardous waste management via RECP Pakistan, monitoring protocols, and institutional arrangements in strict compliance with the Punjab Environmental Protection Agency.

1.6 Proponent of the Project

Name	Ammar Amjad
CNIC	37405-4936096-7
Address	Plot No. 52, Street S-6, Industrial Area, Rawat, Rawalpindi

1.7 Project Consultants

Integrated Environment Consultants
Office: 218 Upper Mall Scheme Lahore, Pakistan.
Phone: (042) 37897273
Email: inenvconsultants@yahoo.com

1.8 Approach and Methodology

The detailed approach and methodology used for this EIA study involved a comprehensive review of relevant environmental guidelines, pharmaceutical manufacturing data, and project-specific engineering plans. This included:

(a) Regulatory Review: A rigorous review of the Punjab Environmental Protection Act (Amended 2012), Drug Regulatory Authority of Pakistan (DRAP) directives, industrial zoning guidelines, and applicable Punjab Environmental Quality Standards (PEQS).

(b) Spatial & Geographic Analysis: Analysis of Google Earth satellite imagery to evaluate land use, the localized industrial estate layout, and access corridors within the National Industrial Zone, Rawat.

(c) Baseline Data Assessment: Examination of District Census Reports (DCR), regional climate profiles, and meteorological data of the Rawalpindi region.

(d) Comparative Benchmarking: Reference to approved EIA reports from comparable pharmaceutical and industrial manufacturing projects.

Both published and unpublished data sources were systematically utilized to evaluate the physical (air, water, noise, soil), biological, and socio-cultural environment of the project area.

Phase	Activities	Status	Responsibility
Screening and Scoping	Reconnaissance site visits, baseline environmental screenings, identification of industrial terrain parameters, and mapping proximity to National Industrial Zone infrastructure and neighbouring plots.	Carried out during the present EIA	Environmental Consultant / Proponent Perspective
Impact Assessment	Identification of potential environmental and social impacts (pharmaceutical effluent, fugitive air emissions from powder handling, hazardous solid waste generation, and heavy transport traffic) through site visits, engineering design reviews, and cleanroom layout evaluations.	Carried out during the present EIA	Environmental Consultant / Proponent Perspective
Impact Categorization & Mitigation	Tabulation of key operational impacts (such as formulation dust and pharmaceutical waste), followed by prescribing engineered mitigation measures like HVAC filtration, pollution control systems, and wastewater routing.	Carried out during the present EIA	Environmental Consultant / Proponent Perspective
EMP Preparation	Development of the Environmental Management Plan (EMP), including effluent testing protocols, hazardous waste tracking via RECP Pakistan, and stakeholder consultations regarding local resource sharing.	Prepared as part of the present EIA	Environmental Consultant / Proponent Perspective
Final EMP Approval	Integration of institutional monitoring schedules, third-party testing frameworks, and final EMP documentation into the report body.	Included in the final EIA report	Environmental Consultant / Proponent Perspective

1.9 Impact Assessment and Mitigation Measures

A systematic approach was adopted for impact identification and assessment across the M/S Olive Laboratories Pharmaceutical Manufacturing Facility, covering all phases from initial scoping to long-term formulation and packaging operations. Potential impacts including pharmaceutical dust emissions, cleanroom ventilation exhausts, machinery noise, heavy transport traffic, and industrial wastewater generation were thoroughly analyzed in relation to the 4 Kanal plot layout and plant installation

workflows. Tailored mitigation measures have been robustly integrated to control these effects, featuring proactive dust suppression, engineered HVAC filtration systems, proper wastewater routing, secure hazardous waste management via RECP Pakistan, and perimeter green strip buffers. These strategies ensure strict compliance with Punjab Environmental Protection Agency (EPA) standards, DRAP guidelines, and sustainable industrial practices.

1.10 Environmental Management Plan (EMP)

An Environmental Management Plan (EMP) has been developed for the effective implementation of the recommended mitigation measures. It includes specific engineering and operational controls to minimize any identified impacts such as fugitive dust emissions, machinery noise, and industrial wastewater discharge, alongside a structured program to monitor the effectiveness of these mitigation measures and any residual impacts during execution. Furthermore, the EMP clearly assigns institutional roles and responsibilities to all concerned parties, ensuring clear accountability from the proponent perspective during both the plant installation and long-term manufacturing operational phases of the industrial project.

1.11 Environmental Monitoring Plan

An Environmental Monitoring Plan has been developed for the assessment of the effective implementation of the recommended environmental safeguards and to evaluate the efficiency of the monitoring protocols during project execution. The purpose of this Environmental Monitoring Plan is to ensure that the industrial manufacturing facility strictly follows provincial environmental regulations, and that any adverse effects on ambient air quality, industrial wastewater streams, and acoustic levels are mitigated and monitored meticulously throughout the project's entire lifecycle from the proponent perspective.

1.12 Structure of the Report

This EIA document is structured as follow:

- **Chapter 1**– "Introduction" describes introduction, location of project, objective and purpose of the EIA report.
- **Chapter 2-"**Screening of the project" describes the process of categorizing the project to determine the level of environmental assessment required by law.
- **Chapter 3-"**Scoping of the project" identifies the specific environmental issues and boundaries that need to be prioritized and analyzed within the study.
- **Chapter 4 –** Analysis of Project Alternatives" discusses the available options and selection of the most suitable options based on specific criteria.
- **Chapter 5 –** "Project Description" provides an overall project description, including its background, features and key components, timeframe and costs.
- **Chapter 6– "**Description of the Environment" comprises a detailed narrative of the existing (baseline) conditions of the project area, with respect to its physical, biological and socio-economic environment."
- **Chapter 7**– "Anticipated Environmental Impacts & Mitigation Measures" elaborates the likely impacts of the project on the physical, biological and socio-economic

environment during the construction and operation stages and lays down the proposed measures to mitigate the adverse impacts of the project.

- **Chapter 8** – "Environmental Management Plan and Institutional Requirements" provides the mechanism to be adopted for the implementation of measures and monitoring the environment during all stages.
- **Chapter 9 –** "Public Consultation and Information Disclosure" provides a summary of consultative sessions with the local community as well as with other stakeholders, including local government officials for their opinions and suggestions on the project.
- **Chapter 10–** "Conclusion and Recommendations" gives the conclusion of the EIA study and recommendations for the construction and operational stages.

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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 class B **(**Manufacturing and processing**), Series 2.** This regulatory framework ensures that the project is developed and implemented in a socially, economically, and environmentally sustainable manner. Following list shows the projects included in Schedule II, Class B.

B. Manufacturing and processing

1. Cement plant
2. **Chemical manufacturing units, including pharmaceuticals and cosmetics**
3. Sugar mills and distilleries
4. Food processing industries, including beverages, milk, and dairy products with a total cost exceeding Rs. 200 million
5. Paper and paperboard, paper pulping, paints, and dyes
6. Textile units comprising dyeing and printing
7. Pesticide and fertilizer manufacturing units
8. Poultry waste processing units and rendering units
9. Tanneries and leather units
10. Rubber projects with a total cost exceeding Rs. 100 million
11. Battery manufacturing and recycling plants
12. Ceramics and glass units
13. Electroplating and nickel or chrome plating, including surgical units
14. Cutlery units
15. Slaughterhouses
16. Iron and steel rolling mills
17. Steel furnaces
18. Smelting plants
19. Automobile manufacturing and assembling units
20. Resource recovery units

M/S Olive Laboratories requires an Environmental Impact Assessment (EIA) due to the nature and scale of its pharmaceutical manufacturing and formulation operations, which involve potential risks related to wastewater generation, fugitive emissions, and industrial waste. The EIA evaluates the project's impact on local air, water, and soil while integrating essential mitigation measures such as advanced HVAC filtration, secure waste management via RECP Pakistan, proper effluent routing, and perimeter green buffers. This ensures full compliance with the Punjab Environmental Protection Act, 1997 (Amended 2012), DRAP guidelines, and sustainable industrial practices.

3 SCOPING OF THE PROJECT

The scoping process outlines the essential concerns and impacts requiring detailed investigation. It establishes the spatial and temporal limits, crucial concerns raised during consultations, and significant impacting factors impacting the project.

3.1 Spatial and Temporal Boundaries of Environmental Assessment

Spatial and temporal boundaries define the geographical extent and operational timeframe of environmental impacts associated with the project. The spatial boundary covers the 4 Kanal site within the National Industrial Zone, Rawat, Rawalpindi, extending to immediate neighboring industrial units and access routes to evaluate air, noise, and effluent effects. Temporal boundaries encompass short-term construction impacts and long-term pharmaceutical manufacturing operations.

Latitude	33°31'0.85"N
Longitude	73°14'49.78"E

3.2 Important issues and concerns raised during consultation

The EIA for the M/S Olive Laboratories Pharmaceutical Manufacturing Facility incorporated a structured two-stage consultation process. The initial stage engaged local industrial estate management, neighbouring industrial operators, and environmental stakeholders to evaluate potential concerns regarding pharmaceutical wastewater discharge, cleanroom ventilation, and transport traffic. A second stage of broader public participation and hearings will be conducted if deemed necessary by the Punjab EPA. This ensures comprehensive feedback from local workers, facility managers, and community members, helping refine the EIA and maintain complete transparency throughout the project lifecycle.

3.3 Significant impacts and factors to be determined

For the **M/S Olive Laboratories Pharmaceutical Manufacturing Facility**, significant environmental, occupational, and operational impacts are evaluated across cleanroom installation and medicine formulation processes. Key factors include:

- **Air Quality:** Managing fugitive dust from powder mixing and tableting, alongside emissions from HVAC systems and backup generators.
- **Wastewater Management:** Ensuring safe routing and pre-treatment of pharmaceutical wash water and domestic effluent to meet PEQS standards.
- **Resource Consumption:** Optimizing energy use, purified water systems, and raw material utilization.
- **Solid Waste Management:** Secure handling and disposal of hazardous pharmaceutical waste (expired batches, chemical residues) via RECP Pakistan, alongside general packaging waste.

- **Community & Infrastructure:** Monitoring ambient noise from mechanical equipment and managing transport logistics within estate corridors.
- **Emergency Preparedness:** Implementing robust safety protocols for chemical spills, fire hazards, and cleanroom containment breaches.

Systematic mitigation of these factors ensures worker safety, environmental protection, and strict compliance with PEQS and DRAP regulations.

3.4 Development of an Environmental Management Plan

The Environmental Management Plan (EMP) for M/S Olive Laboratories Pharmaceutical Manufacturing Facility outlines essential strategies to mitigate industrial and chemical impacts, ensure regulatory compliance, and promote sustainable pharmaceutical manufacturing operations. Key components include:

- **Impact Scope & Mitigation:** Identifies environmental risks such as pharmaceutical powder dust, HVAC and mechanical noise, and process wastewater and prescribes engineered controls like advanced cleanroom filtration, proper effluent routing, secure hazardous waste management via RECP Pakistan, and perimeter green buffers.
- **Monitoring & Compliance:** Establishes continuous tracking protocols for indoor air quality, industrial effluents, and acoustic levels to guarantee strict adherence to Punjab Environmental Quality Standards (PEQS) and DRAP requirements.
- **Safety & Adaptation:** Features robust emergency response plans for chemical spills, fire hazards, or cleanroom containment breaches, alongside stakeholder engagement strategies and a framework for regular EMP updates as production demands evolve.

4 ALTERNATIVES OF THE PROJECT

4.1 Alternatives Considered, and Reasons for their Rejection:

- The project evaluated three key alternatives to ensure optimal environmental and operational performance:
- **No Project / Zero Option:** Rejected because it would sacrifice crucial local employment and the regional supply of essential medicines, outweighing the minor, manageable impacts of a regulated facility.
- **Site Alternatives:** Alternative locations were assessed, but the designated 4 Kanal plot in the National Industrial Zone, Rawat, was selected for its existing industrial zoning, utility readiness, and strategic transport access.
- **Technology and Design Alternatives:** Conventional manufacturing designs were rejected in favor of advanced cleanroom architecture, high-efficiency HVAC filtration, and secure waste management protocols via RECP Pakistan to ensure minimal emissions and full regulatory compliance.

4.1.1 No Project Option / Worst Scenario Option Analysis

- **Strengths and Opportunities:** Canceling the M/S Olive Laboratories Pharmaceutical Manufacturing Facility would conserve capital, avoid short-term construction noise, and prevent local industrial impacts such as wastewater discharge and cleanroom installation traffic.
- **Weaknesses and Threats:** Rejecting the project would deprive the region of essential medicine supplies (such as Omnidol NU, Ciprolive, Ovilox, and Azolive tablets), skilled jobs, and economic growth. It would force reliance on unorganized, unregulated suppliers lacking environmental and quality controls, while wasting the opportunity to establish a modern, environmentally safeguarded facility.
- **Conclusion:** While the "No Project" option avoids temporary construction impacts, it sacrifices long-term healthcare, economic, and environmental benefits. Therefore, this option is rejected as unsustainable.

4.1.2 Site/Location Alternatives

Site 1: The Proposed Project Site (Selected)

The proposed Project Site is located at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi (covering a 4 Kanal area). This selected land tract is fully under the lease transfer, ownership, and legal possession of the project proponent under CEO Mr. Ammar Amjad. The localized territorial planning status of this specific corridor is already designated for industrial manufacturing and processing operations, completely matching the nature of pharmaceutical formulation and packaging.

Site 2: Alternative Project Site (Rejected)

An alternative site located within a mixed residential-commercial zone was evaluated but rejected. Developing a pharmaceutical facility there would cause severe traffic congestion from logistics, create land-use conflicts with nearby residents, and require complex zoning conversions.

Reason for Selection and Rejection:

- **Site 1 (Selected):** Chosen for its established industrial zoning in the National Industrial Zone, Rawat, complete utility readiness, strategic transport access, and optimal 4 Kanal layout.
- **Site 2 (Rejected):** Discarded due to proximity to sensitive residential areas, high risk of community friction, and inadequate infrastructure for industrial transport.

4.1.3 Design and Technology Alternatives

The following table summarizes the design, technology, and environmental alternatives evaluated for the M/S Olive Laboratories Pharmaceutical Manufacturing Facility, detailing the selected operational approaches and their justifications.

Table 4-1 : Design, Technology, and Environmental Alternatives

Category / Alternative	Selected Approach & Technical Features	Justification & Environmental Benefit
Eco-Friendly Construction Materials	Utilization of sustainable industrial building materials, resource-efficient structural layouts, and high-performance insulated cleanroom panels.	Reduces the carbon footprint during the plant installation phase and optimizes internal thermal and contamination control.
Energy-Efficient Technologies	Integration of high-efficiency pharmaceutical machinery, LED lighting across all cleanrooms and administrative blocks, and optimized power systems.	Minimizes long-term utility costs, reduces electrical strain, and lowers overall operational energy demands.
Green Infrastructure & Pollution Control	Incorporation of proper storm-water management, perimeter green strip buffers, and structured paved pathways.	Mitigates industrial runoff, prevents localized soil erosion, and preserves the environmental aesthetics of the industrial estate.
Optimized Operational Spaces	Designing specialized indoor and outdoor utility zones, including quarantine raw material warehouses, finished goods holding areas, and cleanroom airlocks.	Promotes a streamlined, cross-contamination-free pharmaceutical workflow, enhancing workplace safety and regulatory compliance under DRAP.
Electricity Alternatives	Primary power via the national grid network, backed by acoustic-canopied diesel	Ensures continuous, uninterrupted cleanroom operations while

	generators and planned rooftop solar PV panels.	incorporating renewable energy to offset the facility's carbon footprint.
Water Alternatives	Sourcing water via authorized groundwater extraction or municipal supply, stored in underground tanks and treated via on-site purification systems.	Guarantees a continuous supply of high-purity water required for pharmaceutical formulation, cleaning, and utility processes.
Waste Management & Sanitation Alternatives	Engineered wastewater routing for effluents and strict source-segregation for solid waste, with hazardous waste handled via RECP Pakistan.	Prevents drainage contamination, streamlines recycling, and ensures secure disposal of pharmaceutical and hazardous materials in line with PEQS.

4.1.4 Economic Alternatives

The establishment of the M/S Olive Laboratories Pharmaceutical Manufacturing Facility provides significant economic advantages over smaller, unorganized suppliers. It maximizes local financial productivity by creating substantial direct and indirect job opportunities for neighbouring communities during both the active cleanroom installation phase and long-term medicine manufacturing operations. By employing skilled local technical staff, pharmacists, and support personnel, the project stimulates the regional industrial economy, ensures a reliable local supply of essential pharmaceutical formulations (such as Omnidol NU, Ciprolive, Ovilox, and Azolive tablets), elevates property productivity responsibly within the estate corridor, and supports sustainable local business growth while adhering strictly to DRAP and PEQS standards.

5 DESCRIPTION OF THE PROJECT

5.1 General

The establishment of the M/S Olive Laboratories Pharmaceutical Manufacturing Facility by project proponent Ammar Amjad is a strategically planned industrial project located at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi (covering 4 Kanal). The project involves the setup of modern cleanroom pharmaceutical infrastructure, HVAC air-handling systems, advanced manufacturing machinery, and secure hazardous waste handling areas, designed with proper setbacks and buffer zones. In accordance with Section 12 of the Punjab Environmental Protection Act (Amended Act, 2012) read with the Review of IEE and EIA Regulations 2022, this Environmental Impact Assessment (EIA) report is submitted to the Punjab Environmental Protection Agency (EPA) to obtain the required No Objection Certificate (NOC) and Environmental Approval. This submission reflects the proponent's commitment to regulatory compliance, DRAP standards, and sustainable pharmaceutical operations in strict alignment with Punjab Environmental Quality Standards (PEQS).

5.2 Type and Category of the Project

Categorized as a pharmaceutical manufacturing and formulation facility, the M/S Olive Laboratories project is an industrial establishment featuring optimized cleanroom architecture, advanced HVAC filtration, and secure storage zones in the National Industrial Zone, Rawat, Rawalpindi. Under the Punjab EPA Review of IEE and EIA Regulations 2022, this project falls under the industrial manufacturing and pharmaceutical category. Compiling a comprehensive Environmental Impact Assessment (EIA) report is a statutory mandate under Section 12 of the Punjab Environmental Protection Act (Amended 2012). This report is submitted to secure formal Environmental Approval and a No Objection Certificate (NOC) prior to plant installation.

5.3 Objectives of the Project

The main objectives of the project are as follows:

- **Modern Pharmaceutical Production:** Establish a high-efficiency facility by M/S Olive Laboratories to reliably formulate essential medicines (Omnidol NU, Ciprolive, Ovilox, and Azolive tablets) in Rawalpindi.
- **Environmental & Quality Safeguards:** Implement advanced cleanroom HVAC filtration, structured wastewater routing, and secure hazardous waste management via RECP Pakistan to comply with PEQS and DRAP standards.
- **Socio-Economic Growth:** Create direct and indirect employment opportunities for local technical staff and professionals during both plant installation and long-term operations.
- **To Ensure Regulatory Compliance:** Maintain full compliance with Punjab Environmental Protection Agency (EPA) directives, DRAP regulations, and Punjab Environmental Quality Standards (PEQS) through perimeter green buffers and rigorous environmental monitoring.

5.4 Location and site Layout of the Project:

The **M/S Olive Laboratories Pharmaceutical Manufacturing Facility** is situated on a 4 Kanal plot (Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi).The site layout is engineered to maximize operational safety, cleanroom compliance, and workflow efficiency. It features:

- **Core Production Zones:** Dedicated cleanrooms for formulating essential medicines (Omnidol NU, Ciprolive, Ovilox, and Azolive tablets), supported by advanced HVAC air-handling units and quality control laboratories.
- **Storage & Utilities:** Secure warehouses for raw materials and finished goods, underground water storage tanks, and utility plants.
- **Logistics & Environment:** Direct vehicle access from estate roads, dedicated delivery parking, engineered wastewater drainage, secure hazardous waste storage managed via RECP Pakistan, and perimeter green strip buffers.

5.4.1 Google Coordinates:

Google coordinates of the project site are as follows:

Latitude	33°31'0.85"N
Longitude	73°14'49.78"E

5.4.2 Surroundings of the Project Site

The Project Boundaries are provided below:

North	Road
South	Open Land
East	Inshal Pharmaceuticals
West	Road



Figure 5-1: Location of the Project Site

5.5 Land use on the site

The current land use on the project site for the M/S Olive Laboratories Pharmaceutical Manufacturing Facility is classified as an industrial development tract within Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi (covering 4 Kanal). The site is currently undergoing transformation from vacant or unutilized industrial land into an organized, fully functional cleanroom pharmaceutical manufacturing and formulation complex to meet regional healthcare and essential medicine demands.

5.6 Vegetation Features of the site:

The project site comprises a developed industrial plot within the National Industrial Zone, Rawat, Rawalpindi, containing minimal seasonal weeds and routine grasses typical of the Pothohar region. The surrounding industrial estate and adjacent corridors feature common native trees such as Neem, Shisham, and Kikar, with no rare, protected, or endangered botanical species present on-site. The minor land clearing required during plant construction and cleanroom installation will not impact regional ecosystems. Furthermore, a dedicated perimeter tree plantation and green strip buffer campaign will be executed around the 4 Kanal plot to enhance local green cover, mitigate dust, and improve overall environmental quality.

5.7 Cost and Magnitude of operation:

The M/S Olive Laboratories Pharmaceutical Manufacturing Facility is situated on a 4 Kanal plot (Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi). The capital investment covers civil works, cleanroom construction, advanced HVAC air-handling systems, and pharmaceutical machinery for producing essential medicines (Omnidol NU, Ciprolive, Ovilox, and Azolive tablets). Because the land is already secured within a designated industrial estate, the project involves zero public displacement, community resettlement, or complex land acquisition issues.

5.8 Energy requirement

The energy requirements of the M/S Olive Laboratories Pharmaceutical Manufacturing Facility will be fulfilled primarily through a dedicated connection from the Islamabad Electric Supply Company (IESCO). Power will be utilized to operate high-tech pharmaceutical cleanroom machinery, advanced HVAC air-handling units, quality control laboratory equipment, water purification pumps, facility lighting, and administrative offices. To ensure uninterrupted operations and protect sensitive medicine manufacturing processes from power fluctuations, the setup includes a structured internal electrical distribution network, industrial-grade transformers, and backup diesel generators equipped with acoustic sound-attenuation canopies and vertical exhaust extensions for emergency grid disruptions. Additionally, the facility design integrates plans to install rooftop solar photovoltaic (PV) panels to harness renewable energy and offset baseline power loads.

5.9 Availability of Water

Water resources for the M/S Olive Laboratories Pharmaceutical Manufacturing Facility will be secured via authorized groundwater extraction or municipal supply networks to ensure reliable, continuous operations on the 4 Kanal plot in Rawat, Rawalpindi.

Construction Phase: Water requirements are estimated at 7,500 gallons per day to support structural work, cleanroom preparation, and baseline dust suppression.

Operational Phase: Water demand for pharmaceutical formulation, equipment sanitation, quality control laboratories, worker needs, and administrative use is estimated at 7,766 gallons per day, managed efficiently through on-site purification and dedicated underground storage facilities.

5.10 Road Access

The M/S Olive Laboratories Pharmaceutical Manufacturing Facility (CEO: Mr. Ammar Amjad) at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi, benefits from excellent road connectivity via paved estate transit corridors. This strategic location ensures smooth transport logistics for raw material delivery, cleanroom machinery transport, and finished medicine dispatch (Omnidol NU, Ciprolive, Ovilox, and Azolive tablets) without requiring heavy commercial vehicles to navigate congested residential or urban tracks. Delivery trucks transition seamlessly from main industrial estate roads directly into dedicated loading bays and storage yards, with direct links to major regional transport corridors like the Grand Trunk Road and Islamabad-Rawalpindi highway networks.

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Figure 5-2: Road Access near the project site

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5.11 Schedule of Implementation:

It is planned that the following schedule of project implementation will be adhered to for the M/S Olive Laboratories Pharmaceutical Manufacturing Facility. This is subject to the condition that everything goes according to planning and no serious bottlenecks are encountered:

1st Stage: The first stage comprises on-site topographical surveys, soil bearing capacity investigations, cleanroom layout optimization studies, and the finalization of architectural, HVAC, and engineering designs for the pharmaceutical manufacturing facility at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi.

2nd Stage: The second stage comprises the following tasks:

- Commencement of site grading, land leveling, and foundation excavations.
- Construction of structural foundations, cleanroom flooring, and main manufacturing floor sheds.
- Erection of concrete and steel structural frameworks for raw material/finished goods warehouses and administrative blocks.
- Development of basic site infrastructure, baseline drainage systems, and internal transit loops.
- Installation of primary utility networks, including underground water storage lines and IESCO electrical connections.

3rd Stage: The third stage comprises the following tasks:

- Completion of core civil structures, airtight cleanroom partitioning, and roofing for the manufacturing units, storage warehouses, and office blocks.
- Installation of advanced pharmaceutical machinery, cleanroom HVAC air-handling units, quality control laboratory equipment, and acoustic-canopied backup diesel generators.
- Completion of basic industrial infrastructure, including underground water storage tanks, wastewater routing networks, and internal electrical distribution.

4th Stage: The last stage will be the completion of internal and external finishes, execution of perimeter green strip buffer landscaping, final testing and commissioning of cleanroom and manufacturing systems, acquisition of statutory DRAP and Punjab EPA approvals, and the commencement of regular commercial production of essential medicines (Omnidol NU, Ciprolive, Ovilox, and Azolive tablets).

5.12 Description of the project

The operational workflow within the M/S Olive Laboratories Pharmaceutical Manufacturing Facility, CEO: Mr. Ammar Amjad, is structured as a highly efficient, streamlined cleanroom formulation and manufacturing ecosystem designed to manage raw material intake, precise compounding, quality testing, and finished medicine dispatch across a 4 Kanal plot at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi. Unlike traditional unorganized setups, the engineered facility

layout and strict pharmaceutical zoning allow for precise environmental and contamination control over material staging, automated HVAC air-handling distribution, tablet pressing and packaging, wastewater routing, and secure storage for essential medicines (such as Omnidol NU, Ciprolive, Ovilox, and Azolive tablets) in full compliance with DRAP and Punjab EPA standards.

5.12.1 Plot-Wise Allocation of Manufacturing Processes

Since the M/S Olive Laboratories Pharmaceutical Manufacturing Facility is compactly housed on a single 4 Kanal plot (Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi), its operations are distributed strategically across designated cleanroom zones and structural blocks to ensure smooth material flow, strict contamination control, and compliance with industrial and DRAP zoning standards.:

Table 5-1: Section-Wise Functional Allocation and Infrastructure Breakdown

Facility Section / Zone	Core Allocated Pharmaceutical Processes	Raw Material & Finished Goods Storage	Utility, Administrative & Ancillary Facilities
Zone A: Production & Formulation Block	• Dispensing of active pharmaceutical ingredients (APIs) • Granulation, mixing, and tablet compression • Film coating and blistering packaging lines for essential medicines (Omnidol NU, Ciprolive, Ovilox, and Azolive tablets)	• Controlled staging areas for raw APIs and excipients • Intermediate quarantine holding zones	• Dedicated HVAC air-handling units (AHUs) with HEPA filtration • Local dust extraction and air shower units
Zone B: Warehousing & Logistics Block	• Secondary packaging and batch coding • Quality control sampling and inspection staging	•Secure, temperature-controlled warehouses for raw materials • Separate finished goods dispatch holding warehouse	• Loading and unloading bays linked directly to estate transit corridors • Pallet handling and inventory management space
Zone C: Utility & Administrative Block	• Quality control (QC) laboratory testing and analytical assays	• Safe chemical and reagent storage lockers • Hazardous waste temporary staging area (managed via RECP Pakistan)	• Main administrative office building • Worker sanitation, locker rooms, and canteen facilities • Underground water storage tanks, IESCO electrical distribution, and acoustic-canopied backup diesel generators

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5.12.2 Comprehensive Manufacturing Process Flow

The operations at the M/S Olive Laboratories Pharmaceutical Manufacturing Facility are divided into structured, interconnected pharmaceutical production processes utilizing specialized cleanroom machinery, active pharmaceutical ingredients (APIs), and excipients to formulate essential medicines (Omnidol NU, Ciprolive, Ovilox, and Azolive tablets):

Dispensing & Granulation Process

Raw Materials: Active Pharmaceutical Ingredients (APIs), excipients, binders, disintegrants, and purified water.

Workflow: Raw materials are weighed and dispensed in controlled dispensing booths. The ingredients are dry-mixed and subjected to Wet or Dry Granulation processes to form uniform granules, which are then dried in fluid bed dryers and sized through multi-mills.

Tableting & Coating Process

Raw Materials: Prepared granules, lubricants (e.g., magnesium stearate), coating polymers, and pigments.

Workflow: Granules are fed into high-speed Rotary Tablet Compression Machines to produce core tablets. The compressed tablets are subsequently transferred to automated Film Coating Pans for aesthetic and functional polymer coating, ensuring controlled-release profiles.

Packaging & Quality Assurance Process

Raw Materials: Coated tablets, blister-forming PVC/PVDC films, aluminum foil, printed cartons, and leaflets.

Workflow: Coated tablets are routed through automated Blister Packing Lines, sealed, batch-coded, cartoned, and transferred to secondary packaging stations. Every batch undergoes rigorous analytical testing and quality inspection in the on-site QC laboratory before final transfer to the finished goods warehouse for market dispatch.

Table 5-2: Room-Wise Infrastructure and Area Breakdown of M/S Olive Laboratories

Zone / Section	Room Name / Facility	Exact Dimensions (from Approved Plan)	Core Function / Operational Purpose
Logistics & Dispatch	Loading / Unloading Bay	34'-9" x 16'-8"	Primary commercial vehicle docking for raw material arrival and finished medicine dispatch

	Receiving Bay & Sampling Room	18'-0" x 8'-11" / 6'-0" x 6'-0"	Initial incoming material logging and quality control sampling inspection
Storage Warehouses	Finish Goods Store	27'-8" x 29'-3"	Secure holding area for boxed essential medicines (Omnidol NU, Ciprolive, Ovilox, Azolive)
	Raw Material Quarantine & Store	12'-0" x 8'-0" & 14'-0" x 15'-2"	Segregated storage for incoming active pharmaceutical ingredients (APIs) prior to clearance
	Bottle Store & Packaging Material Store	16'-4" x 7'-7" & 19'-3" x 14'-5"	Storage for syrup bottles, blister films, cartons, and packaging supplies
Production & Formulation	Compression Rooms (1, 2, & 3)	7'-4" x 12'-7" (approx. range)	High-speed rotary tablet compression for core essential medicines
	Syrup Mixing (1 & 2)	13'-4" x 14'-7"	Compounding and batch mixing for liquid pharmaceutical syrups
	Wet Mixing & Dry Powder Mixing	9'-0" x 10'-4" & 8'-7" x 7'-10"	Granulation processing for powder blends and tablet formulations
	Capsule Filling & Capsule Inspection	9'-5" x 14'-6" & 13'-4" x 6'-6"	Automated encapsulation and visual quality checking lines
	Packing Halls (Blister / Strip / Syrup)	Various (e.g., 20'-3" x 18'-0", 19'-7" x 12'-3")	Primary blister packing, strip sealing, and syrup filling lines
Quality Control & Utilities	Quality Control Laboratories	19'-8" x 14'-0" & 18'-3" x 14'-0"	Analytical chemical and microbiological testing of raw materials and finished batches
	Instrument Rooms & Retain Sample Room	8'-6" x 11'-7", 8'-0" x 12'-0", etc.	Housing advanced analytical instruments and secure regulatory sample archiving
	RO Plant Room	9'-5" x 11'-3"	Water purification and Reverse Osmosis system for pharmaceutical-grade water
Administration & Ancillary	Admin Office & Porch	10'-8" x 14'-0" / Porch 18'-2" x 9'-4"	Executive management, administrative coordination, and main visitor entry

	Change Rooms (Male & Female)	7'-4" x 5'-10" each	Controlled gowning and personnel airlocks for cleanroom entry

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5.13 Operational Arrangements

At the operational stage, the project proponent will directly manage the day-to-day manufacturing, technical processes, and environmental upkeep of the M/S Olive Laboratories Pharmaceutical Manufacturing Facility at Rawat, Rawalpindi. The operational management team will ensure strict compliance with Punjab EPA and DRAP standards by overseeing:

- Pharmaceutical wastewater routing and RO water purification systems.
- HVAC cleanroom air-handling units and underground water storage infrastructure.
- Source-segregation of solid waste, with hazardous pharmaceutical waste handled strictly through approved contractors like RECP Pakistan.
- Dust extraction units, containment systems, and perimeter green strip landscaping zones.

5.13.1 List of Machinery and Equipment

The manufacturing and processing efficiency of the facility depends on a specialized inventory of heavy-duty industrial equipment. The selected machinery and auxiliary systems ensure a seamless, continuous workflow across all raw material preparation, resin impregnation, and lamination stages.

Table 5-3: Detailed List of Machinery and Equipment for M/S Olive Laboratories

Category	Machinery / Equipment Item	Function & Operational Description	Facility Location / Section
Granulation & Powder Preparation	Multi-Mills & Sifters	High-speed sizing and de-agglomeration of active pharmaceutical ingredients (APIs) and excipients.	Production & Formulation Cleanroom
	Wet Mixers & Dry Powder Mixers	Automated blending chambers for uniform powder compounding and granulation.	Zone A: Granulation Area
	Fluid Bed Dryers (FBD)	Large-scale pneumatic thermal dryers for moisture reduction in wet granules.	Zone A: Formulation Block

Tableting & Encapsulation 	Rotary Tablet Compression Machines	High-speed mechanical presses utilizing precision punches and dies to form core tablets (Omnidol NU, Ciprolive, Ovilox, Azolive).	Compression Rooms 1, 2 & 3
	Capsule Filling Machines	Automated dosing and locking units for precise powder or pellet filling into gelatin capsules.	Capsule Filling Area
Liquid Manufacturing & Water Treatment	Syrup Mixing Tanks (1 & 2)	Stainless steel jacketed mixing vessels with high-shear agitators for compounding liquid pharmaceutical syrups.	Syrup Mixing Area
 	Bottle Blowing & Rinsing Units	Automated machinery to form and wash PET/glass bottles prior to liquid filling.	Syrup Filling Section
	Reverse Osmosis (RO) Water Plant	Advanced multi-stage water purification and deionization system generating pharmaceutical-grade purified water.	RO Plant Room
Coating & Packaging	Automatic Film Coating Pans	Perforated coating drums with precision spray nozzles for functional and aesthetic polymer tablet coating.	Coating Section
	Blister Packaging	Automated sealing units forming blister pockets,	Packing Hall / Blister Area

	Machines (PVC/Alu)	inserting tablets, and sealing with aluminum foil.	
	Strip Sealing & Cartoning Machines	Secondary packaging equipment for individual strip sealing and final carton boxing.	Packaging & Staging Store
Quality Control & Testing	Analytical Laboratory Instruments	High-Performance Liquid Chromatography (HPLC), spectrophotometers, and dissolution testers for quality assurance assays.	Quality Control Laboratories & Instrument Rooms
Utilities & Safety	Cleanroom HVAC & AHU Systems	Specialized air-handling units equipped with HEPA filtration, differential pressure controls, and temperature/humidity regulation.	Dedicated Mechanical & Air-Handling Rooms
	Acoustic-Canopied Diesel Generators	Industrial backup generator sets ensuring uninterrupted power supply for critical cleanroom and utility lines.	Utility Block / Exterior Yard

5.13.2 Water Requirement and Wastewater Generation

- **Construction Phase**

During the construction phase of the M/S Olive Laboratories Pharmaceutical Manufacturing Facility, water will be secured via localized extraction network sources or municipal supply to carry out all cleanroom installation and civil development activities. The water required for the workforce and masonry preparation, alongside the corresponding wastewater generation, is calculated as follows*:*

- Estimated No. of Construction Workers: 100
- Average Water Demand (gallon/capita/day): 50
- Sub-Total for Residential Water Demand (g/d): 5,000
- Peak Hour Water Demand Allowances (+50% on average g/d): 2,500
- Total Construction Water Demand (g/d): 7,500
- Total Wastewater Generated (g/d @ 80% discharge): 6,000

- Total Wastewater Generated (m3/d): 22.7

Operational Phase For the operational phase of the M/S Olive Laboratories Pharmaceutical Manufacturing Facility, the operations incorporate a dedicated industrial workforce and administrative staff count. Comprehensive water budgeting is structured based on pharmaceutical manufacturing and institutional standards to manage cleanroom processing, equipment sanitation, and worker loads sustainably.

- Total Static Workforce Population: 150
- **A. Domestic Water Demand (Worker Sanitation & Facility Use)**
  - Proposed No. of Persons: 150
  - Average Water Demand (gallon/capita/day): 50
  - Sub-Total for Domestic Water Demand (g/d): 7,500
- **B. Industrial and Commercial Support Water Demand**
  - B1: For Administrative Offices & Rest Areas (20% of Population): 30 persons at 3 gallons/capita/day = 90 g/d
  - B2: For Plant Canteen & Ancillary Facilities (15% of Population): 22 persons at 8 gallons/capita/day = 176 g/d
- **C. Total Average Demand**
  - Total of (Sub-Total A + B-1 + B-2) (g/d): 7,766 gallons per day

5.14 Power Requirement / Power Source

5.14.1 Construction Phase

The main source of electricity and electrical power during the construction phase of the Pharmaceutical Manufacturing Facility will be mobile diesel generators to supply energy for temporary site offices, security illumination, cleanroom structural installation, and civil construction machinery.

5.14.2 Operational Phase

The predicted total electrical load required to sustain the pharmaceutical cleanroom manufacturing lines, HVAC air-handling units, liquid syrup mixing systems, RO water plant, and auxiliary equipment is estimated at approximately 1.5 MW, which will be fulfilled primarily through a dedicated grid connection from the Islamabad Electric Supply Company (IESCO). For emergency backup and to guarantee uninterrupted workflow safety during grid disruptions, standalone diesel generators equipped with acoustic sound-attenuation canopies will be integrated into the mechanical plant zones, supported by high-tension (H.T.) electrical transformers and switchgear.

5.14.3 Solid Waste Management

- To ensure rigorous environmental compliance and safe handling of industrial outputs, M/S Olive Laboratories has established a formal contractual agreement with Resource Efficient Cleaner Production Pakistan (RECP Pakistan) for professional waste collection, transportation, and environmentally compliant incineration.
- Scope of Services: Olive Laboratories provides all generated pharmaceutical waste including expired active pharmaceutical ingredients (APIs), rejected batches, and

contaminated residues to RECP Pakistan for safe disposal primarily via controlled incineration.

- Collection Frequency & Charges: Waste collection is conducted on a twice-a-month basis at a service rate of Rs. 40/- per kg, with formal invoicing issued upon completion of each disposal cycle.
- Operational Validity: The waste management agreement remains valid through December 31, 2026, ensuring continuous regulatory compliance under Punjab EPA and DRAP guidelines

5.14.4 Advanced Plantation and Landscaping

- **Biodiversity & Microclimate:** Plant native, dense-canopy species (such as Neem, Amaltas, and Shisham) suited to the Rawat region to support local biodiversity, provide soil stability, and act as natural bio-filters for ambient particulate matter.
- **Perimeter Green Belts:** Develop structured multi-row green belts along the facility boundaries to serve as natural acoustic barriers against HVAC and generator noise, preserve visual harmony, and prevent soil erosion.
- **Vertical Greening:** Utilize climbing vines and vertical creepers on boundary walls to reduce solar heat absorption, lower the local thermal footprint, and soften the industrial infrastructure.

5.14.5 Sustainable Water Management

- **Rainwater Harvesting:** Dedicated rainwater harvesting networks and sediment-trap collection basins along the extensive roofing structures of the pharmaceutical manufacturing and warehouse blocks will be implemented. Capturing and conserving seasonal rainwater for facility washing, equipment cooling makeup, and perimeter green belt irrigation will significantly reduce reliance on local groundwater extraction networks.
- **Smart Water Recycling:** Deploy localized water conservation practices, such as utilizing the facility's RO water plant reject streams or process runoff where applicable, and utilizing automated shut-off nozzles and high-efficiency washing systems to optimize the capacity of the underground water storage facilities.

5.14.6 Waste and Energy Efficiency

- Rainwater Harvesting: Dedicated rainwater harvesting networks and sediment-trap collection basins along the extensive roofing structures of the pharmaceutical manufacturing and warehouse blocks will be implemented. Capturing and conserving seasonal rainwater for facility washing, equipment cooling makeup, and perimeter green belt irrigation will significantly reduce reliance on local groundwater extraction networks.
- Smart Water Recycling: Deploy localized water conservation practices, such as utilizing the facility's RO water plant reject streams or process runoff where applicable, and utilizing automated shut-off nozzles and high-efficiency washing systems to optimize the capacity of the underground water storage facilities.

5.14.7 Wastewater Management

- The M/S Olive Laboratories Pharmaceutical Manufacturing Facility is expected to generate wastewater primarily from domestic use (restrooms, handwashing, and canteen facilities) and from ancillary cleanroom activities such as equipment washing, floor cleaning, syrup compounding, and laboratory analytical processes. To ensure that this wastewater complies strictly with Punjab Environmental Quality Standards (PEQS) and DRAP requirements without posing any risk to the environment, the facility incorporates a dedicated Effluent Treatment Plant (ETP).
- The ETP treats wastewater through a structured series of physical, chemical, and biological processes to remove contaminants before safe disposal or reuse in landscaping. The step-by-step treatment methodology includes:
- Effluent Collection: Domestic and process wastewater are collected separately in holding tanks (domestic tank and equalization tank) and transported via underground sewers to the Equalization Tank.
- Equalization to Flash Mixers: Effluent is pumped from the equalization tank to Flash Mixer 1, where an alum solution is added to destabilize suspended particles. It then flows to Flash Mixer 2, where the pH is checked and adjusted (maintaining 7.0–7.5 using lime or hydrochloric acid) and a polyelectrolyte flocculent is added to form visible flocks.
- Primary Settling & Clarification: Wastewater enters the Primary Settling Tank (Clarifier) where settled solids are separated by gravity. Sludge is drained from the bottom to sludge drying beds, while clarified water overflows into the aeration tank.
- Biological Aeration: Primary treated effluent is combined with direct inflow from the domestic collection tank inside the aeration tank. Using positive displacement air blowers and diffused aeration, dissolved oxygen (DO) is maintained at 1.5–2.0 ppm to support biological cultures that degrade organic matter and reduce Chemical Oxygen Demand (COD) and Biochemical Oxygen Demand (BOD).
- Secondary Settling: Effluent overflows into the secondary settling tank equipped with a clarifier mechanism. Settled biological sludge is recycled back to the aeration tank to maintain active biomass, while excess culture is drained into sludge drying beds.
- Filtration & Disinfection: The supernatant flows by gravity into the filter bed tank, passing through sand and activated carbon filters to remove suspended particles, color, and odor. Calcium hypochlorite (2 to 3 ppm dose) is added after filtration to eliminate microorganisms.
- Treated Water Reuse & Monitoring: The final treated effluent is collected in a dedicated treated water tank and reused for estate gardening and plantation irrigation. Treated effluent water quality is tested weekly for pH, COD, BOD, suspended particles, TDS, chlorides, and hardness.

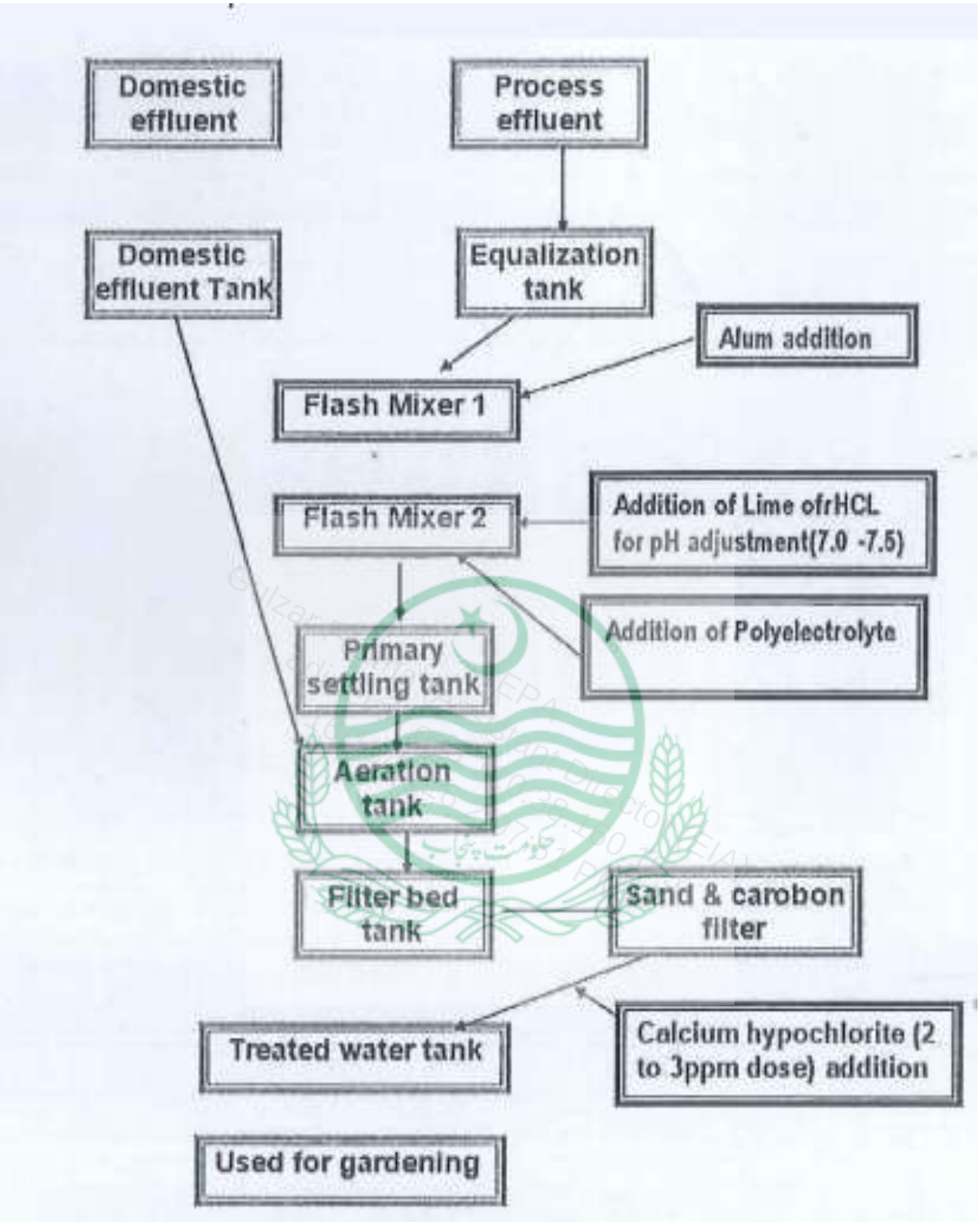


Figure 5-3: Process Flow diagram of Effluent Tretament plant At M/S Olive Laboratories

5.14.8 Conclusion

The establishment of the M/S Olive Laboratories Pharmaceutical Manufacturing Facility at Rawat, Rawalpindi, will provide a high-quality, ecologically conscious pharmaceutical operation. Supported by advanced cleanroom layouts, an Effluent Treatment Plant (ETP), and a formal hazardous waste management contract with RECP Pakistan, the facility ensures strict compliance with Punjab EPA and DRAP regulations, balancing commercial viability with environmental preservation.

5.14.9 Restoration/Rehabilitation at the End of Project Life:

At the end of the project's life cycle, a systematic decommissioning plan will be executed to safely dismantle cleanroom partitions, machinery, and sub-grade infrastructure (such as underground water tanks and ETP units). All resulting structural debris will be cleared via Punjab-EPA-approved contractors, followed by a targeted revegetation initiative with native tree species to restore the topsoil matrix and ensure long-term environmental stability.

Gulzar Fatima (Assistant Director (EIA)-3)
EPA

6 DESCRIPTION OF THE 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 Desk Studies

Project design data was collected from proponents. This data included the available documents, drawings, reports, etc. related to the proposed project. The experts conducted a detailed desk study of the above available data before the field visit. Salient features of the Project were thoroughly reviewed to assess their environmental implications. The documents which were consulted and departments visited are Project Head Office, Project Site, Irrigation Department, Meteorological Department, Forest offices and other related officials.

6.3 Site Visits

A team of experts visited the proposed site to collect baseline environmental data for ambient air, noise levels, drinking water and waste water sampling, public consultation, baseline ecological environment data etc.

After the survey of the project area the environmental data regarding physical, ecological and socioeconomic aspects were collected for carrying out environmental assessment. Secondary data were also collected from various sources mainly studies carried out by project proponents and reports of other line Departments. A social survey of the proposed area was carried in which people living around the proposed unit site were interviewed to ascertain their views about the project commissioning and operational activities to perceive the impacts on the natural and socioeconomic environment around the proposed project site. This included information on land, surface water, groundwater, air, vegetation, animals and human.

6.4 PHYSICAL ENVIRONMENT

Rawalpindi is a prominent city in Punjab province, Pakistan, located immediately south of the federal capital, Islamabad. Together, the two cities form the Islamabad-Rawalpindi metropolitan area, a key political, economic, and strategic region in the country. Rawalpindi serves as the administrative centre of Rawalpindi District and is well-connected through national highways, motorways, and the Islamabad International Airport, making it a vital transit and commercial hub.

The city's origins trace back to ancient times, with archaeological evidence linking it to the Gandhara civilization. The area was historically known as “Ganjipur” and was later settled by the Rawal tribe, from whom the modern name “Rawalpindi” is derived. It remained a modest settlement until the early 19th century, when it gained importance

under Sikh rule. Rawalpindi's transformation began during the British colonial era when it was established as a major military garrison in 1851. Its strategic location made it the headquarters of the British Northern Command and later a key military centre for Pakistan after independence in 1947. In the 1960s, it served as the temporary capital of Pakistan during the construction of Islamabad. Today, Rawalpindi is a vibrant urban centre with a mix of colonial heritage, traditional markets, modern infrastructure, and expanding residential and industrial zones. It continues to play a central role in national defence, trade, and regional development, reflecting both its historical legacy and future potential

6.4.1 Topography

Rawalpindi district is in the north of the Punjab province. The highest elevation is 9,210 ft. close to Dunga Gali and in the south it is as low as 1,100 feet. It lies on the Potwar Plateau 9 miles (14 km) southwest of Islamabad, the national capital. The district has an area of 5,286 sq. km. (2,041 sq. mi). Originally, its area was 6,192 km2 (2,391 sq. mi) until the 1960s when Islamabad Capital Territory was carved out of the district, giving away an area of 906 sq. km. (350 sq mi). It is situated on the southern slopes of the north-western extremities of the Himalayas, including large mountain tracts with rich valleys traversed by mountain and rivers. The chief rivers are the Indus and the Jhelum, it is noted for its milder climate and abundant rainfall due to its proximity to the foothills.[1]

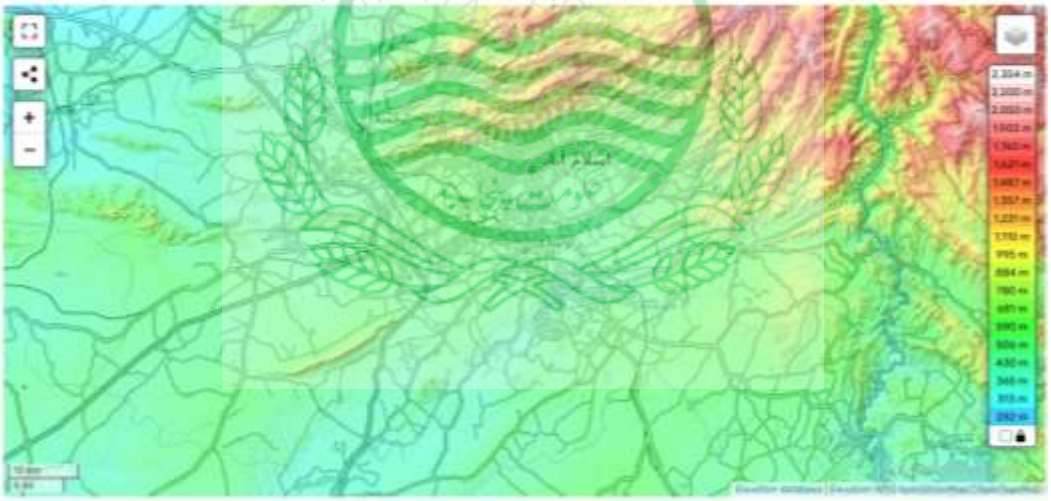


Figure 6-1: Topographic map of Rawalpindi

6.4.2 Soils

The soils of Rawalpindi are primarily derived from the weathering of the Pothohar Plateau's parent rock materials, resulting in a diverse soil profile. The region predominantly features loamy and clayey soils, which are fertile and suitable for agriculture, especially in the peripheral rural areas. These soils often exhibit good water retention properties but can become compact and less permeable, affecting drainage. In some areas, especially where urban development has intensified, soil degradation and erosion are evident due to construction activities and deforestation.

[1] https://rawalpindi.punjab.gov.pk/geographic_conditions1

The presence of alluvial soils along the streams and nullahs adds to the diversity, providing a mix of fertile grounds for cultivation and areas prone to seasonal waterlogging. Overall, the soils of Rawalpindi support a range of vegetation, from agricultural crops to urban greenery, contributing to the city's mixed land use.

6.4.3 Climate and Meteorology

Rawalpindi has a humid subtropical climate with hot summers, a defined monsoon season, and short, mild winters. Summers, from May to September, are long and intense, with June being the hottest month and temperatures often exceeding **40°C**. The monsoon season (July–September) brings heavy rainfall, occasionally causing urban flooding.

Winters (December–February) are mild, with temperatures ranging between **5°C and 18°C**. The city receives an average annual rainfall of about **1,346.8 mm**, mostly during the monsoon. Rawalpindi also experiences the highest number of thunderstorms in Punjab, averaging nearly **98 per year**, especially in August. Its proximity to the Himalayas contributes to sudden weather changes throughout the year.

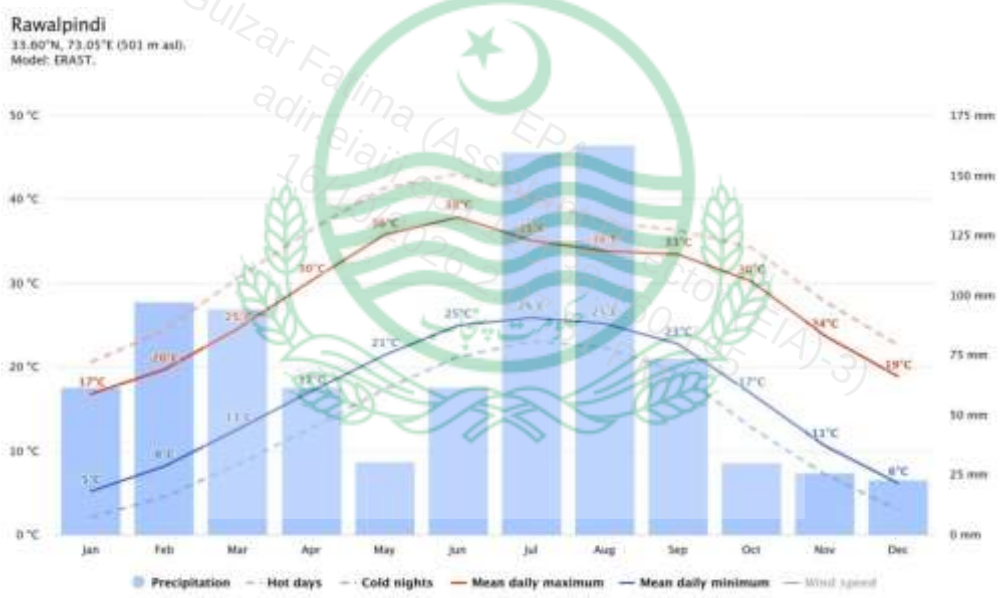


Figure 6-2: Average temperature and precipitation of Rawalpindi

Rawalpindi experiences extreme seasonal variation in monthly rainfall. Rain falls throughout the year in Rawalpindi. The month with the most rain in Rawalpindi is July, with an average rainfall of 6.7 inches. The month with the least rain in Rawalpindi is November, with an average rainfall of 0.5 inches.

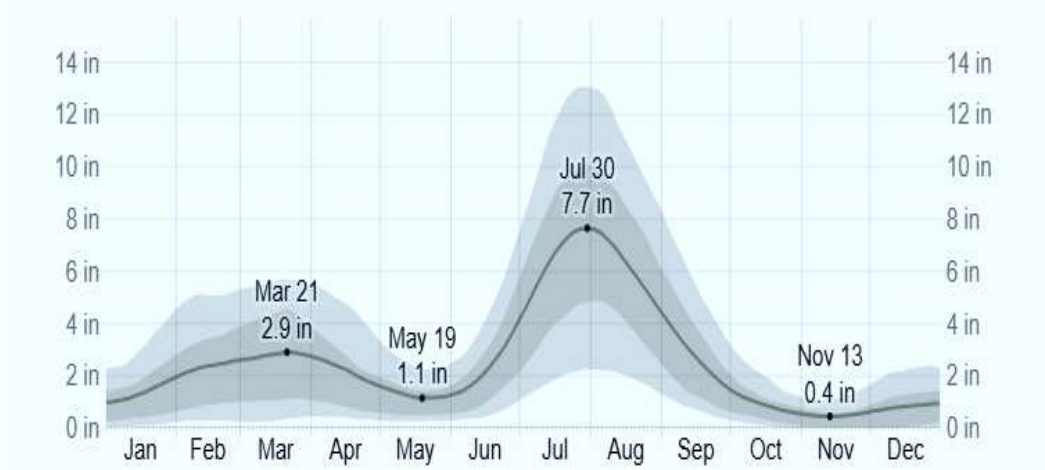


Figure 6-3: Average monthly rainfall in Rawalpindi[2]

6.4.4 SURFACE AND GROUND WATER

Surface Water

Rawalpindi's primary surface water source is the Rawal Dam, which supplies water to both Rawalpindi and Islamabad. Other significant surface water bodies include the Korang River, Soan River, and several seasonal streams (locally called *nullahs*), such as Leh Nullah. These are prone to pollution from domestic and industrial effluents, especially during the monsoon.

Groundwater

Groundwater is extensively used through a network of tube wells, particularly in urban and peri-urban areas. The aquifer is mainly unconfined and replenished through rainfall infiltration and seepage from rivers and canals. However, over-extraction has led to a decline in groundwater levels, particularly in central Rawalpindi, with water tables dropping by approximately 1–2 meters annually in some locations.

Water Quality

Both surface and groundwater sources face contamination risks due to urban runoff, industrial discharges, and poor sanitation infrastructure. Common contaminants include coliform bacteria, nitrates, and heavy metals, especially near densely populated or industrial zones.

[2] https://weatherspark.com/y/107754/Average-Weather-in-Rawalpindi-Pakistan-Year-Round#google_vignette



Figure 6-4: Rawal Dam

6.5 Seismology

The district belongs to Zone 3 of the Seismic Zone Map of Pakistan.[3] This means moderate to severe damage to property due to earthquakes. The region is part of the tectonically active Himalayan zone and experiences frequent low to moderate earthquake**s** (Magnitude 3–5), with rare stronger events. The 2005 Kashmir earthquake caused noticeable tremors in Rawalpindi, underlining its vulnerability. Construction in the area must follow earthquake-resistant design standards as per the Building Code of Pakistan (2007)**.**

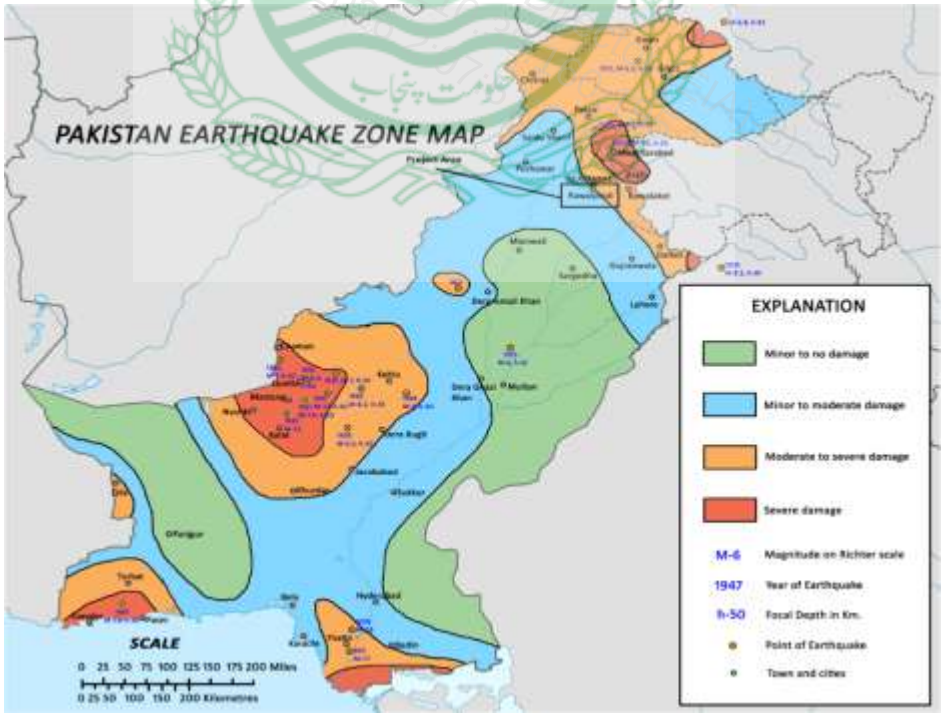


Figure 6-5: Seismic zones map of Pakistan

[3] https://pakistanalmanac.com/punjab-rawalpindi/#1633497087354-b3c63ef2-64a3

6.6 ECOLOGICAL RESOURCES

Rawalpindi boasts a range of ecological resources that contribute to its environmental richness and biodiversity. The Margalla Hills National Park, located to the north, is a prominent ecological asset, featuring diverse flora and fauna, including several endangered species. This park provides a vital green lung for the region, supporting various ecosystems from dense forests to scrublands. The Rawal Lake and its surrounding areas serve as important habitats for migratory birds, adding to the avian diversity and providing recreational spaces for residents.

Agricultural lands on the outskirts of the city are another crucial ecological resource, supporting crops, orchards, and pastoral activities that contribute to the local economy. Urban green spaces, parks, and gardens within Rawalpindi offer pockets of biodiversity amidst the urban sprawl, helping to mitigate urban heat island effects and providing recreational areas for the populace. Efforts to preserve and enhance these ecological resources are essential for maintaining environmental balance and ensuring sustainable development in the region. Challenges such as urbanization, pollution, and deforestation pose threats to these resources, necessitating proactive conservation and management strategies.

6.6.1 Flora

The flora of Rawalpindi is quite diverse, thanks to its location at the foothills of the Himalayas. Some of the most common trees found in Rawalpindi include

Table 6-1: Flora of the project area

Sr. No.	Common Name	Scientific Name
1.	Shisham	*Dalbergia sissoo*
2.	Keekar	*Acacia arabica*
3.	Siris	*Albizzia lebbeck*
4.	Ber	*Ziziphus jujuba*
5.	Guava	*Psidium guajava*
6.	Citrus	*Citrus spp.*
7.	chir	*Pinus roxburghii*
8.	Fir	*Abies balsamea*
9.	Biar	*Pinus excels*
10.	Toot	*Morus alba*
11.	Lasura	*Cordiamyxa*



Chir(*Pinus roxburghii)*



Fir (*Abies balsamea)*



Toot (*Morus alba)*



Lasura (*Cordiamyxa)*

Figure 6-6: Flora of the project area

6.6.2 Fauna

Table 6-2: Fauna of the project area

Mammals	
Indian Pangolin	*Manis crassicaudata*
Indian Hare	*Lepus nigricollis*
Red Fox	*Vulpes vulpes*
Indian Grey Mongoose	*Herpestes edwardsii*
Wild Boar	*Sus scrofa*
Rhesus Macaque	*Macaca mulatta*
Indian Crested Porcupine	*Hystrix indica*
Small Indian Civet	*Viverricula indica*
Birds	
Indian Peafowl	*Pavo cristatus*

White-throated Kingfisher	*Halcyon smyrnensis*
Common Myna	*Acridotheres tristis*
Barn Owl	*Tyto alba*
Reptiles	
Indian Cobra	*Naja naja*
Monitor Lizard	*Varanus bengalensis*
Indian Flapshell Turtle	*Lissemys punctata*
Indian Star Tortoise	*Geochelone elegans*
Saw-scaled Viper	*Echis carinatus*
Amphibians	
Indus Valley Bullfrog	*Hoplobatrachus tigerinus*
Skittering Frog	*Euphlyctis cyanophlyctis*
Common Asian Toad	*Duttaphrynus melanostictus*



Rhesus monkeys(*Macaca mulatta*)



Indian Peafowl(*Pavo cristatus*)



Indus Valley Bullfrog(*Hoplobatrachus tigerinus*)



Saw-scaled Viper*(Echis carinatus)*

Figure 6-7: Fauna of the project area

6.7 SOCIO-ECONOMIC ENVIRONMENT

Rawalpindi has a vibrant and diverse socioeconomic environment shaped by its urban character, strategic location, and strong institutional presence. As one of Punjab's most urbanized districts, with over 70% of its population living in cities, it benefits from a well-developed infrastructure and close economic integration with the federal capital, Islamabad. The district boasts a high literacy rate of over 83%, supported by numerous public and private educational institutions, including universities and technical colleges. Its economy is service-oriented, with a large portion of the workforce engaged in government, education, healthcare, retail, and small-scale enterprises. While agriculture plays a limited role due to urbanization, Rawalpindi hosts several industrial units in sectors like textiles, pharmaceuticals, and food processing. The district has an extensive healthcare system with major hospitals and basic health units serving both urban and rural populations. Despite these strengths, challenges such as youth unemployment, rising living costs, and pressure on urban services persist, calling for focused policy interventions to support inclusive growth and job creation.



Figure 6-8: Map of Rawalpindi

6.7.1 Population and Demographics

Rawalpindi District, as per the 2023 census, hosts approximately 6.12 million residents across 931,813 households, marking a population increase from 5.40 million in 2017. Around 70% live in urban areas, with 4.21 million in cities and 1.91 million in rural zones. The sex ratio is balanced, with 104 males for every 100 females, and 1,344 transgender individuals recorded.

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Total population	**6,118,911**	
Annual growth (2017–2023)	2.5%	
Gender split	Male	50.7%
	Female	49.3%
Population density	1,039 persons per km^2	
Literacy Rate (age 10+)	Overall 83%	
	Male	90%
	Female	76%
Household Size	6.5 persons per house	

6.7.2 Eductaion and Literacy

Rawalpindi District exhibits strong educational indicators compared to national averages. According to the 2023 census, the literacy rate in the district is 83.1%, with male literacy at 87.6% and female literacy at 78.3%. The district has a well-established network of educational institutions, including public and private schools, colleges, and universities. Notable higher education institutions include Pir Mehr Ali Shah Arid Agriculture University, Fatima Jinnah Women University, Rawalpindi Medical University, and branches of national universities such as NUML and Virtual University. In addition to formal education, the district also supports technical and vocational training centers aimed at skill development, particularly for youth. The urban areas, which make up about 70% of the population, benefit from better access to educational resources, while efforts are ongoing to improve literacy and school enrollment in rural areas. The high literacy rate and availability of diverse educational facilities contribute to a relatively skilled and informed population, which is an important factor in the sustainable planning and implementation of development projects.

Details of schools in district are as follows:

Gujar Khan	07
Kahuta	204
Kallar Syedan	201
Kotli Sattian	183
Murree	232
Rawalpindi	483
Taxila	104



Fatima Jinnah Women University



Pir Mehr Ali Shah Arid Agriculture University

Notable universities of the area

The district also emphasizes technical and vocational education through institutions such as the Government Technical Training Institute, Punjab Vocational Training Council centers, and TEVTA colleges, which provide skill-based training in trades like electrical work, IT, fashion design, and mechanical technologies.

6.7.3 Health facilities

Rawalpindi offers a comprehensive healthcare ecosystem comprising public, military, and private providers, along with community clinics and outreach programs:

Public Hospitals & Primary Care:

- **Benazir Bhutto Hospital** (750 beds) and **Holy Family Hospital** (864 beds) are major teaching hospitals affiliated with Rawalpindi Medical University The district runs over **98 Basic Health Units (BHUs)** and multiple Rural and Tehsil Health Centers. Starting February 2025, seven BHUs have been outsourced and rebranded as "Maryam Nawaz Clinics," offering free basic healthcare and maternal services
- The **Punjab Healthcare Commission (PHC)** actively ensures public and private providers meet WHO standards and hold proper licensing

Military & Specialized Hospitals:

- **Combined Military Hospital (CMH) Rawalpindi**, a 1,200-bed facility, is the largest military hospital offering tertiary care and teaching programs. Some civilians report mixed experiences, including delayed treatment on weekends.
- **Armed Forces Institute of Cardiology (AFIC)**, with 800 beds, provides advanced cardiac care to military and civilian patients

- **Rawalpindi Leprosy Hospital** is the region's oldest specialized facility, offering outpatient/inpatient services under a mission-run model

Private & Semi-Private Sector:

- Numerous private hospitals such as **Bahria International**, **Al-Khidmat Razi**, **Bilal Hospital**, **Mega Medical Complex**, and others are empaneled under the Sehat Card program for subsidized care

Access & Quality Assurance:

- Only **19% of primary care facilities provide access within a 5 km radius**, indicating potential gaps in geographic coverage
- The PHC's recent regulatory drive aims to standardize care quality, closing unlicensed facilities and enforcing compliance.

6.7.4 Economic activity

Rawalpindi is one of the more important cities of Pakistan. After the weakening of the Mughal Dynasty, Sikhs gained power in this area and invited nearby traders to live in the city. The city, thus, became a hub of trade due to its strategic location, connecting Punjab and Kashmir.

Agriculture with its Allied Livestock Breeding, Fishing	8.4%
Manufacture	5.3%
Construction	10.3%
Wholesale/ Retail, Hotel/ Restaurant	11.7%
Transport, Storage, Communication	2.8%
Community, Social & Personal Services	45.3%
Activities Not Adequately Defined	15.3%
Others	0.9

Overall, Rawalpindi's economy is **service-led**, with the secondary sector providing significant but modest industrial employment. Agriculture remains vital for rural income, while construction and real estate growth support urban expansion. These dynamics reflect a balanced socio-economic environment shaped by urbanization, infrastructure development, and proximity to the capital city.

6.7.5 Religion

Muslims	97.7%
Christians	2.1%
Hindus	Negligible %
Ahmadis	0.14%
Schedule Castes	Negligible %
Others	Negligible %

6.7.6 Language

Urdu	1,029,015
Punjabi	3,596,866
Sindhi	17,362
Pushto	630,908
Balochi	3,911
Saraiki	40,031
Hindko	236,986
Brahvi	370
Mewati	522
Kohistani	10,921
Other Language	491,648

6.8 Site Suitability

Based on the environmental and socio-economic baseline of the area, the selected site for the M/S Olive Laboratories Pharmaceutical Manufacturing Facility (Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi) is highly suitable and technically feasible. Strategically located within an established industrial corridor, the site ensures accessible logistics for pharmaceutical inputs and distribution while avoiding protected ecological zones, national parks, or wildlife sanctuaries. The location complies with Punjab EPA zoning guidelines, maintains proper buffer distances from sensitive receptors, and provides a stable geological foundation for sustainable industrial operations.

7 SCREENING OF ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

7.1 General

This section identifies potential environmental and socio-economic impacts during the construction and operation of the M/S Olive Laboratories Pharmaceutical Manufacturing Facility (Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi). It evaluates effects across physical, ecological, and socio-economic domains, proposing practical mitigation measures to safeguard worker health, protect local air and water quality, and ensure sustainable industrial operations under the Punjab Environmental Protection Act (PEPA), DRAP regulations, and Punjab Environmental Quality Standards (PEQS) frameworks. The project proponent is filing a written Affidavit and undertaking with the Punjab EPA, committing to strict compliance with the Environmental Management Plan (EMP) throughout the facility's lifecycle, including adherence to secure hazardous waste disposal protocols through certified providers such as RECP Pakistan. With proper mitigation, all activities will fully comply with PEQS standards, preventing adverse environmental impacts.

7.2 Methodology for Impact Screening

The methodology for assessing the risk level associated with each potential impact is presented below. Risk has been assessed as the likelihood that the activity will have an effect on the environment as well as the consequence of the effect occurring.

Risk = Likelihood × Consequence

Likelihood Scale

Likelihood	Definition	Scale
Certain	Will certainly occur during the activity at a frequency greater than every week if preventative measures are not applied.	5
Likely	Will occur more than once or twice during the activity but less than weekly if preventive measures are not applied.	3
Unlikely	May occur once or twice during the activity if preventive measures are not applied.	2
Rare	Unlikely to occur during the project.	1

Consequence Scale

Consequence	Definition	Score
Catastrophic	The action will cause unprecedented impacts.	**5**
Major	The action will cause major adverse impacts.	**3**

Consequence	Definition	Score
Moderate	No or minimal impacts.	**2**
Minor	No or minimal impacts.	**1**

Risk Score Table

	Consequence				
		Catastrophic	Major	Moderate	Minor
Likelihood	Certain	25	15	10	5
	Likely	15	9	6	3
	Unlikely	10	6	4	2
	Rare	5	3	2	1

Risk: **Significant:** 15-25
Medium: 6-10
Low: 1-5

Any 'Medium' to 'Significant' risk requires an environmental management measure to manage the potential environmental risk. Judgment will be required concerning the application of an environmental management measure to mitigate low risk situations.

7.3 Design/Pre-Construction Phase

7.3.1 Impact Screening Matrix

The screening of potential impacts during the design/pre-construction phase is provided in Table 4.1 below.

Screening of possible Impacts during Design/Pre- Construction phase

Potential Issue	Likelihood	Consequence	Risk Level	Residual Impact (After Mitigation)
Land ownership and site title verification	Low	Delay in regulatory approvals and NOC issuance	Medium	Negligible via verified legal allotment for M/S Olive Laboratories
Site preparation and soil disturbance	Medium	Loss of surface cover across the 4 Kanal plot	Medium	Minor via organized structural layouts and green buffers
Dust emissions during civil works	High	Temporary air quality	High	Negligible via regular water

		deterioration in the industrial zone		sprinkling and covered materials
Noise and vibration from machinery setup	Medium	Nuisance to adjacent industrial units	Medium	Negligible via scheduled working hours and modern machinery
Solid waste generation (debris and packaging)	Medium	Blockage of localized drainage and space clutter	Medium	Minor via segregation, recycling, and designated waste collection
Worker occupational health and safety risks	High	On-site injuries during structural setup and machinery placement	High	Low via mandatory PPE compliance and active ISO 45001 safety protocols
Traffic movement from transport vehicles	Medium	Road congestion on internal estate corridors	High	Negligible via off-peak scheduling and dedicated entry gates

7.3.2 Land Ownership and Site Title Verification

Impact: Unresolved land boundaries or disputed ownership can cause severe legal injunctions, community resentment, and administrative suspension of construction.

Mitigation Measures:

- **Rigorous Title Verification:** Verify land titles, mutation records, and non-encumbrance certificates through local Revenue offices to confirm clear title ownership for M/S Olive Laboratories.
- **Clear Boundary Delineation:** Demarcate exact geometric coordinates using total-station surveys and install permanent concrete boundary markers to prevent encroachment.
- **Grievance Redressal:** Establish a localized Grievance Redressal Mechanism to resolve any border or tenancy claims before breaking ground.

7.3.3 Site Preparation and Soil Disturbance

Impact: Uncontrolled site clearance and vegetation removal across the plot can lead to localized soil loss and increased erosion vulnerability during heavy monsoons.

Mitigation Measures:

1. **Staged Clearance:** Limit site clearance strictly to the engineered footprint required for manufacturing halls, preserving peripheral green buffers.

2. **Topsoil Preservation:** Systematically stockpile and cover excavated topsoil layers for future landscaping and green belt development.
3. **Surface Stabilization:** Apply temporary geotextiles or compacted gravel coverings on exposed earth slopes to prevent rain-induced washout.

7.3.4 Dust Emissions during Civil Works

Impact: High dust emissions from excavation and material handling can cause temporary air quality deterioration in the industrial zone and pose respiratory discomfort.

Mitigation Measures:

1. **Water Sprinkling:** Deploy water tankers to spray haul roads, excavation zones, and unpaved stockpiles multiple times daily
2. **Material Covering:** Securely cover all transport trucks carrying fine aggregates or construction materials with tarpaulins during transit.
3. **Speed Limits:** Enforce strict speed limits for all construction and transport vehicles within the facility perimeter.

7.3.5 Noise and Vibration from Machinery Setup

Impact: Operation of heavy machinery and construction tools can generate excessive noise and localized vibrations, causing a nuisance to adjacent industrial units.

Mitigation Measures:

1. **Scheduled Working Hours:** Restrict heavy construction and noisy structural activities to daytime working hours.
2. **Machinery Maintenance:** Utilize modern, well-maintained equipment equipped with factory-fitted mufflers and acoustic enclosures.
3. **Acoustic Barriers:** Install temporary acoustic barriers or hoardings around high-noise activity areas during construction.

7.3.6 Solid Waste Generation (Debris and Packaging)

Impact: Accumulation of construction debris and packaging waste can block localized drainage channels and create unhygienic conditions.

Mitigation Measures:

1. **Source Segregation:** Establish designated on-site collection bins to separate inert construction debris from domestic and recyclable packaging waste.

2. **Approved Disposal:** Coordinate with Punjab-EPA-approved municipal or private waste contractors to haul construction scrap to authorized dumping sites.

3. **Housekeeping Protocols:** Enforce strict daily housekeeping rules across all active work zones to prevent drainage obstruction.

7.3.7 Worker Occupational Health and Safety Risks

Impact: Workers face potential risks of physical injury, falls from heights, electrical hazards, and dust exposure during structural setup.

7.3.8 Mitigation Measures:

- **Mandatory PPE Compliance:** Require all personnel on-site to wear appropriate Personal Protective Equipment, including helmets, safety boots, and dust masks.
- **Active Safety Protocols:** Implement rigorous occupational health and safety management protocols aligned with international standards.
- **Safety Training & First Aid:** Conduct mandatory pre-work safety briefings and maintain fully stocked first-aid stations on-site.
- **1.22.7 Traffic Movement from Transport Vehicles**
- **Impact:** Influx of heavy transport trucks delivering construction materials can cause road congestion on internal estate corridors.
- **Mitigation Measures:**
- **Off-Peak Scheduling:** Schedule the delivery of heavy raw materials and machinery during off-peak traffic hours.
- **Dedicated Entry Gates:** Designate clear entry and exit gates for transport vehicles to streamline internal traffic flow.
- **Traffic Management:** Employ trained traffic marshals at the facility gates to guide heavy vehicles safely grievances.

7.4 Impacts during Construction Phase

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

Table 7-1: Screening of possible Impacts during Construction phase

Potential Issue	Likelihood	Consequence	Risk Level	Residual Impact (After Mitigation)
Land title and regulatory verification	Low	Delay in statutory approvals and licensing	Medium	Negligible via verified ownership for M/S Olive Laboratories
Site clearance and civil work	Medium	Minor disruption across the 4 Kanal plot	Medium	Minor via organized layout plans
Soil compaction and grading	High	Localized runoff and soil displacement	High	Negligible via proper grading and leveling

Dust emissions from construction activities	High	Air quality nuisance on industrial corridors	High	Negligible via regular water sprinkling
Noise and vibration from equipment setup	Medium	Disturbance to neighboring industrial units	Medium	Negligible via restricted working hours
Construction debris and packaging scrap	Medium	Blockage of internal drainage networks	Medium	Minor via prompt waste clearance and disposal protocols

7.4.1 Land Title and Regulatory Verification

- **Impact:** Inadequate documentation, unresolved regulatory filings, or missing statutory clearances (such as DRAP manufacturing licenses or Punjab EPA approvals) can lead to severe legal penalties, operational suspensions, and administrative delays for the pharmaceutical facility.
- **Mitigation Measures:**
    1. **Statutory Compliance Audit:** Conduct a comprehensive internal review of all property titles, land mutation records, and industrial allotment documents for Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi.
    2. **Proactive Agency Coordination:** Maintain transparent, continuous liaison with the Punjab EPA, DRAP, and local municipal authorities to ensure all licensing renewals and environmental NOC conditions are met ahead of deadlines.
    3. **Documentation Archive:** Establish a centralized digital and physical repository for all regulatory filings, compliance reports, and legal ownership certificates to facilitate seamless inspections.

7.4.2 Site Clearance and Civil Work

- **Impact:** Minor disruptions, minor soil exposure, and localized aesthetic alterations across the 4 Kanal plot during ongoing structural maintenance or expansion work can impact immediate surroundings.
- **Mitigation Measures:**
    1. **Strict Footprint Containment:** Confine all structural maintenance, civil repairs, and material staging strictly within the designated boundaries of the 4 Kanal industrial plot.
    2. **Phased Execution:** Implement maintenance and minor civil works in structured phases to minimize simultaneous disruptions across different operational zones.
    3. **Aesthetic Preservation:** Maintain clear separation between active civil work zones and landscaped perimeter green belts to preserve the visual harmony of the industrial estate.

7.4.3 Soil Compaction and Grading

- **Impact:** Heavy vehicular movement, material stockpiling, and unmanaged grading across the industrial plot can lead to soil compaction, alterations in natural drainage patterns, and localized rainwater runoff displacement.
- **Mitigation Measures:**
    1. **Engineered Grading Design:** Adhere strictly to a site-specific grading and drainage plan that preserves natural water flow gradients and prevents artificial ponding.
    2. **Dedicated Access Corridors:** Restrict heavy transport trucks and service vehicles to paved internal access roads to prevent widespread, unnecessary soil compaction across open plot areas.
    3. **Runoff Management:** Construct temporary interceptor channels and silt traps around active grading zones to safely capture displaced sediment before stormwater reaches boundary drains.

7.4.4 Dust Emissions from Construction Activities

- **Impact:** Material handling, civil repairs, or vehicular movement on unpaved surfaces can generate airborne particulate matter, creating an air quality nuisance on internal industrial corridors.
- **Mitigation Measures:**
    1. **Frequent Water Sprinkling:** Deploy water tankers to regularly spray internal unpaved paths, material loading zones, and handling areas multiple times daily to suppress dust dispersion.
    2. **Covered Material Transit:** Ensure all transport vehicles carrying fine powders, aggregates, or construction inputs are securely covered with tarpaulins during transit.
    3. **Strict Speed Regulations:** Enforce low speed limits for all service and transport vehicles within the facility perimeter to minimize dust resuspension.

7.4.5 Noise and Vibration from Equipment Setup

- **Impact:** Operation of auxiliary equipment, backup generators, HVAC compressors, or maintenance machinery can generate noise and vibration, causing a disturbance to neighbouring industrial units.
- **Mitigation Measures:**
    1. **Restricted Operating Hours:** Schedule loud maintenance, installation, or heavy equipment testing during standard daytime working hours to avoid disturbing neighbours during sensitive periods.
    2. **Acoustic Enclosures:** Ensure all major noise-generating equipment, such as backup generators and air-handling units, are fitted with professional acoustic enclosures and vibration dampeners.
    3. **Regular Equipment Servicing:** Conduct routine mechanical maintenance on all facility machinery to prevent excessive noise caused by worn bearings or uncalibrated parts.

7.4.6 Construction Debris and Packaging Scrap

- **Impact:** Accumulation of operational scrap, discarded packaging materials, and maintenance debris can cause clutter and potential blockage of internal drainage networks.
- **Mitigation Measures:**
    1. **On-Site Segregation:** Establish dedicated waste collection bins to separate inert debris, cardboard packaging, plastic wrapping, and general refuse.
    2. **Prompt Waste Clearance:** Coordinate regular pickups with approved waste management contractors to remove scrap materials from the facility before they accumulate.
    3. **Hazardous Waste Protocol:** Manage any expired pharmaceutical inputs or specialized waste through certified disposal contractors, such as RECP Pakistan, in strict accordance with the established waste management agreement.

7.5 Impacts during Operational Phase

Table 7-2: Screening of possible Impacts during Operational Phase

Screening of possible Impacts during Operational Phase

Potential Issue	Likelihood	Consequence	Risk Level	Residual Impact (After Mitigation)
Pharmaceutical and hazardous solid waste	High	Contamination or improper disposal risks	High	Low via RECP Pakistan incineration agreement and safe segregation
Industrial and washing wastewater discharge	High	Drainage or water pollution risks	High	Low via proper effluent management and PEQS compliance
Fugitive emissions from formulation processes	Medium	Air quality impact from powder handling	Medium	Negligible via dust collection and HVAC filtration systems
Noise from generators and utility equipment	Medium	Disturbance to neighboring units	Medium	Negligible via acoustic enclosures and regular maintenance
Energy and water resource consumption	High	Strain on utility lines	Medium	Low via energy-efficient machinery and resource optimization
Worker health and safety hazards	High	Workplace injuries or chemical exposure	High	Low via mandatory PPE compliance and ISO 45001 protocols
Regional employment and economic boost	High (Positive)	Local economic development	Positive	Long-term positive via job creation and stable medicine supply

7.5.1 Pharmaceutical and Hazardous Solid Waste

- **Impact:** Improper handling, unmonitored storage, or uncertified disposal of expired active pharmaceutical ingredients (APIs), rejected batches, and contaminated laboratory waste can lead to severe soil and water contamination, posing significant public health and regulatory liabilities.
- **Mitigation Measures:**
    1. **Strict Source Segregation:** Implement rigorous on-site segregation protocols to separate pharmaceutical waste, hazardous chemical residues, and general domestic refuse at the point of generation.
    2. **Certified Incineration Contract:** Execute and maintain a formal waste management agreement with a certified provider (such as RECP Pakistan) to ensure regular twice-a-month collection and environmentally compliant incineration of all pharmaceutical waste.
    3. **Tracking and Record-Keeping:** Maintain detailed logbooks and destruction certificates for every batch of hazardous waste handed over for disposal to satisfy Punjab EPA and DRAP audits.

7.5.2 Industrial and Washing Wastewater Discharge

- **Impact:** Direct release of untreated process wastewater generated from cleanroom equipment washing, floor cleaning, and laboratory processes can lead to toxic accumulation, drainage blockages, and groundwater pollution.
- **Mitigation Measures:**
    1. **Effluent Treatment Plant (ETP) Operation:** Route all industrial and domestic wastewater through the facility's dedicated multi-stage ETP, utilizing equalization, flash mixing, biological aeration, and filtration.
    2. **Regular Water Quality Monitoring:** Test treated effluent weekly for critical parameters including pH, COD, BOD, suspended solids, TDS, chlorides, and hardness to ensure strict compliance with Punjab Environmental Quality Standards (PEQS).
    3. **Safe Reuse:** Direct the final treated water exclusively toward estate gardening and perimeter green belt irrigation, avoiding any unmonitored surface runoff.

7.5.3 Fugitive Emissions from Formulation Processes

- **Impact:** Dispersion of fine medicinal powders, excipient dust, and volatile vapours during dry mixing, granulation, and tablet compression can degrade indoor air quality and cause fugitive emissions outside the production blocks.
- **Mitigation Measures:**
    1. **Advanced HVAC HEPA Filtration:** Equip all cleanroom production areas with dedicated HVAC systems incorporating High-Particulate Air (HEPA) filters to capture airborne particulates at the source.
    2. **Dust Extraction Units:** Install localized dust collection cyclone systems and exhaust hoods directly above active powder handling and tableting machinery.
    3. **Routine Air Quality Audits:** Conduct periodic ambient air quality monitoring around the facility perimeter to confirm that particulate emissions remain well within regulatory limits.

7.5.4 Noise from Generators and Utility Equipment

- **Impact:** Continuous operation of heavy backup generators, HVAC air-handling units, and water pumps can create persistent noise pollution, causing a nuisance to neighbouring industrial units.
- **Mitigation Measures:**
    1. **Acoustic Enclosures:** Install factory-fitted sound attenuation panels and acoustic enclosures on all major backup generators and rooftop utility compressors.
    2. **Vibration Dampeners:** Mount heavy pumps and blowers on heavy-duty rubber vibration isolators to prevent structural noise transmission.
    3. **Preventive Maintenance:** Carry out routine mechanical servicing and lubrication of all rotating machinery to eliminate abnormal friction and operational noise.

7.5.5 Energy and Water Resource Consumption

- **Impact:** High energy demands for continuous cleanroom climate control and intensive groundwater extraction for pharmaceutical operations can strain local utility grids and deplete regional water tables.
- **Mitigation Measures:**
    1. **Energy-Efficient Infrastructure:** Deploy high-efficiency electric motors, LED lighting systems, and variable frequency drives (VFDs) across utility equipment to minimize power consumption.
    2. **Rainwater Harvesting:** Implement dedicated rainwater harvesting networks and sediment-trap collection basins to capture seasonal roof runoff for landscaping and general cleaning.
    3. **Water Conservation Practices:** Utilize automated shut-off nozzles and high-efficiency cleaning systems to optimize water use and reduce overall demand.

7.5.6 Worker Health and Safety Hazards

- **Impact:** Operators and laboratory technicians face potential exposure to active pharmaceutical ingredients, sharp instruments, electrical hazards, and heavy machinery accidents during daily production shifts.
- **Mitigation Measures:**
    1. **Mandatory PPE Compliance:** Enforce strict requirements for workers to wear specialized cleanroom garments, gloves, safety boots, and respiratory masks where applicable.
    2. **ISO 45001 Protocols:** Implement comprehensive occupational health and safety management protocols aligned with international standards to manage workplace risks.
    3. **Emergency Preparedness:** Maintain fully stocked first-aid stations, eye-wash stations, and clear emergency evacuation routes across all production and laboratory zones.

7.5.7 Regional Employment and Economic Boost (Positive Impact)

- **Impact:** The long-term operation of the pharmaceutical facility generates positive socio-economic benefits through direct and indirect job creation, skills transfer, and a stable regional supply of essential medicines.
- **Enhancement Measures:**
    1. **Local Hiring Preference:** Prioritize qualified local technicians, engineers, and administrative staff from Rawalpindi and surrounding areas for available positions.
    2. **Skills Training Programs:** Provide continuous technical training on pharmaceutical manufacturing standards, safety protocols, and environmental compliance for all staff.
    3. **Community Support:** Maintain positive engagement with the industrial estate management and local stakeholders to ensure sustainable, mutually beneficial industrial integration.

7.5.8 Potential Environmental Enhancement Measures

The primary operational waste streams, stormwater flows, and utility networks generated by the M/S Olive Laboratories Pharmaceutical Manufacturing Facility will be systematically managed through specialized industrial engineering controls to protect the surrounding environment and ensure long-term sustainability. The following proactive engineering and environmental management protocols will be fully adopted and maintained across the 4 Kanal facility footprint at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi.

7.5.9 Comprehensive Firefighting and Emergency Response System

Due to the localized use of pharmaceutical chemicals, packaging materials, standby power generators, and high-density occupancy within the facility structure, an advanced emergency firefighting and rapid response safety network will be permanently maintained on-site. To ensure immediate containment capabilities, a substantial volume of emergency water will be securely maintained at all times within a dedicated underground reinforced concrete reservoir. This safety setup will be supported by an internal network of high-pressure fire hydrants, specialized industrial-grade chemical, foam, and dry-powder extinguishers, automated smoke-detection alarms, and independent, pressurized water delivery lines distributed across all cleanroom tiers and mechanical plant zones to handle emergency thermal incidents instantly.

7.5.10 Privacy and Boundary Safeguards

The physical layout of the cleanroom manufacturing halls, administrative blocks, internal transit tracks, and storage areas of M/S Olive Laboratories has been engineered to prevent any structural, environmental, or operational intrusion into adjoining properties and neighbouring industrial units. A secure, continuous, structurally reinforced masonry boundary wall will completely isolate the facility from external corridors. This layout maintains a clear perimeter buffer zone and ensures that all heavy transport movements, material loading, and

pharmaceutical processing tasks remain strictly confined within the property boundaries, completely eliminating encroachment onto adjacent estate spaces.

7.6 Impacts on Socio-Economic Environment:

The proposed M/S Olive Laboratories Pharmaceutical Manufacturing Facility does not pose any negative socio-economic impacts on the regional population; rather, it introduces substantial positive impacts to the local community and industrial estate. By utilizing advanced sub-surface wastewater management infrastructure, a dedicated multi-stage Effluent Treatment Plant (ETP), and closed-loop drainage systems instead of unlined discharge methods, the project ensures the local soil, drainage corridors, and groundwater tables are fully protected. This completely prevents negative environmental health impacts on nearby workers and neighboring industrial units while guarding against any decline in the ecological integrity of the surrounding Rawat industrial area.

On a positive note, the establishment of the pharmaceutical facility creates long-term, direct employment and livelihood opportunities for local technical operators, quality control chemists, machinery supervisors, maintenance crews, and security personnel. Furthermore, it stimulates secondary businesses within the community, directly benefiting regional packaging suppliers, chemical distributors, transport operators, and local commercial service providers. By incorporating an eco-sensitive layout that respects local land variations and offering preferential hiring to qualified local residents, the project actively enhances household incomes and fosters sustainable, high-end industrial development within the region.

8 ENVIRONMENTAL MANAGEMENT PLAN AND MONITORING PLAN

8.1 Introduction

The Environmental Impact Assessment (EIA) has identified potential environmental and social impacts during the construction, cleanroom outfitting, equipment installation, and operation of the M/S Olive Laboratories Pharmaceutical Manufacturing Facility. These include localized effects on topsoil stability, surface and groundwater resources, drainage corridors, ambient noise levels, industrial and pharmaceutical solid waste management, and occupational health and safety across the 4 Kanal facility footprint. To address these specific concerns, a comprehensive Environmental Management Plan (EMP) has been prepared based on local regulations, DRAP guidelines, Punjab EPA rules, and regional best practices, ensuring that any residual or uncertain impacts are actively monitored throughout the project lifecycle. This EMP serves as both a practical management and monitoring tool, providing clear engineering guidelines for the project proponents, plant managers, and contractors to avoid or minimize adverse impacts, maximize positive environmental outcomes, and implement timely corrective actions. Ultimately, the plan ensures that this modern pharmaceutical development functions in strict compliance with the Punjab Environmental Quality Standards (PEQS) without causing significant harm to the surrounding environment, local drainage lines, or neighbouring industrial facilities.

8.2 Environmental Management Plan (EMP)

The EMP attached with this report ensures the following:

- **Prescribed Outcomes**: Guarantees environmental and social compliance across all phases, from site clearance to pharmaceutical manufacturing, cleanroom operations, and ongoing facility maintenance.
- **Regulatory Compliance**: Establishes a system for absolute adherence to Punjab environmental legislation, PEQS parameters, DRAP standards, and industrial estate bylaws.
- **Sustainable Design**: Incorporates eco-friendly engineering, including an optimized 4 Kanal industrial footprint, a dedicated multi-stage Effluent Treatment Plant (ETP), waterproofed Underground Water Storage, and secure hazardous waste disposal protocols through RECP Pakistan.
- **Impact Mitigation**: Minimizes adverse effects on soil stability, stormwater runoff pathways, fugitive emissions, and baseline ambient air and noise levels.
- **Resource Optimization**: Manages pharmaceutical solid and hazardous waste, treats industrial and domestic effluent to meet PEQS standards before landscape reuse, and optimizes resource and utility consumption.

8.3 Objectives of Environmental Management plan (EMP)

The EMP provides a delivery mechanism to address potential impacts of project activities, enhance project benefits, and outline good practices for M/S Olive Laboratories. The EMP objectives include:

- Defining Roles and Responsibilities: Establishing clear duties for the project proponent, plant managers, environmental compliance officers, and contractors involved in executing and monitoring the pharmaceutical facility.

- Outlining Mitigation Measures: Specifying practical actions to avoid or minimize potential negative impacts, such as soil erosion, pharmaceutical waste risks, and wastewater contamination.
- Developing Monitoring Mechanisms: Setting up structured monitoring parameters (e.g., PEQS effluent discharge compliance, ETP operational efficiency, and ambient air/noise levels) for systems like the multi-stage wastewater treatment plant and HVAC air filtration.
- Structuring Execution Frameworks: Defining requirements for communication, safety training, environmental auditing, and management across the 4 Kanal facility footprint at Plot No. 52, Street S-6, National Industrial Zone, Rawat, Rawalpindi.

8.4 Project Implementation Institutional Requirements

The following organizations will be directly involved in implementing the EMP for **M/S Olive Laboratories**:

- **Project Proponent:** Holds ultimate responsibility for overall compliance, financial allocation, and EMP execution during both facility setup, cleanroom outfitting, and pharmaceutical operations.
- **Project Contractor / Engineering Team:** Executes the EMP during civil works and installation, managing on-site field mitigation, structural stability, and environmental specifications across the 4 Kanal plot.
- **Supervisory Consultant / Environmental Coordinator:** Acts as technical monitor, overseeing daily EMP execution, ETP performance checks, wastewater infrastructure testing, hazardous waste transfer protocols, and worker health and safety protocols.
- **Environmental Protection Agency (EPA), Punjab:** The provincial regulatory authority responsible for reviewing compliance reports, conducting site inspections, and ensuring adherence to PEQS and statutory environmental mitigation measures.

8.5 Environmental Management Team Along With Their Roles and Responsibilities

List of members that shall be part of environmental management team are mentioned in **table below:**

Environmental Management Team	Roles	Responsibilities
Project Manager	Supervisor	* Plan, disseminate, implement, and continuously develop the environmental management system according to the project's environmental policy. * Monitor, resource, and assess the overall implementation of the Environmental Management Plan (EMP) across all civil setup,

		cleanroom outfitting, and regular pharmaceutical operational cycles.
Health and Safety (HSE) Officer	Member	* Preparing workplace health and safety strategies, developing on-site safety policies, and carrying out comprehensive risk assessments for cleanroom workers, laboratory technicians, and facility staff. * Liaising with regulatory authorities (such as the Punjab EPA, DRAP, and local industrial estate authorities) to ensure continuous compliance with mandatory occupational regulations. * Investigating any operational or structural accidents on-site, producing subsequent safety reports, and formulating technical corrective recommendations. * Carrying out routine site inspections to check that safety policies, cleanroom gowning protocols, boundary safety structures, and Personal Protective Equipment (PPE) procedures are being properly implemented.
Public Health / Environmental Engineer	Member	* Optimize on-site water conservation, monitor internal plumbing and drainage networks, and implement strict quality control systems over the facility's wastewater assets. * Design, test, and oversee the structural execution and hydraulic load balancing of the multi-stage Effluent Treatment Plant (ETP) and wastewater neutralization tanks to ensure flawless treatment before landscape reuse. * Manage and oversee processing elements related to the Underground Water Storage Tank, including the validation of waterproofed concrete mixes to completely eliminate

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		structural seepage, contamination, or groundwater risks.
Head of Environmental Compliance & Audit	Member	* Developing structured testing, soil stability monitoring, and water sampling methodologies to evaluate the adequacy of the ETP discharge and stormwater runoff controls. * Documenting and maintaining formal records of periodic effluent testing against PEQS limits, noise level monitoring of utilities, and ambient air sampling results. * Developing targeted recommendations and compliance reports based on internal environmental audits, and presenting these mitigation findings to senior management for timely corrective action.
Site Engineers / Facility Superintendents	Member	* Oversee day-to-day field activities, including the management of unbuilt open areas, water sprinkling for dust suppression, and maintenance of peripheral drainage lines. * Supervise the manual activities of operational laborers, machinery technicians, landscaping maintenance crews, and transport haulage staff to ensure strict adherence to internal environmental protocols.

8.6 Monitoring & Evaluation (Institutional Arrangement):

The Project Proponent will hold ultimate responsibility for overall Monitoring and Evaluation, while the Proponent's Environmental Coordinator will monitor field-level Environmental Management Plan (EMP) implementation across the facility. These updates, Effluent Treatment Plant (ETP) performance assessments, air filtration metrics, and noise attenuation data will be integrated into the facility's monthly progress reports. At the conclusion of the cleanroom setup and equipment installation phase, the Supervision Consultant's Environmental Specialist will evaluate operational readiness. Additionally, an EPA-certified independent laboratory will conduct periodic third-party validations of EMP execution, treated wastewater discharge parameters against PEQS limits, and ambient air/noise levels. On a regulatory level, the Punjab

Environmental Protection Agency (EPA) will oversee overall compliance and operational standards at the site of M/S Olive Laboratories.

8.7 Training Needs

All engineering, operational, and management staff must receive thorough training to effectively execute the EMP. The structured training program includes:

- **General Promotion of Environmental Awareness:** Educating the workforce on the benefits of maintaining site integrity, preserving green belts, and utilizing advanced Effluent Treatment Plant (ETP) systems over unlined discharges.
- **Specific Training for Staff Working in Sensitive Areas:** Providing targeted safety and technical training for cleanroom operators, chemical handlers, machinery technicians, and utility teams working near production lines, HVAC systems, and hazardous waste storage areas.
- **Updating Staff on Environmental Standards:** Keeping management and engineering teams informed about updates to the Punjab Environmental Protection Act (PEPA), DRAP manufacturing guidelines, Punjab Environmental Quality Standards (PEQS), and industrial estate bylaws.
- **Reporting on Environmental Performance:** Sharing internal audit findings, ETP effluent water quality testing results, and regulatory feedback with the workforce to maintain operational transparency and high environmental standards. Technical personnel monitoring parameters like BOD, COD, TSS, pH, and ambient noise will also receive specialized equipment calibration and testing training.

8.7.1 Organogram for Implementation of Environmental Management Plan (EMP)



Figure 8-1: Environmental Management Plan (EMP)

8.8 Implementation Schedule and Reporting Framework

This schedule is designed to ensure the effective integration of engineering safeguards and regulatory compliance at various stages of development and operation.

Phase	Key Activities	Responsibility
Pre-Construction	Establish baseline testing benchmarks, review land titles, and finalize the site-specific EMP.	Proponent, Environmental Consultant
Construction	Install boundary markers, sediment silt fences, dust suppression controls, and cleanroom framing.	Project Contractor, Environmental Coordinator
Commissioning	Complete HVAC HEPA filter installation, cleanroom plumbing, ETP integration, and waterproofing validation.	Project Contractor, Environmental Coordinator
Trial Run	Test hydraulic flow through the ETP, check backup generator noise limits, and validate air handling efficiency.	Proponent, Environmental Coordinator
Operational	Monitor wastewater treatment assets, manage hazardous waste transfer via RECP Pakistan, and maintain landscaping.	Facility Management, EHS Team
Monitoring & Reporting	Conduct periodic PEQS effluent testing, noise monitoring, and perimeter air quality tracking.	EHS Officer, EPA-Certified Third-Party Lab
Decommissioning	Decommission pharmaceutical processing units and manage legal disposal of specialized waste and debris.	Project Contractor, Environmental Coordinator
Post-Construction	Carry out native tree planting in green buffer zones and final site restoration.	Proponent, Environmental Consultant
External Validation	Perform annual third-party environmental audits, DRAP compliance checks, and grievance documentation.	Independent Auditor, Proponent
Project Closure	Finalize hazardous waste manifests and submit project compliance reports to the Punjab EPA.	Proponent, EHS Officer
Continuous Improvement	Phase in smart energy-efficient HVAC automation, water recycling fixtures, and LED lighting systems.	Proponent, Facility Management

8.9 Environmental Management Cost

Environmental Management Cost

The costs for environmental management and monitoring during both the initial cleanroom setup and long-term operational phases will be integrated directly into the contracts for all appointed contractors, engineering teams, and technical consultants. Against the total capital investment of PKR 110.45 Million for the pharmaceutical facility, the project proponent has allocated a targeted environmental budget of PKR 1.10 Million (1% of the total capital cost). This dedicated budget covers the complete implementation of pharmaceutical environmental safeguards, Effluent Treatment Plant (ETP) maintenance, HVAC HEPA-filter management, hazardous waste handling through RECP Pakistan, site stability checks, and periodic pollution monitoring protocols. Following the initial operational timeframe, the monitoring program will be systematically reviewed and updated in consultation with the Punjab Environmental Protection Agency (EPA) and DRAP, and the ongoing operational budget will be adjusted accordingly to meet all regulatory compliance requirements.

Table 8-1: Summary of EMP Cost

Sr. No.	Parameter / Environmental Infrastructure	Cost (Pak Rupees)
1.	**Greenbelt Development & Eco-Filter Buffer** (Dense multi-row periphery tree plantation of native Rawat/Punjab region species like Neem, Shisham, Arjun, and Eucalyptus across open plot spaces to act as a physical dust, sound, and visual landscape barrier)	350,000
2.	**Occupational Health & Safety (OHS) Compliance & ISO 45001** (Specialized cleanroom PPE garments, safety boots, heavy-duty respirators, daily safety briefings, site-wide fire suppression systems, and a fully equipped first-aid station setup)	280,000
3.	**Environmental Parameter Monitoring** (Quarterly EPA-certified third-party testing for ETP effluent quality against PEQS limits, ambient air quality, HVAC particulate tracking, and noise levels near generator yards and utility areas)	275,000
4.	**Environmental & Safety Sustainability Trainings** (Annual refresher training for plant management, cleanroom operators, and technical staff on pharmaceutical waste segregation, DRAP compliance, and emergency response protocols)	195,000
-	**Total Environmental Management & Monitoring Cost** (1% of the total PKR 110.45 Million capital cost)	**1,100,000**

		(PKR 1.10 Million)

8.10 Environmental Monitoring Program

The costs for environmental management and monitoring will be integrated directly into contractor and consultant agreements. Against the total capital investment of **PKR 110 Million** for **M/S Olive Laboratories**, the project proponent has allocated a dedicated environmental budget of **PKR 1.10 Million** (1% of the total capital cost). This budget covers pharmaceutical environmental safeguards, Effluent Treatment Plant (ETP) maintenance, HVAC HEPA-filter management, hazardous waste handling through RECP Pakistan, site stability checks, and pollution monitoring protocols. The monitoring program and operational budget will subsequently be reviewed and updated in consultation with the Punjab Environmental Protection Agency (EPA) and DRAP to ensure ongoing compliance.

Table 8-2: Environmental Monitoring Plan

Sr. No	Monitoring Parameter	Monitoring Location	Remarks / Regulatory Compliance	Monitoring Frequency
Construction Stage				
1.	Noise Levels	Active cleanroom outfitting zones, structural modification corridors, and heavy machinery deployment routes across the 4 Kanal plot.	The contractor will use calibrated sound-level meters to ensure construction noise from site-prep machinery remains within baseline limits and protects neighbouring industrial units and workers.	Quarterly Basis
2.	Smoke & Exhaust Emissions	Inbound construction material dumpers, transit vehicles, concrete mixers, and temporary site diesel generators.	Regular mechanical tuning and valid vehicular fitness certifications will be strictly enforced to comply with Punjab Environmental Quality Standards (PEQS).	Quarterly Basis
3.	Fugitive Dust (PM_{10}, $PM_{2.5}$)	Cleanroom structural framing zones, foundation areas, and unprotected soil	Visual inspections and ambient particulate monitoring to verify the adequacy of wet-suppression, water-	Monthly during dry seasons

		or aggregate storage piles.	sprinkling loops, and boundary windbreaks.	
Operational Stage				
1.	Wastewater Effluent Quality	Sampling port at the outlet of the multi-stage Effluent Treatment Plant (ETP) and neutralization systems.	Direct laboratory testing of liquid discharge parameters (BOD, COD, TSS, Oils & Grease, pH) via an EPA-certified laboratory to ensure strict compliance with PEQS thresholds.	Quarterly Basis
2.	Ambient & Boundary Noise	Standby power generator rooms, mechanical utility bays, HVAC compressor housing, and property perimeters.	Sound pressure monitoring to verify that structural foundations, vibration dampeners, and acoustic canopies keep operational noise well within the statutory limits of PEQS for industrial zones.	Daily (Internal) / Quarterly (Third-Party)
3.	Stormwater & Runoff Quality	Primary collection sumps, perimeter drainage bypass channels, and natural contour outlet lines.	Analytical monitoring of runoff water quality parameters (pH, Turbidity, Suspended Solids) to confirm that unbuilt open areas are successfully managing natural drainage without causing soil erosion.	Monthly Basis (During rainy seasons)
4.	Pharmaceutical & Hazardous Waste	Centralized enclosed hazardous waste storage shed and color-coded segregation bins.	Verification of regular bi-monthly lifting schedules by certified handlers (RECP Pakistan), checking containment integrity, and maintaining secure hazardous waste manifests and logbooks.	Monthly Basis
5.	Groundwater Table Clearance	Boundary monitoring zones relative to the underground water storage	Monitoring local static water levels and sub-surface integrity to ensure that the water table remains fully protected from any	Bi-Annual Basis

		tank and facility footprint.	operational seepage or contamination risks.	
6.	Health, Safety & Environment (HSE) Compliance	Cleanroom floors, packaging lines, laboratory spaces, mechanical utility rooms, and main gates connecting to the estate roads.	Daily safety audits ensuring the mandatory use of job-specific certified cleanroom PPE (gowns, protective boots, gloves, eye protection) alongside continuous tracking of fire suppression systems and emergency readiness.	Daily Basis

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Table 8-3: Environmental Management Plan

Sr. No.	Project Component / Impact	Mitigation / Preventive Action	Responsibility (Implementation)	Responsibility (Monitoring)
		Construction & Setup Phase		
1	Degradation of air quality (Fugitive Dust & Exhaust Emissions)	* Implement strict water-sprinkling dust suppression routines on unpaved approach lanes; cover all loose sand, excavated soil piles, and cement/aggregate stockpiles with heavy geotextile sheets. * Ensure all inbound material delivery dumpers, excavation machinery, and concrete mixers hold valid vehicular fitness certifications and comply with PEQS exhaust limits.	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator
2	Soil erosion and drainage blockages during cut-and-fill operations	* Install heavy structural timber/steel shoring, reinforced retaining wall bases, and geotextile silt fencing during all foundation and leveling works. * Construct temporary sediment traps and drainage channels to prevent muddy construction-phase runoff from cascading into neighboring industrial units or drainage lines.	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator
3	Traffic congestion on main regional estate roads	* Schedule heavy equipment mobilization, bulk steel/cement deliveries, and soil haulage exclusively during designated operational hours. * Deploy trained flagmen with retroreflective signage and safety lighting at the project's main access junction to maintain safe, fluid traffic conditions.	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator

4	Structural safety risks and friction with nearby property owners	* Build structural perimeter retaining and boundary walls early in the civil development phase, and install prominent safety warning signs around the site borders. * Establish an active Grievance Redressal Committee (GRC) to quickly resolve environmental, noise, or property boundary complaints raised by adjacent industrial units.	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator
5	Occupational Health & Safety (OHS) hazards on-site	* Mandate the absolute use of certified PPE (including cleanroom garments, safety helmets, protective gloves, and steel-toed boots) across all worker tiers. * Conduct daily morning safety toolbox briefings for all technical and labor staff involved in structural modifications, cleanroom framing, and equipment installation.	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator
6	Elevated ambient noise levels from structural civil works	* Limit noise-intensive activities—such as mechanical hammering, cutting, and structural concrete mixing—strictly to standard daytime hours (08:00 AM to 05:00 PM). * Provide personal ear protection (earplugs or earmuffs) for all site workers operating near high-vibration machinery or temporary diesel generators.	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator
7	Improper construction waste handling and debris accumulation	* Systematically segregate civil debris, timber scrap, rebar cuttings, and empty packaging at a secure on-site storage depot. * Ensure all non-recyclable construction waste and excavated rock/soil debris are hauled away by authorized waste contractors to legally approved municipal or estate disposal sites.	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator
8	Management of temporary construction worker effluent	* Equip temporary contractor site offices and labor transit camps with properly sized, mobile, water-tight chemical toilets or temporary septic tanks. * Monitor these temporary systems routinely to prevent any raw	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator

		sewage leakages or overflows onto the ground or into local open drainage channels.		
9	Soil and watershed contamination from accidental fuel spills or lubricants	* Refuel all on-site construction machinery, excavators, and service vehicles exclusively over an impervious, bunded concrete maintenance pad * Maintain fully stocked chemical spill kits on-site, and immediately excavate and safely dispose of any accidentally contaminated soil as hazardous waste.	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator
10	Employment and local social considerations	* Prioritize hiring qualified technical operators, engineering staff, masonry workers, and unskilled laborers from local communities and adjacent regional towns. * Enforce a strict corporate code of conduct, mandate fair and timely wages, and completely prohibit child or forced labor across all sub-contractor teams.	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator
11	Vegetation loss and landscape restoration	* Limit land clearing, topsoil scraping, and tree removal strictly to the required structural footprint of the primary pharmaceutical blocks. * Launch an early landscape restoration and tree plantation campaign within unbuilt open areas, utilizing native tree species to establish a natural environmental buffer.	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator
12	Archaeological Chance Finds	* Halt all excavation and earthmoving work immediately if any historical artifacts, old coins, ancient remains, or old masonry structures are uncovered during site leveling. * Secure the immediate area and coordinate directly with the Punjab Department of Archaeology for a formal professional evaluation and clearance.	Contractor & Environmental Coordinator	Contractor & Environmental Coordinator

Operational Phase				
1	Emergencies or utility infrastructure failure (Machinery Breakdown / Power Blackout)	* Conduct regular electrical thermal imaging of central control panels, high-capacity motors, HVAC systems, and mechanical water pumping stations. * Install emergency backup power automation links, manual override switches, and distinct fire-rated barrier walls around the standby generator bays.	Proponent / Facility Management	Proponent / Facility Management
2	Wastewater treatment overflow or structural leakage of ETP assets	* Perform weekly structural inspections of the multi-stage Effluent Treatment Plant (ETP) chambers to check for any sludge build-up, blockages, or mechanical faults. * Maintain automated high-level water sensors in primary collection sumps to alert operators before any overflow occurs.	Proponent / Facility Management	Proponent / Facility Management
3	Gaseous exhaust exposure or smoke risks from standby generator assets	* Maintain restricted access zones around the exhaust stacks of backup generator units and route exhaust pipes well above the building's top roof line. * Conduct regular ambient air quality testing around facility boundaries to monitor carbon monoxide (CO), sulfur dioxide (SO2), and particulate matter emissions.	Proponent / Facility Management	Proponent / Facility Management
4	Hazardous pharmaceutical and facility waste (APIs, Spent Solvents, Generator Lubricants / Batteries)	* Store expired APIs, rejected batches, spent generator lubricants, and backup battery banks in sealed, clearly labeled containers within an indoor, bunded hazardous waste storage shed. * Ensure safe haulage and disposal strictly via Punjab EPA-certified hazardous waste contractors (RECP Pakistan) and licensed incinerators.	Proponent / Facility Management	Proponent / Facility Management

5	Noise pollution from facility utilities (HVAC Compressors, Water Pumps, & Generators)	* Periodically monitor noise levels at property perimeters to ensure compliance with strict industrial parameters of the Punjab Environmental Quality Standards (PEQS). * Service mechanical equipment and water pumps routinely, and maintain high-density acoustic insulation panels and sound-attenuating canopies on all backup generators.	Proponent / Facility Management	Proponent / Facility Management
6	Accumulated pharmaceutical and domestic solid waste	* Enforce a strict internal waste management rule requiring color-coded segregation bins across all operational and packaging areas. * Collect accumulated waste daily inside a covered, centralized indoor transit waste zone and ensure reliable lifting by certified handlers and estate authorities.	Proponent / Facility Management	Proponent / Facility Management
7	Stormwater runoff management and site protection	* Route all rooftop rainwater and surface runoff through engineered, concrete-lined drainage channels. * Ensure unbuilt open areas are kept clean and correctly graded to prevent water pooling or soil erosion during heavy monsoon periods	Proponent / Facility Management	Proponent / Facility Management
8	Facility management health and safety protocols (Cleanroom Maintenance / High-Voltage Utility Control)	* Provide specialized personal protective equipment (PPE), including cleanroom gowns, hairnets, and safety footwear, alongside high-voltage rubber gloves for electric room operators. * Enforce a mandatory "Permit to Work" (PTW) system and Lock-Out Tag-Out (LOTO) safety protocols for all machinery maintenance and main switchgear repairs.	Proponent / Facility Management	Proponent / Facility Management

9 SOLID WASTE MANAGEMENT PLAN

Solid waste management is one of the most critical environmental and municipal concerns associated with industrial developments. Improper handling and disposal of construction debris, pharmaceutical waste, or domestic refuse can lead to serious environmental issues such as soil degradation, the breeding of disease vectors, blockage of natural drainage routes, and aesthetic degradation of the surrounding industrial estate. Therefore, a comprehensive Solid Waste Management Plan (SWMP) has been developed for the M/S Olive Laboratories Pharmaceutical Manufacturing Facility to ensure the systematic collection, source segregation, internal transportation, recycling, and final sanitary disposal of all waste streams generated during both the construction and operational phases. This plan strictly aligns with the regulatory requirements of the Punjab Environmental Quality Standards (PEQS), DRAP manufacturing guidelines, the Punjab Solid Waste Management Rules, 2021, and Punjab Environmental Protection Agency (EPA) regulations, ensuring long-term environmental sustainability and absolute compliance throughout the project lifecycle.

9.1 Construction and Setup Phase

Solid waste generated during the cleanroom outfitting and structural assembly phase will include civil debris, massive excavation spoils, packaging material, and domestic waste from the construction workforce. To manage these streams effectively:

- **Source Segregation:** Waste will be strictly segregated at the source into recyclable, non-recyclable, and hazardous technical categories.
- **Material Reutilization:** Reusable construction materials such as scrap metal, shuttering wood, and excavated sub-soil/rock will be salvaged and reused internally for terracing, site stabilization, or sub-grade backfilling.
- **Hazardous Management:** Hazardous construction waste (e.g., empty paint canisters, spent formwork oil containers, concrete curing chemicals, and waterproofing agents) will be safely isolated and handled exclusively by Punjab EPA-approved hazardous waste contractors.
- **Inert Waste Haulage:** Non-recyclable inert waste and surplus excavated rock will be transported using covered dump trucks to authorized municipal or estate landfill sites, strictly routed during off-peak hours to avoid estate traffic congestion.
- **Prohibition of Open Dumping:** Open burning of waste and indiscriminate dumping of debris into adjacent ravines or natural stormwater easements will be strictly prohibited.
- **Compliance Checks:** Regular environmental training sessions and daily field monitoring will be conducted to ensure full compliance with the EMP and PEQS guidelines.

9.2 Operational Phase

During the long-term operational phase, the facility will generate pharmaceutical processing waste, green waste from expansive unbuilt areas, and facility maintenance hazardous waste (from backup generators, HVAC filters, and mechanical equipment). Management measures will include:

- **Centralized Indoor Waste Transit Zone:** A dedicated, centralized waste management transit room will be established on the ground tier. This facility will be built with an impermeable base, washable tiled walls, and robust mechanical ventilation to completely eliminate odor pooling, pest intrusion, or rain-induced runoff.

- **Source Segregation Systems:** Clearly marked, separate color-coded bins will be provided across all cleanroom manufacturing bays, common corridors, and administrative zones to enforce source segregation: Green Bins (for organic/biodegradable waste), Blue Bins (for dry recyclables like plastics and paper), and Red Bins (for hazardous operational items and expired materials).
- **Effluent & Wastewater Management:** Industrial process wastewater and sanitary blackwater will be routed strictly into the facility's multi-stage Effluent Treatment Plant (ETP) network, while treated effluent is intercepted for landscape irrigation reuse.
- **Green Debris Management:** Green waste and leaf litter gathered from unbuilt open areas and perimeter tree plantations will be routed to a designated on-site composting zone to produce nutrient-rich organic fertilizer for landscape maintenance.
- **Hazardous Utility & Pharmaceutical Waste Management:** Expired active pharmaceutical ingredients (APIs), rejected batches, spent lubricating oils from standby generators, and depleted battery banks will be securely locked in bunded chemical rooms until safe disposal via certified contractors like RECP Pakistan.
- **Reliable Municipal Haulage:** Facility management will contract with local industrial estate or municipal solid waste authorities to ensure regular lifting of accumulated municipal waste, preventing any structural overflow.

Table 9-1: Solid Waste Management Plan

Type of Waste	Source of Generation	Internal Management Measures	Disposal Method / Institutional Responsibility
Construction Phase			
Excavated rock/soil, concrete debris, and mortar.	Hillside slope excavation, basement prep, and structural retaining wall civil works.	Reuse clean rock/soil for site terracing and sub-grade filling; segregate and store reusable structural materials.	Disposal of surplus non-reusable inert waste at approved municipal or estate landfill sites; Project Contractor holds primary field responsibility.
Packaging material, scrap metal, timber waste, and plastics.	Structural concrete assembly, steel rebar tying, and interior cleanroom finishing works (tiles, glass, fixtures).	Establish a dedicated secure storage depot; sort waste into recyclable and non-recyclable fractions.	High-value recyclable scrap sold directly to authorized industrial recyclers; non-recyclables routed to municipal sites.
Domestic municipal waste.	Temporary labor transit camps, site operational	Provide clearly marked, lidded waste bins across the camp	Collected waste systematically hauled away and disposed of

	offices, and engineering bays.	site; enforce a mandatory daily collection routine.	by local municipal or estate waste services.
Hazardous waste (spent machinery oils, paints, primers, chemicals).	Heavy excavation machinery refueling zones, equipment maintenance bays, and waterproofing setup areas.	Store separately in leak-proof steel drums over impervious bunded surfaces; maintain emergency spill kits.	Turn over accumulated hazardous waste volumes to Punjab EPA-approved specialized hazardous waste contractors.
Operational Phase			
Domestic Solid Waste (Food scraps, organic refuse).	Factory cafeterias, administrative offices, and staff pantries.	Enforce staff usage of Green Bins; transfer daily to the centralized, ventilated indoor waste transit room.	Reliable daily lifting and haulage by local estate or municipal solid waste management authorities.
Dry Recyclables (Cardboard, plastic bottles, glass packaging).	Manufacturing packaging, delivery containers, and administrative offices.	Enforce usage of Blue Bins; compress cardboard/plastics in the transit zone to reduce volume.	Periodic collection by authorized recycling contractors and municipal authorities.
Green waste (leaves, grass clippings, pruned branches).	Tree plantations and lawns within unbuilt open areas and courtyards.	Route all gathered bio-waste to a designated small-scale composting bin area within the facility footprint.	Processed organic compost is fully reused as natural fertilizer for the facility's landscaping requirements.
Hazardous electronic/utility/pharmaceutical waste (Expired APIs, used batteries, generator lubricants, HEPA filters).	Standby generator maintenance bays, HVAC cleanroom units, mechanical control rooms, and laboratory areas.	Implement separate secure collection in bunded lockers, proper sorting, clear hazard labeling, and handling by trained site EHS staff.	Controlled disposal or chemical incineration strictly via licensed, EPA-approved hazardous waste management facilities (e.g., RECP Pakistan).

9.2.1 Solid Waste and Wastewater Management Engineering Metrics

As identified in the environmental assessment, the primary continuous waste streams generated during the operational phase of this pharmaceutical manufacturing facility will consist of industrial effluent/sewage and solid waste. To systematically enhance the

environmental profile, control municipal infrastructure strain thresholds, and implement sustainability principles (such as green waste composting and greywater reclamation), the project design incorporates strict segregation rules. The targeted daily operational volumes, generation capacities, and disposal metrics for these primary streams are structurally quantified in the following engineering matrix:

Table 9-2: Quantitative Operational Solid Waste & Wastewater Management Matrix

Sr. No.	Engineering Parameter / Operational Detail	Manufacturing / Production Sector	Facility Management & Landscaping Sectors	Total Combined Volume
1	Total Water Consumption per Day	6,000 Gallons/day (Process use: cleaning, dust control, sanitation)	1,500 Gallons/day (Facility cleaning, utility rooms, irrigation)	7,500 Gallons/day
2	Wastewater / Sewage Generation per Day	5,000 Gallons/day (Industrial process water & cleanroom drainage)	800 Gallons/day (Floor washing runoff & staff sewage)	5,800 Gallons/day
3	Reusable Treated Water Reclaimed per Day (Treated effluent intercepted for landscape use)	0 Gallons/day (Treated via centralized ETP)	1,200 Gallons/day (Re-routed to unbuilt open area green belt plantation)	1,200 Gallons/day
4	Total Solid Waste Generation per Day	600 kg/day (Pharmaceutical refuse, packaging, and raw material scrap)	100 kg/day (Green waste & facility maintenance scrap)	700 kg/day
5	Reusable / Recyclable Waste Separated per Day (Dry recyclables sorted + green waste composted)	250 kg/day (Sorted dry plastics, glass, and paper packaging)	70 kg/day (Organic leaf litter/grass diverted to compost)	320 kg/day
6	Net Disposable Solid Waste per Day (Residual mixed refuse & hazardous sludge routed off-site)	350 kg/day (Residual refuse & ETP sludge)	30 kg/day (Inert maintenance waste)	380 kg/day

10 RAINWATER HARVESTING PLAN

The rainwater harvesting plan for the pharmaceutical manufacturing facility of M/S Olive Laboratories aims to promote sustainable water resource management, reduce operational pressure on the local Rawat groundwater aquifer, and mitigate localized stormwater flooding, soil erosion, or waterlogging risks within the facility boundaries. By capturing, filtering, and systematically reusing stormwater runoff across the 4 Kanal site, the project will enhance groundwater recharge and support climate-resilient industrial development within Punjab.

10.1 Objectives of Rainwater Harvesting Plan

The key strategic objectives of the integrated rainwater harvesting matrix are to:

- **Conserve Water Resources:** Capture and store monsoon rain and winter precipitation to reduce the pharmaceutical facility's total fresh groundwater extraction demand for utility, cooling, and cleaning requirements.
- **Control Stormwater Hazards:** Minimize rapid peak surface runoff and eliminate localized waterlogging, flash flooding, or soil erosion along cleanroom access driveways, yards, and around structural foundations.
- **Aquifer Replenishment:** Recharge the local sub-surface aquifer to maintain dynamic water table levels and combat regional groundwater drawdown.
- **Sustainable Utility Integration:** Support unbuilt open area landscaping, greenbelt maintenance, and yard washing routines using harvested water.
- **Reduce Ecological Footprint:** Lower the overarching environmental footprint of the industrial development through low-impact environmental engineering designs.

10.2 Description of the Rainwater Harvesting System

The proposed rainwater harvesting infrastructure for the pharmaceutical facility is engineered to collect, filter, store, and utilize rainwater efficiently while actively facilitating groundwater recharge. The technical layout comprises five core stages:

- **Collection Network:** High-velocity runoff from the factory rooftops, cleanroom canopies, and unbuilt open yards will be collected via an interconnected grid of surface drains, concrete-lined perimeter channels, and drainage loops. These conduits will route initial gravity flows directly toward a centralized multi-chamber collection and sedimentation sump distributed within the lower structural levels.
- **First Flush Diverters:** To ensure water quality integrity, the system will incorporate mechanical first flush diverters. These mechanisms automatically separate and isolate the initial 10–15 minutes of rainfall runoff, which typically carries accumulated atmospheric dust, vehicle emissions, soot particles, and roof surface contaminants, preventing it from entering primary storage structures.
- **Multi-Layer Filtration Infrastructure:** Following first-stage diversion, cleaner stormwater fractions will pass through localized, multi-layer filtration units consisting of graded river sand, washed gravel, and activated charcoal layers. This physical-chemical treatment removes remaining suspended solids, organic sediments, and particulate impurities before reuse.
- **Underground Storage and Reuse:** Purified rainwater will flow into the reinforced centralized Underground Water Storage Tank (treated with internal waterproofed plastering mixes). This water will be utilized for landscape irrigation across green tiers, common area cleaning, and emergency reserves, directly decreasing dependence on deep tube well extraction.

- **Engineered Recharge Structures:** Any surplus stormwater volumes exceeding maximum storage capacities will be diverted via overflow channels into specialized groundwater recharge pits and dual-chamber recharge wells established within the lower terraced green belts. These recharge wells will feature perforated casings and a gravel-pack envelope to maximize safe, sediment-free percolation directly into the localized aquifer without compromising site stability.

10.3 Maintenance and Monitoring Protocol

A systematic maintenance and monitoring protocol will be implemented by the facility's environmental management team to ensure the long-term operational efficiency of the rainwater harvesting network and prevent structural clogging, silt bio-fouling, or system inefficiencies.

Table 10-1: Rainwater Harvesting Maintenance and Monitoring Matrix

Sr. No	Target Infrastructure Component	Prescribed Maintenance & Operational Activity	Regulatory / Technical Purpose	Prescribed Frequency
1	Collection Network & Channels	Manual clearing of windblown silt, leaves, and debris from surface drain gratings, roof gutters, and perimeter channels.	Prevents blockages, drainage overflows, and ensures unhindered gravity flow during heavy rain events.	Bi-Annually (Pre and Post-Monsoon)
2	First Flush & Filtration Units	Flushing out sediment chambers, washing filter media, and replacing the activated charcoal layer.	Eliminates biological film/atmospheric dust buildup and maintains optimum hydraulic filtration rates.	Quarterly / Before Major Rain Events
3	Recharge Pits & Wells	High-pressure backwashing, mechanical desilting, and top-layer sand replacement in recharge basins.	Prevents subterranean clogging and maintains long-term aquifer infiltration efficiency without affecting site stability.	Annually (During the Dry Season)
4	Storage Reservoirs	Structural integrity testing of the central Underground Water Tank, checking for masonry cracks or leaks, and cleaning floor silt/sludge accumulation.	Ensures operational reliability and prevents subsurface water loss or cross-contamination that could undermine foundations.	Annually

5	Water Quality Monitoring	Semi-annual laboratory sampling and analysis of basic physical, chemical, and biological parameters (pH, Turbidity, COD).	Verifies water safety and suitability for utility backup and greenbelt irrigation reuse.	Bi-Annually
6	Volumetric Data Logging	Maintaining continuous electronic logs of total harvested, stored, and extracted stormwater volumes via automated level sensors.	Quantifies environmental performance metrics and tracks absolute aquifer recharge volumes for sustainability auditing.	Continuous / Monthly Reporting

10.3.1 Institutional Responsibility

The Facility Management Department of **M/S Olive Laboratories** will hold primary responsibility for the operation, maintenance, and monitoring of the rainwater harvesting system. The department will ensure that the system functions effectively in accordance with the Environmental Management Plan (EMP) and complies with all relevant environmental laws and provincial standards. Their responsibilities will include:

- Overseeing the routine operation and maintenance of all rainwater harvesting components, structural filters, and filtration networks.
- Maintaining detailed logs of inspection, cleaning, desilting, and water quality testing activities.
- Coordinating with the Project Environmental Coordinator for periodic performance audits and structural verification of drainage loops.
- Ensuring corrective actions are taken promptly in case of any channel blockage, filter breakdown, or system non-compliance.
- Submitting periodic monitoring data and reports to relevant regulatory bodies, including the Punjab Environmental Protection Agency (EPA) and DRAP, as required under the rules.

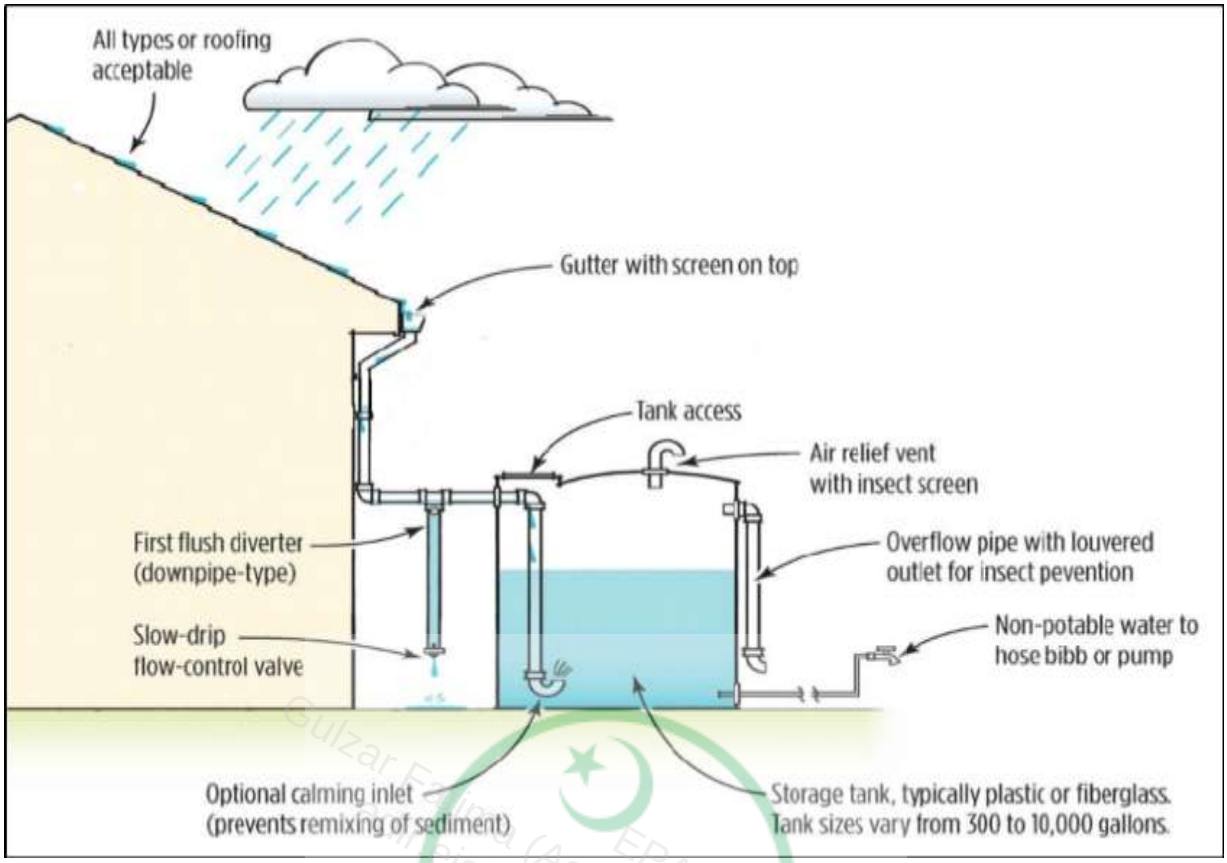


Figure 10-1: Rainwater Harvesting Plan

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11 STAKEHOLDERS / PUBLIC CONSULTATION

Stakeholder consultation is a vital mechanism for involving all primary and secondary stakeholders in the M/S Olive Laboratories pharmaceutical manufacturing facility's decision-making process in order to address their concerns, improve cleanroom and infrastructural layout designs, and give the development long-term social legitimacy. Consultation, if conducted in a participatory and objective manner, significantly enhances the socioeconomic and environmental sustainability of the project. Community input regarding local infrastructure, industrial traffic dynamics, site stability, ambient air quality, water tables, and ecological dynamics can greatly improve the overall quality of decision-making. For this reason, a comprehensive stakeholder consultation framework was carried out in the Rawat project area. This was executed not only to satisfy the statutory legal requirements of the environmental assessment process under the Punjab Environmental Protection Act and DRAP regulations, but also to ensure inclusiveness, transparency, and public consensus in the structural design, environmental safeguards, and long-term operation of the pharmaceutical facility.

11.1 Objectives of Stakeholder Consultation

In line with international benchmarks and regulatory frameworks, stakeholder consultation was undertaken to assess the likely physical, ecological, and socioeconomic impacts of the **M/S Olive Laboratories** pharmaceutical manufacturing facility.

The specific aims of this process were to:

- **Promote Community Understanding:** Inform local stakeholders and neighboring industrial units about the cleanroom facility, infrastructure layouts, and environmental mitigation frameworks (such as the Effluent Treatment Plant and rainwater harvesting systems).
- **Identify and Address Public Concerns:** Proactively document and resolve concerns raised by neighboring businesses, landowners, and nearby residents regarding utility management and industrial operations.
- **Establish Conflict Resolution Pathways:** Provide a formal mechanism (such as the Grievance Redressal Committee) to address issues like construction traffic, noise, and dust control early, preventing disputes.
- **Foster Transparency and Trust:** Build a collaborative partnership between the project proponent, consultants, and local stakeholders to ensure long-term environmental protection and compliance with Punjab EPA and DRAP standards.

11.2 Objectives of Public Involvement

Public involvement is integrated into the planning of the **M/S Olive Laboratories** pharmaceutical manufacturing facility to create a transparent channel of communication between the project developers and the surrounding Rawat industrial community. The primary objectives of this public involvement process are to:

- **Inform and Educate Stakeholders:** Ensure that local residents, neighboring industrial operators, DRAP representatives, and relevant regional authorities are fully informed about the facility's cleanroom layout, engineering design, and structural environmental protection measures (such as the multi-stage Effluent Treatment Plant, rainwater harvesting filters, and waterproofed water storage infrastructure).
- **Empower Unrepresented Groups:** Provide an accessible, safe, and equitable opportunity for vulnerable or otherwise unrepresented local groups (including nearby

residents and small-scale local traders) to voice their concerns regarding site stability, local air quality, aquifer resources, or regional socioeconomic changes in the area.

11.3 Stakeholders

Stakeholders identified for this development include all individuals, groups, and organizations who may be directly or indirectly affected by the infrastructure works and long-term operations of the **M/S Olive Laboratories** pharmaceutical manufacturing facility. To ensure comprehensive public inclusion, a broad definition of stakeholders was adopted during the environmental assessment process:

- **Direct Stakeholders:** This primary group encompasses the local residents of surrounding Rawat settlements, adjacent industrial unit operators, pharmaceutical facility workers and laboratory technicians, construction contractors, and immediate land users who will interact directly with the 4 Kanal project site footprint at Plot No. 52, Street S-6, National Industrial Zone.
- **Indirect Stakeholders:** This secondary group includes regional utility service providers (such as electricity and water management departments), commercial pharmaceutical distributors, district and provincial regulatory authorities (including the Punjab EPA and DRAP), and local non-governmental organizations (NGOs) focused on industrial environmental conservation operating within the region.

11.4 Mechanism

Information regarding the **M/S Olive Laboratories** pharmaceutical manufacturing facility was presented directly to the participants in non-technical, accessible Urdu and Punjabi languages. To ensure a highly participatory process, ample time was allocated for open floor discussions, allowing community members to ask questions, voice environmental apprehensions regarding site stability, cleanroom waste handling, or water consumption, and suggest field-level improvements. All queries, suggestions, and technical concerns raised by the participants were systematically recorded in the field log and addressed directly by the environmental team. Furthermore, all public venues and session timings were carefully selected in coordination with local elders and community representatives to minimize daily routine disruptions and guarantee maximum community attendance.

11.5 Timing and Frequency

The stakeholder consultation process was initiated during the early conceptual and design stages of the project and was maintained continuously throughout the Environmental Impact Assessment (EIA) process. This proactive approach ensured that public feedback could be effectively integrated into the project's site planning, cleanroom layout, and environmental mitigation framework. For this specific pharmaceutical facility of **M/S Olive Laboratories**, intensive field-level consultations and public engagement sessions were carried out across the Rawat study area for six consecutive days.

11.6 Consultation Tools

To ensure comprehensive stakeholder engagement for the **M/S Olive Laboratories** project, community meetings, focus group discussions, semi-structured interviews, and participatory appraisal techniques were utilized across the Rawat industrial zone.

Important Considerations

Throughout the consultation process, the environmental team adhered to the following core principles:

- **Clear Communication of Project Objectives:** Ensuring all participants fully understood the pharmaceutical facility's scope, including its cleanroom operations, environmental safeguards, and DRAP compliance measures.
- **Identification of Stakeholders and Their Concerns:** Actively mapping out both direct and indirect stakeholders and accurately logging their specific environmental, infrastructural, or socio-economic apprehensions.
- **Ensuring Feedback Mechanisms:** Establishing accessible and transparent channels (such as the Grievance Redressal Committee) for ongoing dialogue, grievance reporting, and feedback submission.
- **Considering Stakeholder Concerns in Project Design:** Actively incorporating public and neighboring industrial community feedback into the final structural layouts, Effluent Treatment Plant (ETP) capacity planning, and the overarching Environmental Management Plan (EMP).

11.7 Consultation Process

Primary stakeholders were consulted through formal and informal meetings in the project area for the **M/S Olive Laboratories** pharmaceutical facility. The process was carried out in Punjabi and Urdu, explaining the project components—such as cleanroom operations, Effluent Treatment Plant (ETP) management, and rainwater harvesting—along with potential impacts in simple terms. This was followed by open discussions where participants shared their concerns and feedback regarding local infrastructure, industrial traffic, and environmental safeguards. Information gathered was documented and analyzed for incorporation into the Environmental Impact Assessment (EIA).

Secondary stakeholders, such as government departments (including Punjab EPA and DRAP representatives), local NGOs, and regional welfare organizations, were consulted through structured meetings and telephonic interviews. They were briefed about the facility design, potential positive and negative impacts, and proposed mitigation measures outlined in the Environmental Management Plan (EMP). Care was taken not to raise unrealistic expectations during consultations, maintaining complete transparency regarding the industrial scope of the project.

11.8 Points Discussed

The stakeholder consultation sessions yielded a broad social consensus, establishing a collaborative framework between the project proponent and the Rawat community. The key outcomes are summarized below:

- **Socioeconomic Acceptance:** Local participants strongly supported the **M/S Olive Laboratories** pharmaceutical manufacturing facility, noting it will boost regional economic activity, improve technical skills development, and create direct employment opportunities for local technical operators, engineers, and support staff.
- **Environmental & Geotechnical Safeguards:** Neighboring landowners and industrial operators validated the facility layout, expressing satisfaction with structural retaining walls, cleanroom foundation stabilization works, and the multi-

stage Effluent Treatment Plant (ETP) designed to prevent wastewater leaching and ensure strict PEQS compliance.

- **Resource Commitments:** Participants welcomed the Rainwater Harvesting Plan, first-flush filtration systems, and dense perimeter tree plantation buffers across unbuilt open areas, recognizing them as essential measures for stormwater management, dust suppression, and Rawat aquifer protection.
- **Operational Action Plan:** The project proponent committed to continuous dust suppression, controlled vehicle hauling schedules to prevent industrial estate traffic congestion, enclosed hazardous waste transit zones, and a fully functional Grievance Redressal Mechanism (GRM) aligned with DRAP and Punjab EPA standards.

11.9 Stakeholder Consultation Technique

To ensure an inclusive and representative dialogue for the **M/S Olive Laboratories** development, a balanced mix of informal and formal engagement methods was utilized across the Rawat study area. Focused interactive sessions—including separate meetings with community elders, local business operators, and workers—were arranged to capture diverse perspectives. Additionally, targeted focus group discussions were conducted with regional traders, nearby landowners, and labor representatives to thoroughly evaluate the potential socioeconomic and environmental aspects of the pharmaceutical facility.

11.10 Proponent

During the stakeholder consultation sessions, the management of **M/S Olive Laboratories** presented a comprehensive overview of the pharmaceutical facility's ecological footprint and corresponding mitigation strategies. They assured the attendees that all development, cleanroom engineering, and long-term operational activities will strictly adhere to Punjab EPA and DRAP regulations, incorporating state-of-the-art environmental safeguards, specialized soil stabilization frameworks, robust rainwater harvesting and first-flush filtration networks, strict indoor hazardous waste recycling protocols, a multi-stage Effluent Treatment Plant (ETP), and dense perimeter greenbelt standards.

11.11 The Responsible Authority

The project proponent, facility engineering division, and long-term management team of **M/S Olive Laboratories** will take all necessary environmental, geotechnical, and social safeguards during both the cleanroom setup and long-term operations of the proposed pharmaceutical manufacturing facility, ensuring strict compliance with all provincial regulatory standards and environmental protection protocols.

11.12 Other Departments and Agencies

Formal institutional consultations were held with relevant local administration offices, environmental experts, geotechnical engineers, DRAP representatives, and regional line departments to align the **M/S Olive Laboratories** pharmaceutical manufacturing facility layout with regional development plans and ensure absolute regulatory compliance.

- **Departments Engaged:** Consultations were coordinated with the local district administration, Rawat industrial estate authorities, regional power distribution

companies, water sanitation departments, forest officials, Drug Regulatory Authority of Pakistan (DRAP) representatives, and certified environmental professionals.

- **Key Concerns Addressed:** Discussions focused on managing industrial traffic along access routes, ensuring cleanroom structural load safety, minimizing operational noise from HVAC compressors and backup generators, and implementing strict runoff control measures to prevent soil erosion.
- **Regulatory Focus:** Regional line departments emphasized meeting Punjab Environmental Quality Standards (PEQS) and DRAP manufacturing guidelines, reinforcing structural retaining walls, and ensuring the multi-stage Effluent Treatment Plant (ETP) and rainwater harvesting networks follow approved engineering designs.
- **Socioeconomic Benefits:** Administrative agencies highlighted that facility operations will generate skilled technical, laboratory, and maintenance jobs, expand pharmaceutical supply chains, and foster sustainable, high-standard industrial growth in the region.

11.13 Environmental Practitioners and Experts

The environmental consultant team conducted detailed site visits, focus group discussions, and targeted community consultations with various demographic groups, including local residents, commercial traders, resort staff, and women.

- **General Consensus:** A majority of stakeholders supported the high-rise residential project due to localized hospitality employment prospects, tourism infrastructure improvements, and regional economic development.
- **Environmental Priorities:** The consultation highlighted the necessity of implementing a structured, enclosed solid waste collection framework, deploying advanced graywater separation systems, and executing rigorous hillside soil stabilization techniques to eliminate landslide and open runoff risks around the steep project zones.
- **Involvement of Women:** Due to local cultural norms, women were more hesitant to participate in open public forums; however, they shared their views comfortably through targeted, informal discussions.
- **Key Observations:** Female stakeholders highly appreciated the potential for regional socio-economic development, noting that a modernized, regulatory-compliant residential facility with strict environmental controls, localized rainwater harvesting systems, and secure perimeter infrastructure would provide a safer, cleaner, and structurally stable ambient environment for their families.

11.14 Government Representatives

Meetings were held with institutional representatives from relevant government line departments, including district administrative offices, DRAP officials, and the Punjab Environmental Protection Agency, to evaluate the **M/S Olive Laboratories** pharmaceutical manufacturing facility's alignment with provincial resource and environmental frameworks.

- **Socioeconomic Uplift:** Representatives highlighted that the facility will drive regional economic growth by generating skilled technical, laboratory, and maintenance jobs and expanding commercial opportunities for local suppliers and traders.

- **Traffic Management:** Officials emphasized the need for a structured traffic management plan during heavy material and chemical transport to prevent access bottlenecks and ensure smooth transit on Rawat industrial estate roads.
- **Environmental & Geotechnical Controls:** Departments stressed strict compliance with environmental protocols, requiring proper management of structural retaining walls and the multi-stage Effluent Treatment Plant (ETP) network to prevent soil erosion and groundwater contamination.
- **Resource Preservation:** Representatives noted the importance of executing planned tree plantation buffers within open areas to safeguard regional green cover, control dust, and minimize environmental degradation.

11.15 Affected and Wider Community

Local community members largely expressed positive opinions, noting that th A comprehensive public consultation process was conducted with the communities in the vicinity of the **M/S Olive Laboratories** pharmaceutical manufacturing facility footprint at Plot No. 52, Street S-6, Rawat, to gauge public perception and integrate local feedback into the project design.

- **Resettlement Framework:** There is no directly affected community or settlement within the project boundary requiring physical relocation or involuntary resettlement, as the 4 Kanal site footprint is privately owned and designated for industrial development.
- **Community Engagement:** Structured consultations were actively held with local residents, regional commercial traders, neighboring industrial staff, and village elders from surrounding Rawat settlements.
- **Positive Expectations:** Local community members largely expressed positive opinions, noting that the pharmaceutical facility will generate direct skilled, technical, and maintenance employment, improve local economic supply chains, and drive regional infrastructure development.
- **Construction-Phase Concerns:** Participants raised environmental concerns regarding heavy dust generation during cleanroom construction and site excavation, as well as localized traffic congestion from transport trucks moving along regional access roads.
- **Operational-Phase Concerns:** The wider community emphasized the critical importance of effective effluent management via the multi-stage Effluent Treatment Plant (ETP), strict hazardous waste containment, and proper maintenance of stormwater controls and rainwater harvesting systems to prevent runoff and soil degradation.

12 CONCLUSION AND RECOMMENDATIONS

Based on the Environmental Impact Assessment (EIA) of the proposed M/S Olive Laboratories pharmaceutical manufacturing facility located at Plot No. 52, Street S-6, Rawat, the following measures are recommended:

- **Green Belt Development:** Plant dense, multi-row green belts of native, hardy trees across unbuilt open areas and perimeter zones to act as a physical dust, wind, and noise buffer, enhancing the ambient air quality around the industrial estate.
- **Resource Conservation:** Implement the rainwater harvesting plan using the centralized, waterproofed underground water storage tank to capture monsoon runoff for industrial utility, cleanroom cleaning, and landscape irrigation, thereby conserving local Rawat groundwater supplies.
- **EMP Implementation:** Enforce the Environmental Management Plan (EMP) strictly to control construction-phase dust, coordinate vehicle hauling schedules during off-peak hours to avoid local traffic congestion, and suppress operational noise from HVAC compressors, machinery, and backup generator bays.
- **Eco-Friendly Facility Management:** Embed cleaner production protocols and DRAP-compliant cleanroom standards into daily operations—such as comprehensive solid waste segregation inside enclosed indoor transit rooms and advanced Effluent Treatment Plant (ETP) wastewater management—to maintain long-term sustainability and community trust.
- **Geotechnical and Waste Infrastructure:** Maintain the structural integrity of retaining walls and foundation stabilization works, and ensure the multi-stage ETP and drainage networks are operated according to approved engineering designs to guarantee zero effluent leaching and eliminate environmental degradation.

In conclusion, the project will not pose significant, long-term adverse impacts on the local population or the surrounding ecosystem, provided these engineering controls, cleanroom safeguards, and EMP guidelines are systematically followed. It is respectfully recommended that **the Environmental Protection Agency (EPA), Punjab** issue the formal Environmental Approval for this pharmaceutical facility.

APPENDICES

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EPA Punjab

APPENDIX A: LIST OF ACRONYMS

EA	Environmental Approval
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency –Punjab
EPC	Environmental Protection Council
GOP	Government of Pakistan
GRM	Grievances Redress Mechanism
HSE	Health Safety & Environment
IEE	Initial Environmental Examination
LAA	Land Acquisition Act
MSW	Municipal Solid Wastes
NOC	No Objection Certificate
O&M	Operation and Maintenance
OHS	Occupational Health and Safety
Pak–	Pakistan Environment Protection Agency
PEPA	Punjab Environmental Protection Amendment Act
PEPC	Pakistan Environment Protection Council
PEQS	Punjab Environmental Quality Standards
PKR	Pak Rupees
PPE	Personal Protective Equipment
HSE	Health Safety Equipment
WAPDA	Water and Power Development Authority

APPENDIX B: REFERNCES

1. Listed below are some of the documents, reports and other references consulted during the preparation of this report:
2. Information and data provided by project proponents;
3. Project Pre-feasibility Study Report;
4. Technical Design Data related to the project.
5. Information gathered through discussions with the project related persons of the project proponent;
6. Information collected from the Technical documents of various suppliers of machinery/equipment.
7. National Environment Quality Standards for Ambient Air November 2010; Punjab Environment Quality Standards Noise Levels November 2010;
8. Punjab Environment Quality Standards for Drinking Water November 2010:;
9. Pakistan Environmental
10. Protection Act, 1997;
11. The Punjab Environmental Protection (Amendment) Act 2011 covers aspects related to:
12. The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development;
13. Establishing complete regulatory and monitoring bodies, policies, rules, regulations and national environmental quality standards; and
14. 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.
15. Environment related Laws in Pakistan and the Province of Punjab;
16. Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review and Approval of Environmental Assessment, 2022;
17. Google earth, maps.
18. Guidelines for Public Consultations - These guidelines cover:
19. Consultation, involvement and participation of Stakeholders
20. Techniques for public consultation (principles, levels of involvements, tools, building trust)
21. Effective public consultation (planning, stages of IEE where consultation is appropriate)
22. Consensus building and dispute resolution.
23. Workplace safety and health act 2011
24. Land Acquisition Act (LAA) of 1894
25. The forest Act 1927
26. Pakistan Penal Code, 1860
27. Provincial Wildlife Act, 1974

APPENDIX C: TERM OF REFERNCES

- 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.
- The Study should be comprehensive and should cover all aspects which are envisaged under the relevant national and provincials laws & regulations including but not limited to:
- Identification and recommendation for suitable solution/treatment/mitigation measures of emissions and effluents such as waste water and sludge etc in accordance with National 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.

Sulzar Fatima (Assistant Director (EIA)-3)
EPA

APPENDIX D: TEAM PREPARED AND REVIEWED THE IEE

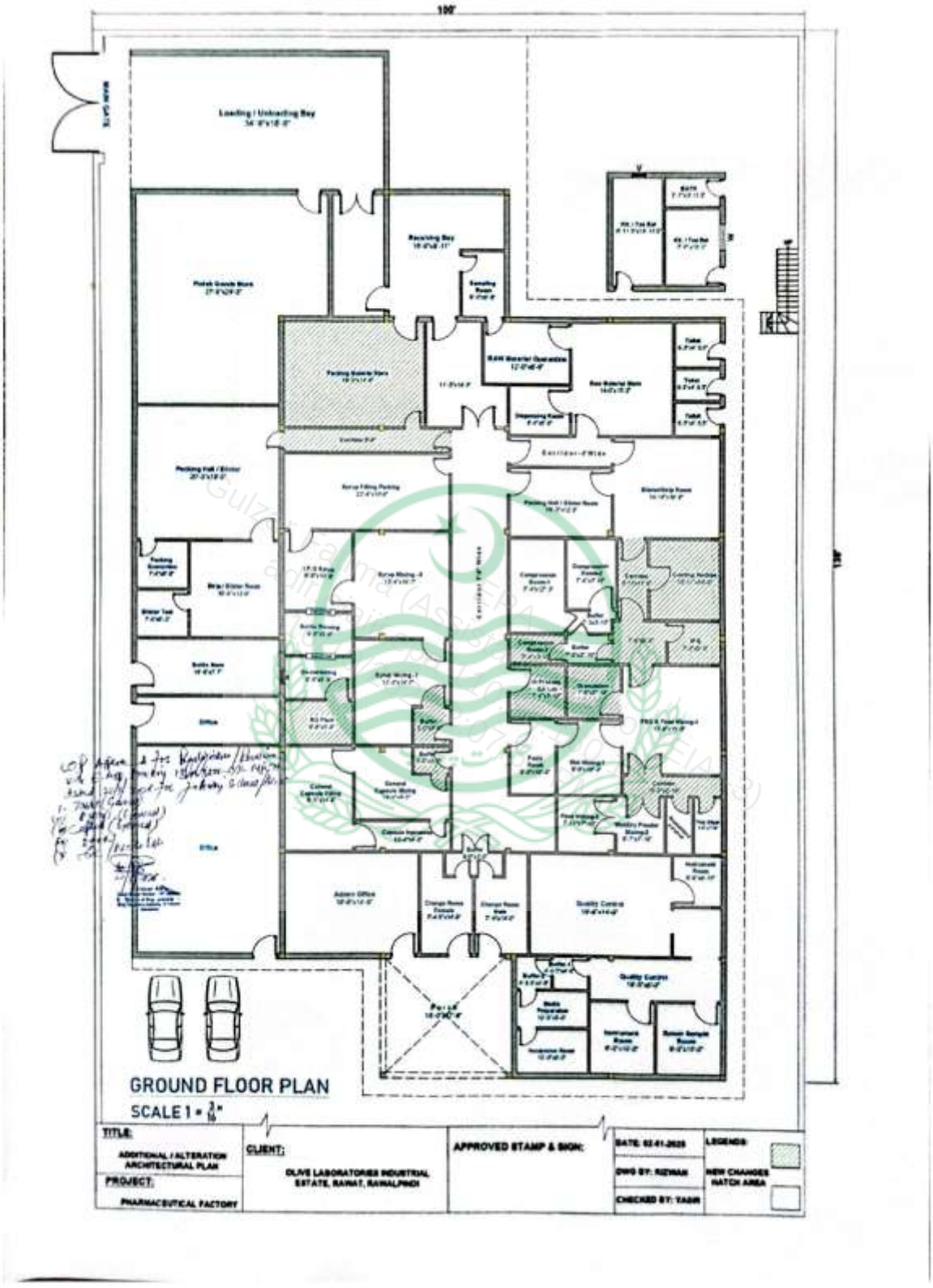
The EIA team comprised of the members as provided below:

List of IEE Team Members

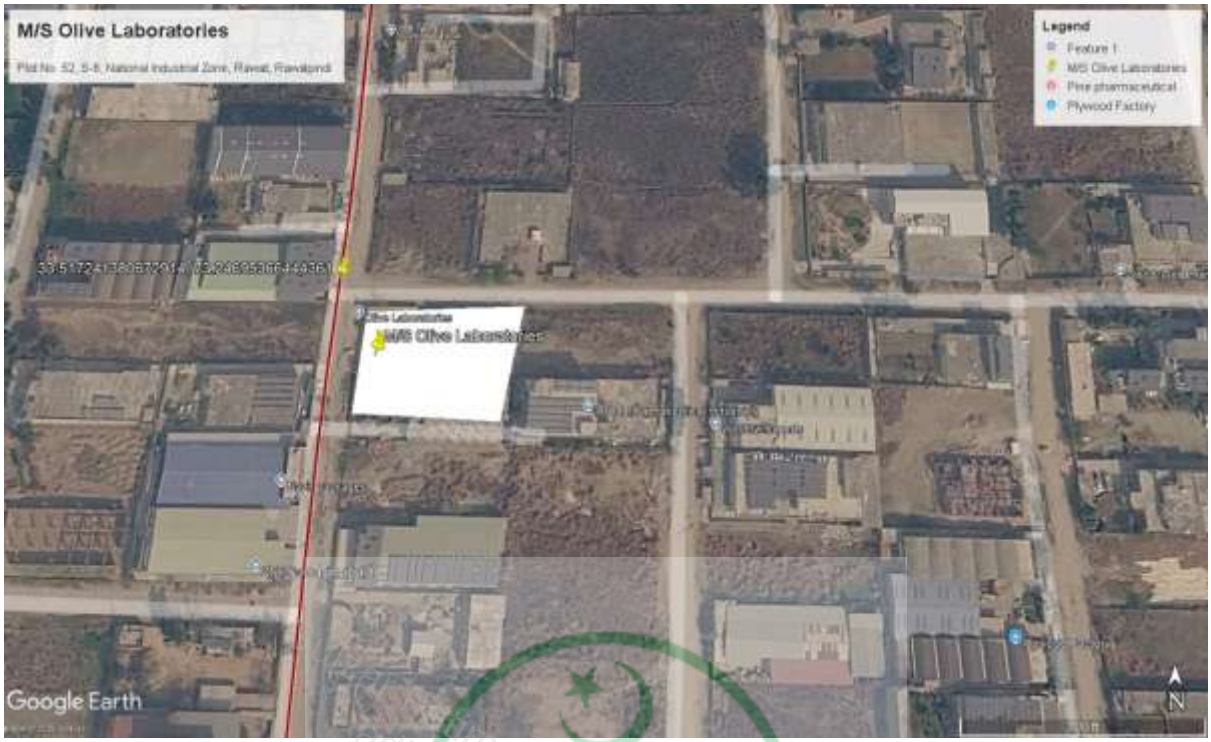
Name	Qualification	Status in Project
Mr. Ahtasham Raza	PhD (Env. Sciences) Punjab University, Lahore	Project In-charge
Mr. Adnan Sharif	MPhil (Env. Sciences) Diploma in Environmental Law - Punjab University	Team Leader
Mr. Mehmood Amjad	BS (Hons) Environmental Sciences NFC.IET. Multan	Monitoring In-charge
Zain Abbasi	BS Environmental Sciences GC University, Lahore	Environmentalist

Ghazar Fatima Assistant Director (EIA)-3)

ANNEXURE F: LAYOUT PLAN



ANNEXURE G
KML FILE



EPA
Punjab
(Assistant Director (EIA)-3)

CHECKLIST (EIA)

PUNJAB EPA GUIDELINES FOR PREPARATION AND REVIEW OF ENVIRONMENTAL REPORTS, 1997

Required Content	EIA Report		
	PAGE NO.	**REMARKS (If Any)**	**LACKING**
Executive summary: 1. Title and location of project	B		
2. Name of the proponent	D		
3. Name of the organization preparing the report	D		
4. A brief outline of the proposal (type, process, technology and land requirement)	D		
5. The major impacts	E		
6. Recommendations for mitigation measures	E		
7. Proposed monitoring	G		
Introduction: 1. Purpose of report	1		
2. Identification of project and proponent	4		
3. Details of consultant	5		
4. Brief description of nature, size, and location of project	5		
Screening: Whether the Project requires IEE or EIA as per Regulations	9		

Scoping			
1. Spatial and Temporal Boundaries of Environmental Assessment	10		
2. Important issues and concerns raised during consultation	10		
3. Significant impacts and factors to be determined	11		
Consideration of Alternatives			
1. Site alternatives, their selection and rejection criteria	14		
2. Design/Technology alternatives, their selection and rejection criteria	14		
3. Environmental Alternatives, their selection and rejection criteria	15		
4. Economic Alternatives, their selection and rejection criteria	16		
Description of the project:			
1. Objectives of Project	18		
2. Location and Site Layout of the project (May be annexed at the end of report)	19		
3. Land use on the site	21		
4. Road access	21,22		

5. Vegetation features of the site	23		
6. Cost and Magnitude of operation	23		
7. Schedule of implementation	23		
8. Description of the project (Process flow chart/steps, Technology, Raw material and products, by-products)	24		
9. Restoration and rehabilitation plans	38		
Description of Environment: Clear-cut picture of existing environmental resources:	39		
1. Baseline Physical Environment			
2. Baseline Ecological Environment	44		
3. Baseline Socioeconomic Environment	47		
4. Lab reports of environmental analyses (along with soil tests, geoinvestigation in case of building projects and industries)	Annexure		
5. Suitability of the site (not prohibited, environmentally sensitive, incompatible to surroundings and unsuitable)	53		
Impact Assessment 1. Methodologies for impact identifications (One/more)	54		
✓ Checklists			
✓ Matrices			
✓ Networks			
✓ Overlays			

✓ GIS and Computer expert systems			
2. Characteristics of impacts (nature, magnitude, extent and location, timing, duration, reversibility, risk)	55		
Screening of potential Environmental Impacts and mitigation measures on/during:			
1. Project location	55		
2. Design	55		
3. Construction phase	57		
4. Operational phase	62		
5. Potential Environmental Enhancement Measures	67		
Environmental management and monitoring program	70		
i. Description of proposed mitigation actions along with:			
ii. Schedule for implementation and Environmental budget	77		
iii. Environmental Management Team along with their Roles and responsibilities (by name or position)	71		
iv. Proposed monitoring program to assess performance or output of EMP	77		
v. Proposed EMP reporting and reviewing procedures	78		
vi. Any training needs required to ensure implementation of EMP and Monitoring plans	73		

Stakeholders Consultation: Communicate the possible impacts and concerns to the following to assist further analysis and decision making:	95		
i. Proponent's Environment Management Team	96		
ii. The responsible authority	97		
iii. Other departments and agencies			
iv. Environmental practitioners and experts	98		
v. Affected and wider community	99		
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3. Lists of individuals and organizations consulted along with their written feedback	106		
4. Sources of data and a full list of all reference material used	107		
5. Terms of references of environmental reports and those given to individual specialists	108		
6. List of names, qualifications and roles of team members carrying out the IEE/EIA study	109		

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7. Approvals from other concerned departments	-		

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