

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

Collection, Transportation, and Incineration of Waste



Punjab Science Enclave, Old Multan Road,
Behind Toyota Ravi Motors, Thokar Niaz Baig,
District Lahore

Prepared by

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Table of Contents

EXECUTIVE SUMMARY	i
CHAPTER # 1. INTRODUCTION	1
1.1 Purpose of the Report	1
1.2 TYPE AND CATEGORY OF THE PROJECT	2
1.3 IDENTIFICATION OF PROJECT AND PROPONENT	2
1.4 DETAILS OF CONSULTANT.....	2
1.5 brief description of nature size and location of project	3
CHAPTER # 2. Screening of the Project	5
CHAPTER # 3. Scoping of the project	6
3.1 Spatial and Temporal Boundaries of Environmental Assessment.....	6
3.1.1 Spatial Boundary	6
3.1.2 Temporal Boundary	6
3.2 Important issues and concerns raised during consultation.....	7
3.3 Significant impacts and factors to be determined	7
3.4 Development of an Environmental Management Plan.....	8
CHAPTER # 4. ALTERNATIVES OF THE PROJECT	9
4.1 No Project Option / Worst Scenario Option	9
4.1.1 Strengths and Opportunities	9
4.1.2 Weaknesses and Threats	10
4.1.3 Conclusion	10
4.2 ALTERNATIVE waste treatment technologies	10
4.2.1 Analysis.....	10

4.2.2	Strengths and Opportunities	11
4.2.3	Weaknesses and Threats	11
4.2.4	Conclusion	11
4.3	Alternative designs	12
4.3.1	Analysis.....	12
4.3.2	Strengths and Opportunities	12
4.3.3	Weaknesses and Threats	13
4.3.4	Conclusion	13
CHAPTER # 5. DESCRIPTION OF THE PROJECT		14
5.1	BACKGROUND.....	14
5.2	Objective of the Project	14
5.3	Location and Site Layout of the Project.....	15
5.4	LAND USE ON THE SITE.....	15
5.5	ROAD ACCESS.....	16
5.6	DETAILS OF THE incinerator's company	18
5.7	TYPE OF WASTE PRODUCED	18
5.8	COLLECTION OF WASTE.....	18
5.9	TRANSPORTATION OF WASTE	19
5.10	STORAGE OF WASTE	20
5.11	DETAILS OF THE INCINERATOR.....	20
5.11.1	Source of Power.....	20
5.12	CAPACITY OF THE INCINERATOR.....	20
5.13	INSTALLATION OF THE INCINERATOR.....	20

5.13.1	Control System	20
5.13.2	Emission and Environmental Performance	21
5.13.3	Modular and Packaged Design	21
5.14	COMBUSTION CHAMBERS	21
5.14.1	Combustion Chamber of Waste	21
5.14.2	Secondary Combustion Chamber	22
5.14.3	Scrubbers	23
5.14.4	Stabilization of Alkalinity	24
5.14.5	Chimney	24
5.15	DESIGN SPECIFICATIONS	26
5.16	ASH PITS	27
5.17	VEGETATION FEATURES OF THE SITE	27
5.18	COST OF THE PROJECT	28
5.19	LAND ACQUISITION	28
5.20	PROJECT AREA	28
5.21	GREEN ENERGY SOLUTIONS.....	28
5.22	FIRE SAFETY ARRANGEMENTS	29
CHAPTER # 6.	DESCRIPTION OF THE ENVIRONMENT	30
6.1	General	30
6.2	Physical Environment.....	30
6.2.1	Terrain of the Area	30
6.2.2	Climate and Meteorology	31
6.2.3	SURFACE AND GROUND WATER	33

6.3	Seismology	36
6.4	ECOLOGICAL RESOURCES	38
6.4.1	Endangered Species	38
6.5	SOCIO-ECONOMIC ENVIRONMENT	38
6.5.1	History.....	38
6.5.2	Political Set Up	40
6.5.3	Economic Activities.....	40
6.6	Quality Of Life Values	41
6.6.1	Demographic Survey	41
6.6.2	Literacy Rate	42
6.6.3	Cultural and Social Status.....	43
6.6.4	Educational Institutions & Health Facilities	43
6.7	Archaeological Sites.....	44
6.8	ENVIRONMENTAL Monitoring.....	44
6.9	Site Suitability.....	46
CHAPTER # 7.	SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES	47
7.1	General	47
7.2	Project Area of Influence	47
7.3	Methodology for impact assessment	48
7.4	IMPACTS DURING COLLECTION, TRANSPORTATION AND STORAGE	49
7.4.1	Occupational Health and Safety of Workers	51
7.4.2	Soil and Groundwater Contamination	52
7.4.3	Chemical Reactions	52

7.4.4	Fire Hazard	53
7.4.5	Improper segregation of waste	53
7.4.6	Improper disposal of waste	53
7.4.7	Pest Infection	54
7.5	IMPACTS DURING INSTALLATION PHASE	54
7.5.1	Dust Generation and Deterioration of Air Quality	57
7.5.2	Noise Generation from Construction Activities	57
7.5.3	Occupational Health and Safety Risks	57
7.5.4	Slips, Trips, and Falls	58
7.5.5	Generation of Construction Waste	58
7.5.6	Soil Contamination from Fuel and Chemical Spills	58
7.5.7	Fire Hazards during Installation	59
7.5.8	Electrical Hazards	59
7.5.9	Increased Vehicle Movement and Traffic Risks	59
7.5.10	Visual Disturbance and Temporary Site Aesthetic Impacts	60
7.6	IMPACTS DURING OPERATIONAL PHASE	60
7.6.1	Air Emissions from the Incineration Process	61
7.6.2	Flue Gas Emissions	62
7.6.3	Wastewater Generation from Wet Scrubber	62
7.6.4	Occupational Health and Safety	63
7.6.5	Fire and Explosion Hazards	64
7.6.6	Noise Generation	64
7.6.7	Odor Generation	64

7.6.8	Equipment Failure and Operational Malfunction	65
CHAPTER # 8. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN.....		66
8.1	Objectives of EMMP.....	66
8.2	ROLES AND RESPONSIBILITIES	67
8.3	environmental management during design related phase	68
8.4	Environmental Management During Installation Phase	68
8.5	ENVIRONMENTAL MANAGEMENT PLAN DURING COLLECTION AND TRANSPORTATION OF WASTE.....	69
8.6	ENVIRONMENTAL MANAGEMENT PLAN DURING OPERATIONAL PHASE.....	69
8.7	Environmental Monitoring Program	79
8.7.1	Aim.....	79
8.8	ENVIRONMENT MANAGEMENT TEAM	79
8.9	Monitoring Parameters and Frequency	80
8.10	ENVIRONMENTAL POLICY	81
8.11	EQUIPMENT MAINTENANCE DETAILS.....	81
8.12	TRAINING NEEDS	82
8.13	TRAINING SCHEDULES.....	82
8.14	EMERGENCY RESPONSE & DISASTER MANAGEMENT PLAN	83
8.15	ENVIRONMENTAL BUDGET	84
CHAPTER # 9. OCCUPATIONAL HEALTH AND SAFETY PLAN		85
9.1	Objectives of Occupational Health and Safety Plan.....	85
9.2	POTENTIAL IMPACTS	86
9.3	MITIGATION MEASURES	87
CHAPTER # 10. STAKEHOLDER CONSULTATION		91

10.1	OBJECTIVES OF STAKEHOLDER CONSULTATION	91
10.2	methodology	92
10.3	THE RESPONSIBLE AUTHORITY	93
10.4	ENVIRONMENTAL PRACTITIONERS AND EXPERTS	93
CHAPTER # 11. Grievance Redress Mechanism		95
11.1	KEY FEATURES OF GRM.....	95
11.2	OBJECTIVES OF GRIEVANCE REDRESS MECHANISM.....	95
11.3	MECHANISM OF FILING complaint	96
11.4	Roles and Responsibilities	97
11.4.1	Grievance Resolution Procedure	97
CHAPTER # 12. CONCLUSION AND RECOMMENDATION		99

LIST OF FIGURES

Figure 1-1 Location of the Project	4
Figure 5-1Current Land Use.....	16
Figure 5-2Road Access Near Project Area	17
Figure 5-3Design Specifications	26
Figure 5-4Proposed Plantation Area	27
Figure 5-5: Environmental Enhancement Measures	29
Figure 5-6: Fire Fighting Arrangements	29
Figure 6-1Topography of the project (https://www.floodmap.net/elevation/ElevationMap/?gi=1172451)	31
Figure 6-2: Average Temperature and Rainfall of the Area	32
Figure 6-3 Average Monthly Temperature.....	32
Figure 6-4: Average Sunshine Hours in Lahore	33
Figure 6-5: Average wind speed in Lahore	33
Figure 6-6: Surface and Ground Water	35
Figure 6-7: Seismic Zones of Pakistan	37
Figure 6-9: Map of Punjab	39
Figure 6-10: Population of Lahore.....	42
Figure 6-11: Pictorial Evidence of Environmental Monitoring.....	45
Figure 7-1Risk Assessment Matrix.....	48
Figure 7-2: Waste Hierarchy	54
Figure 8-1: Organogram for Implementation of the Environmental Management Plan (EMP) ..	81
Figure 10-1: Stakeholder Management	92
Figure 10-2: Pictorial Evidence of Stakeholder Consultation.....	94
Figure 11-1: Grievance Redress Mechanism	98

LIST OF TABLES

Table 1-1: Name of Team Members Preparing Report.....	3
Table 5-1: Company Details.....	18
Table 6-2: Distance of Industrial Estate from PAFDA.....	41
Table 6-3: Literacy Rate in Lahore	42
Table 7-1: Screening of Possible impacts during Collection, Transportation, and Storage of Waste	49
Table 7-2: Screening of Possible Impacts during the Installation Phase.....	54
Table 7-3: Screening of Possible impacts during Operational Phase	60
Table 8-1: Roles and Responsibilities	67
Table 8-2: Environmental Management Plan for Installation Phase	70
Table 8-3: Environmental Management Plan for the Collection and Transportation of Waste ...	73
Table 8-4: Environmental Management Plan for Operational Phase	76
Table 8-5: Environmental Management Team.....	79
Table 8-6: Environmental Monitoring Plan.....	80
Table 8-7: Training Schedules	83
Table 8-8: Environmental Budget	84
Table 9-1: Personal Protective Equipment	89
Table 11-1: Stakeholders and Their Roles and Responsibilities.....	93
Table 12-1: Roles and Responsibilities	97

List of Abbreviation

EA	Environmental Approval
EHS	Environment, Health & Safety
EIA	Environmental Impact Assessment
EMMP	Environmental Management & Monitoring Plan
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPCCD	Environmental Protection & Climate Change Department
ERP	Emergency Response Plan
ERT	Emergency Response Team
IEE	Initial Environment Examination
LESCO	Lahore Electric Supply Company
M & E	Monitoring & Evaluation
NEQS	National Environmental Quality Standards
OHS	Occupational Health & Safety
PEPA	Punjab Environmental Protection Act
PEQS	Punjab Environmental Quality Standards
PM	Particulate Matter
PPEs	Personal Protection Equipment
SWMP	Solid Waste Management Plan
TMA	Tehsil Municipal Authority
UNCED	United Nations Conference on the Environment and Development
PAFDA	Punjab Agriculture, Food and Drug Authority
PV	Photovoltaic
PLC	Programmable Logic Controller
GBP	Great British Pound

EXECUTIVE SUMMARY

The **Punjab Agriculture, Food and Drug Authority (PAFDA)** is a regulatory and forensic institution established by the Government of Punjab to ensure the quality, safety, and compliance of agricultural inputs and food products. The Authority operates advanced laboratories for testing and forensic analysis of pesticides, fertilizers, seeds, food products, veterinary drugs, and other regulated substances. Through scientific investigation and regulatory oversight, PAFDA plays a vital role in protecting public health, food security, environmental quality, and consumer interests across the province.

To support its laboratory operations and ensure environmentally sound management of generated waste, PAFDA proposes the installation of a dedicated incineration facility for the treatment and disposal of non-hazardous and hazardous laboratory wastes. The facility will include waste collection, transportation, scanning and tracking, temporary storage, and high-temperature incineration. The proposed incinerator is essential for preventing environmental contamination, minimizing public health risks associated with wastes, ensuring compliance with environmental regulations, and providing a safe and sustainable waste management solution for the Authority's forensic and analytical operations.

The project for the commissioning of its objective and construction requires fulfilling the legal requirements of the Punjab Environmental Protection Act (amended act 2012), Section 12, for which this Environmental Impact Assessment (EIA) report is being submitted. 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 G (2)**.

TITLE AND LOCATION OF PROJECT:

“Collection, Transportation, and Incineration of Waste by M/s Punjab Agriculture, Food and Drug Authority (PAFDA), at Punjab Science Enclave, Old Multan Road, Behind Toyota Ravi Motors, Thokar Niaz Baig, District Lahore”

Location: Punjab Science Enclave, Old Multan Road, Behind Toyota Ravi Motors, Thokar Niaz Baig, District Lahore



PROJECT PROPONENT

Proponent: Sabahat Nisar - General Manager Finance

Address: House No 32/11-A, Lawrence Road, Lahore

BRIEF OUTLINE OF PROJECT

The proposed project involves the establishment of an integrated waste management and incineration facility at the PAFDA, Lahore. The facility is designed for the safe collection, transportation, receiving, scanning, temporary storage, and incineration of hazardous and non-hazardous laboratory wastes generated from PAFDA's forensic and analytical activities. The project includes the installation of an Addfield C50 dual-chamber incinerator along with supporting infrastructure such as a designated Yellow Room, operator control room, flue gas cooling system, wet scrubber unit, wastewater management through the existing WWTP, and an engineered ash disposal system. Waste will be scanned, documented, and securely stored prior to incineration without manual opening, ensuring safe handling and containment. The facility is designed to provide an environmentally sound and regulatory-compliant solution for the management of laboratory waste while minimizing risks to human health and the environment.

Table E-1 Salient Features of the Project

1	Project Title	"Collection, Transportation, And Incineration of Waste By M/s Punjab Agriculture, Food and Drug Authority (PAFDA), at Punjab Science Enclave, Old Multan Road, Behind Toyota Ravi Motors, Thokar Niaz Baig, District Lahore"
2	Proponent	Proponent: Sabahat Nisar - General Manager Finance Address: House No 32/11-A, Lawrence Road, Lahore
3	Project Location	Punjab Science Enclave, Old Multan Road, Behind Toyota Ravi Motors, Thokar Niaz Baig, District Lahore
4	Co-ordinates	31°28'20.7"N 74°13'59.3"E
6	Land Use in Surrounding of area	North: Canal Colony South: Access Road

	North: South: East: West:	East: Open Land West: Open Land
7	Total Area	The total area of the PAFDA is 38 Kanal 9 Marla.
8	Cost of Project	Great British Pound (GBP) 118, 786 PKR 4,42,85,178.83 (Considering 372.81 Pakistani Rupees)
9	Type of Waste	Ash
10	Status of Project	Pre-Construction
11	Nature of Area	Commercial
12	Source of Power	Lahore Electric Supply Company (LESCO)
13	Incineration Capacity	50 kg/hour

PROJECT BASELINE

The baseline environmental conditions of the proposed project area at the PAFDA have been assessed to establish the existing status of the physical, biological, and socio-economic environment prior to project implementation. The project site is located within a developed institutional setting and comprises an open, level area exclusively designated for the installation of the incineration facility. The surrounding environment is urban in nature with well-established infrastructure, road networks, and utility services. Baseline conditions indicate that there are no significant ecological resources, sensitive habitats, or archaeological sites within the project footprint. Environmental parameters such as air quality, noise levels, and meteorological conditions reflect typical urban characteristics of Lahore. This baseline information provides a reference point for evaluating potential environmental impacts associated with the installation and operation of the proposed incineration facility.

PROJECT IMPACTS AND RECOMMENDATIONS FOR THEIR MITIGATION

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

recognizing environmental, social and economic challenges and risks and gives the directions to develop strategies that mitigate these risks and adjust the plan accordingly.

Table E-2 Possible Impacts and their Mitigation Measures

Possible Impact	Impact Magnitude	Mitigation Measures
Installation Phase		
<i>Dust generation from minor construction activities</i>	Low	Regular water sprinkling and good housekeeping practices.
<i>Noise from construction equipment and installation works</i>	Low	Restrict activities to daytime hours and maintain equipment. Provision of PPE's.
<i>Generation of construction waste</i>	Low	Segregate and dispose of waste through approved contractors.
<i>Occupational health and safety risks to workers</i>	Low to Moderate	Provision of PPE. Implementation of safety procedures.
Collection and Transportation of Waste		
<i>Accidental spillage or leakage of waste during transportation</i>	Moderate	Use sealed and labeled containers and trained transport personnel.
<i>Exposure of workers to waste</i>	Moderate	Use PPE, training, and safe handling procedures.
<i>Traffic-related impacts and vehicle emissions</i>	Low	Optimize transport routes and maintain vehicles.
<i>Odor generation from improperly stored waste</i>	Low	Ensure timely transportation and sealed packaging.
<i>Cross-contamination during waste handling</i>	Moderate	Maintain waste segregation and handling protocols.

Possible Impact	Impact Magnitude	Mitigation Measures
<i>Public health risks due to accidental release of waste</i>	Low to Moderate	Emergency response procedures and spill containment kits.
<i>Increased fuel consumption and associated emissions</i>	Low	Use efficient vehicles and minimize transportation frequency.
Operational Phase		
<i>Air emissions from incineration activities</i>	Moderate	Operate dual-chamber incinerator with wet scrubber and maintain optimum combustion temperatures.
<i>Generation of fly ash, bottom ash, and sludge</i>	Moderate	Collect, store, and dispose of residues in designated facilities.
<i>Wastewater generation from wet scrubber system</i>	Low to Moderate	Treat scrubber effluent through the existing WWTP before discharge.
<i>Occupational exposure to heat, emissions, and hazardous waste</i>	Moderate	Implement OHS measures, training programs, and use of PPE.

ENVIRONMENTAL MONITORING PLAN

The implementation of a monitoring plan within an EIA is crucial for several reasons. It serves as a fundamental tool to track and evaluate the actual environmental effects of a project against the predicted impacts outlined in the EIA report. By establishing a monitoring plan, it becomes possible to assess the accuracy of the initial predictions, ensuring compliance with environmental regulations and standards. This ongoing assessment aids in identifying any unforeseen or adverse impacts, enabling timely corrective measures or adjustments to the project to mitigate or prevent environmental harm, fostering sustainable development and ensuring the project's alignment with environmental conservation objectives throughout its lifecycle.

Table E-3 Environmental Monitoring

Environmental Component	Monitoring Parameters	Monitoring Frequency	Responsibility
<i>Ambient Air Quality</i>	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , VOCs	Quarterly	Environmental / EHS Manager
<i>Noise Levels</i>	dB(A)	Quarterly	Environmental / EHS Manager
<i>Wastewater Quality</i>	pH, COD, BOD, TDS and TSS	Quarterly	Environmental / EHS Manager
<i>Solid & Hazardous Waste</i>	Waste type, quantity, disposal method	Monthly (Internal Inspection)	EHS Manager
<i>Occupational Health & Safety</i>	PPE usage, exposure to noise and vapors	Monthly (Internal Inspection)	EHS Manager
<i>Emergency & Spill Response</i>	Availability and condition of spill kits, firefighting systems	Monthly (Internal Inspection)	EHS Manager

STAKEHOLDER CONSULTATION

Stakeholder consultation was conducted as part of the EIA process for the proposed incineration facility at PAFDA. Relevant stakeholders were engaged to discuss the nature of the project, its potential environmental and social impacts, and the proposed mitigation measures. The consultation process provided an opportunity to share information regarding project activities such as waste collection, transportation, incineration, and emission control systems, and to incorporate feedback into the environmental management framework. The stakeholders expressed general support for the project, recognizing its importance in ensuring the safe and environmentally sound disposal of laboratory waste.

CHAPTER # 1. INTRODUCTION

The safe management and disposal of laboratory waste are essential for protecting human health and the environment. Laboratories involved in forensic investigations, scientific research, and regulatory testing generate a variety of waste streams, including non-hazardous solid waste as well as chemical and biological waste that require specialized treatment and disposal. Improper handling of such waste can result in environmental contamination, occupational health risks, and adverse impacts on public health. Consequently, the implementation of environmentally sound waste management systems has become an integral component of modern laboratory operations.

The Punjab Agriculture, Food and Drug Authority (PAFDA) is a premier regulatory and forensic institution established by the Government of Punjab to ensure the quality, safety, and compliance of agricultural inputs, food products, and related commodities. Through its advanced laboratories, PAFDA undertakes testing, research, and forensic investigations that generate various categories of laboratory waste requiring controlled treatment and disposal. To address these requirements, PAFDA proposes the installation and operation of an Addfield C50 dual-chamber incinerator within its premises at Lahore. The proposed facility will provide an integrated solution for the collection, transportation, storage, treatment, and final disposal of laboratory waste generated from its operations. The project includes waste receiving and scanning facilities, a designated Yellow Room, high-temperature incineration, flue gas treatment through a wet scrubber system, wastewater management through the existing wastewater treatment plant, and ash handling infrastructure.

This EIA has been prepared to evaluate the potential environmental and social impacts associated with the proposed project and to identify appropriate mitigation measures to minimize adverse effects. The EIA also demonstrates the project's compliance with applicable environmental legislation and provides an Environmental Management Plan (EMP) to ensure environmentally responsible implementation and operation of the facility.

1.1 PURPOSE OF THE REPORT

The report aims to ensure that environmental considerations are integrated into the planning and decision-making processes prior to the commencement of project activities. It provides a detailed analysis of the project's potential impacts on the physical, biological, and socio-economic

environment during the construction and operational phases. Furthermore, this EIA outlines strategies and an Environmental Management Plan (EMP) to minimize adverse effects, enhance positive outcomes, and ensure compliance with the **Punjab Environmental Protection Act (PEPA), 1997**, and the **IEE/EIA Regulations, 2022**.

1.2 TYPE AND CATEGORY OF THE PROJECT

Based on the nature, scale, and activities of the proposed development. In accordance with the Environmental Protection Agency, Government of the Punjab, Lahore, “List of Projects Requiring an EIA”, the project under consideration falls into Schedule II, which is the category of projects requiring an EIA. Therefore, to fulfill the legal requirements of Section 12 of the Punjab Environment Protection Act (amended 2012), the client is required to submit the EIA report to the Environmental Protection Agency, Government of the Punjab, Lahore, to obtain the required EA.

1.3 IDENTIFICATION OF PROJECT AND PROPONENT

“Collection, Transportation, and Incineration of Waste by M/s Punjab Agriculture, Food and Drug Authority (PAFDA), at Punjab Science Enclave, Old Multan Road, Behind Toyota Ravi Motors, Thokar Niaz Baig, District Lahore”

Proponent details as follows:

Proponent: Sabahat Nisar - General Manager Finance

Address: House No 32/11-A, Lawrence Road, Lahore

1.4 DETAILS OF CONSULTANT

Environmental Services of Pakistan Private Limited (ESPAK) is an independent company that conducts IEE, EIA, EMP, and other environmental investigations through its panel of environmental consultants, public participation practitioners, and experienced environmental managers. The company has its own recommended instruments to check the baseline environmental data/PEQS and a lab analysis facility for water, wastewater, and priority parameters.

Environmental Services Pakistan Pvt. Ltd (ESPAK)



Office No. 731, Block 2, Sector D1, Shahjilani Road Township, Lahore
Contact: 042-35154012, 0312-0849999

The current study was carried out by the following professionals:

Table 1-1: Name of Team Members Preparing Report

#	Name of Team Members	Designation	Qualification
1	Ali Ramzan	Senior Environmentalist	B.S Environmental Sciences
2	Nabia Farrukh Sohail	Environmentalist	M.S Environmental Science
3	Qurat Ul Ain	Project Coordinator	MBA Marketing

1.5 BRIEF DESCRIPTION OF NATURE SIZE AND LOCATION OF PROJECT

The proposed project involves the installation and operation of an integrated waste incineration facility at the (PAFDA), Lahore. The project is intended to provide a safe, efficient, and environmentally sound solution for the collection, transportation, temporary storage, treatment, and disposal of laboratory wastes generated from PAFDA's forensic and analytical laboratories. The waste stream includes laboratory chemicals, solvents, pesticides, biological specimens, animal tissues, laboratory waste, and contaminated consumables generated during testing, research, and regulatory activities. The project comprises the installation of an Addfield C50 dual-chamber incinerator with a waste destruction capacity of 50 kg per hour. Supporting infrastructure includes a designated Yellow Room, operator room, wet scrubber system, flue gas cooling unit, ash disposal area, and associated utility services. The facility is proposed within the existing premises of PAFDA, Lahore, on land fully owned by the Authority and specifically allocated for the development of the incineration facility. The project site is situated within an institutional setting and is compatible with the existing land use and operational activities of PAFDA.

*Environmental Impact Assessment (EIA) Report
Installation of Incinerator
Thokar Niaz Baig, District Lahore*



Figure 1-1 Location of the Project

CHAPTER # 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 G (2)**. Following list shows the projects included in Class G.

G. Waste Storage and Disposal

1. Landfill sites
2. Waste Incinerators and autoclaves
3. Hazardous substance or waste storage warehouse

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CHAPTER # 3. SCOPING OF THE PROJECT

Scoping is a key stage of the EIA process that identifies the significant environmental and social issues requiring detailed evaluation during the assessment. It establishes the scope and boundaries of the study by identifying potential environmental impacts associated with the proposed project and determining the environmental components that may be affected during the installation, waste collection and transportation, and operational phases.

For the proposed incineration facility at the PAFDA, the scoping exercise involved a review of the project design, operational processes, baseline environmental conditions, applicable environmental regulations, and consultations with relevant stakeholders. The process focused on identifying key issues related to air emissions, wastewater generation, ash management, waste handling, occupational health and safety, noise, and emergency preparedness. The outcomes of the scoping exercise provide the basis for the detailed impact assessment and the development of appropriate mitigation measures and an EMP to ensure environmentally sound and sustainable project implementation.

3.1 SPATIAL AND TEMPORAL BOUNDARIES OF ENVIRONMENTAL ASSESSMENT

3.1.1 Spatial Boundary

The spatial boundary of the environmental assessment encompasses the proposed incineration facility and its immediate area of influence within the premises of the PAFDA. The assessment includes the project site designated for the installation of the incinerator, Yellow Room, operator room, ash handling area, wet scrubber system, wastewater treatment facilities, transportation routes, and surrounding areas that may potentially be affected by project-related activities, including air emissions, noise, wastewater generation, and waste handling operations.

3.1.2 Temporal Boundary

The temporal boundary of the assessment encompasses all phases of the project lifecycle, including installation, waste collection and transportation, and operation of the incineration facility.

- Installation Waste: Assessment of potential environmental impacts associated with site preparation, construction of supporting infrastructure, installation of the incinerator and associated equipment, transportation of materials, and commissioning activities.
- Collection and Transportation of Waste: Assessment of impacts related to the collection, handling, transportation, receiving, scanning, and temporary storage of laboratory waste prior to treatment, including occupational health and safety considerations and accidental spill risks.
- Operational Phase: Assessment of impacts associated with routine operation of the incinerator, including waste combustion, air emissions, flue gas treatment, wastewater generation, ash and sludge management, resource consumption, occupational health and safety, and long-term environmental performance of the facility.

3.2 IMPORTANT ISSUES AND CONCERNS RAISED DURING CONSULTATION

During the scoping process, consultations were conducted with relevant project personnel and stakeholders to identify key environmental and operational concerns associated with the proposed incineration facility. The major issues raised included the potential impact of air emissions from the incinerator on ambient air quality, the safe handling, collection, transportation, and temporary storage of laboratory waste, and the proper management and disposal of bottom ash and fly ash. Concerns were also expressed regarding wastewater generated from the wet scrubber system, occupational health and safety of workers, fire hazards, and emergency preparedness. Stakeholders emphasized the importance of installing an efficient flue gas treatment system, implementing continuous environmental monitoring, maintaining regulatory compliance, and ensuring that the facility is operated in accordance with approved standard operating procedures.

3.3 SIGNIFICANT IMPACTS AND FACTORS TO BE DETERMINED

Based on the scoping exercise, several environmental and social aspects were identified for detailed assessment during the EIA. These include potential impacts on ambient air quality arising from incinerator emissions, wastewater generation from the wet scrubber, management and disposal of bottom ash and fly ash, noise generated by operational equipment, and occupational health and safety risks associated with waste handling and incinerator operation. Other factors requiring assessment include the effectiveness of the dual-chamber combustion system and wet scrubber in controlling emissions, the adequacy of waste storage and transportation arrangements,

emergency response capability, and compliance with applicable environmental regulations and emission standards. The assessment also evaluates the likelihood, magnitude, duration, and significance of each identified impact and proposes suitable mitigation measures to minimize adverse environmental effects.

3.4 DEVELOPMENT OF AN ENVIRONMENTAL MANAGEMENT PLAN

The findings of the scoping process formed the basis for the preparation of the EMP, which provides a structured framework for managing the environmental aspects of the proposed project. The EMP identifies specific mitigation measures, environmental monitoring requirements, implementation responsibilities, reporting procedures, and emergency response mechanisms for each phase of the project, including installation, collection and transportation of waste, and operational activities. It also outlines measures for air pollution control, wastewater management, ash handling and disposal, occupational health and safety, equipment maintenance, and staff training. The EMP is intended to ensure compliance with national environmental regulations, minimize environmental impacts, safeguard the health and safety of workers and surrounding communities, and promote the sustainable operation of the proposed incineration facility throughout its lifecycle.

CHAPTER # 4. ALTERNATIVES OF THE PROJECT

This chapter presents an evaluation of the feasible alternatives considered for the proposed incineration facility at the PAFDA. The assessment of alternatives is an essential component of the EIA process, aimed at identifying the most environmentally sustainable, technically viable, and economically feasible option for waste management. The alternatives analysis includes consideration of the “no project” option, alternative waste treatment technologies, and design-related options. Each alternative is evaluated in terms of its potential environmental impacts, operational efficiency, regulatory compliance, and suitability for managing waste generated at PAFDA’s laboratories. This comparative assessment supports informed decision-making and ensures that the selected option represents the best balance between environmental protection and operational effectiveness.

Project Alternatives

- No Project Option
- Alternative Waste Treatment Technologies
- Alternative Designs

4.1 NO PROJECT OPTION / WORST SCENARIO OPTION

4.1.1 Strengths and Opportunities

The proposed incineration facility by PAFDA offers significant strengths, including the availability of an on-site, scientifically controlled system for the safe disposal of non-hazardous as well as hazardous including chemical, biological, and laboratory wastes. The use of a dual-chamber incinerator with advanced flue gas treatment systems (wet scrubber, chimney stack, and PLC-based control) ensures high combustion efficiency and reduced environmental emissions. The project also benefits from strong institutional support, dedicated infrastructure such as the Yellow Room and ash handling system, and compliance with environmental regulatory requirements. In addition, the facility presents opportunities for improved waste management efficiency, enhanced biosecurity, reduced dependency on external disposal facilities, and strengthened environmental and occupational health standards within PAFDA.

4.1.2 Weaknesses and Threats

Despite its advantages, the project has certain weaknesses, including high operational costs associated with fuel consumption, maintenance of advanced equipment, and skilled manpower requirements. The system also requires strict operational control and continuous monitoring to ensure optimal performance and compliance with emission standards. Potential threats include risks of accidental emissions in case of system failure, improper handling of nonhazardous and hazardous waste during collection or transportation, and occupational health hazards for workers if safety protocols are not strictly followed. Additionally, public perception concerns regarding incineration emissions may arise, requiring effective communication and transparent environmental monitoring to ensure stakeholder confidence.

4.1.3 Conclusion

The evaluation of alternatives for the proposed incineration facility by PAFDA indicates that the selected option of an on-site, dual-chamber incineration system with integrated flue gas treatment and controlled waste handling infrastructure is the most suitable and environmentally sound solution. The “no project” option was deemed unacceptable due to the continued risks associated with the off-site disposal of hazardous laboratory waste, including transportation hazards and limited control over final treatment processes. Alternative technologies were also reviewed; however, they were found to be less effective in achieving complete destruction of complex hazardous waste streams generated by PAFDA.

The proposed system provides a balanced approach in terms of environmental protection, operational efficiency, and regulatory compliance. With appropriate implementation of mitigation measures and strict adherence to the Environmental Management Plan, the selected alternative ensures safe, reliable, and sustainable waste management while minimizing potential environmental and health impacts.

4.2 ALTERNATIVE WASTE TREATMENT TECHNOLOGIES

4.2.1 Analysis

Various alternative technologies for the treatment and disposal of hazardous, chemical, biological, and laboratory wastes were considered as part of the EIA process. These include autoclaving,

chemical disinfection, plasma pyrolysis, microwave treatment, and off-site disposal through licensed hazardous waste management facilities. Each technology offers different levels of treatment efficiency, environmental performance, operational complexity, and suitability depending on the nature of waste generated at PAFDA's laboratories. However, given the diverse and potentially highly hazardous nature of the waste streams, high-temperature dual-chamber incineration remains the most comprehensive and effective treatment option.

4.2.2 Strengths and Opportunities

Alternative technologies such as autoclaving and microwave treatment offer lower operational emissions and reduced air pollution risks compared to incineration, making them environmentally attractive for specific waste types such as infectious or biological waste. Chemical disinfection methods can be cost-effective for limited waste categories, while off-site disposal provides flexibility by utilizing specialized external facilities. Emerging technologies like plasma pyrolysis also present opportunities for high-efficiency waste destruction with minimal residue generation and potential energy recovery. These alternatives collectively provide opportunities for selective treatment and integrated waste management approaches.

4.2.3 Weaknesses and Threats

Despite their advantages, most alternative waste treatment technologies have significant limitations. Autoclaving and microwave systems are not suitable for chemical, or mixed hazardous wastes, as they do not ensure complete destruction of toxic compounds. Chemical treatment methods may generate secondary pollutants and require careful handling of reactive substances. Plasma pyrolysis and advanced systems involve high capital and operational costs, technical complexity, and limited local availability. Off-site disposal introduces transportation risks, dependency on external facilities, and reduced control over final treatment processes. Overall, these limitations make alternative technologies less suitable for the comprehensive and secure management of PAFDA's diverse hazardous waste streams.

4.2.4 Conclusion

Based on the assessment of available waste treatment technologies, high-temperature dual-chamber incineration has been identified as the most suitable option for the proposed project.

While alternative technologies such as autoclaving, microwave treatment, chemical disinfection, and off-site disposal may be effective for specific waste categories, they are not capable of adequately treating the diverse range of hazardous, chemical, biological, and laboratory wastes generated at PAFDA's laboratories. Furthermore, some alternatives involve operational limitations, higher costs, or increased dependency on external facilities.

The proposed incineration system provides a reliable and comprehensive solution by ensuring effective destruction of hazardous constituents, substantial volume reduction of waste, and compliance with applicable environmental regulations. When coupled with appropriate emission control measures, wastewater treatment, and environmental management practices, the selected technology offers the most practical, efficient, and environmentally acceptable approach for the safe management of laboratory waste generated at PAFDA's laboratories.

4.3 ALTERNATIVE DESIGNS

4.3.1 Analysis

Various design alternatives were considered during the planning of the proposed incineration facility to identify the most efficient, environmentally sound, and operationally practical configuration. The alternatives included single-chamber incinerators, dual-chamber incinerators, different flue gas treatment arrangements, and varying waste storage and handling systems. The assessment considered factors such as combustion efficiency, emission control performance, operational safety, waste handling requirements, regulatory compliance, and long-term sustainability.

4.3.2 Strengths and Opportunities

The selected design offers several advantages, including enhanced combustion efficiency through the use of primary and secondary combustion chambers operating at high temperatures. The incorporation of a wet scrubber system significantly improves air pollution control by reducing particulate matter and gaseous pollutants. The dedicated Yellow Room provides secure temporary storage of waste prior to incineration, while the PLC-controlled operating system ensures continuous monitoring, operational safety, and process optimization. The design also supports

compliance with environmental regulations and provides flexibility for handling different categories of hazardous laboratory waste generated at PAFDA's laboratories.

4.3.3 Weaknesses and Threats

The proposed design involves higher capital and operational costs compared to simpler incineration systems due to the inclusion of advanced combustion and pollution control equipment. The system requires regular maintenance, skilled operators, and continuous monitoring to ensure optimal performance. Failure of critical components such as burners, scrubbers, or control systems may affect treatment efficiency and environmental performance. Additionally, improper operation or inadequate maintenance could increase the risk of emissions, equipment downtime, and occupational safety concerns.

4.3.4 Conclusion

After evaluating the available design alternatives, the proposed dual-chamber incinerator with integrated wet scrubber, automated control system, waste storage facilities, and ash management infrastructure was determined to be the most suitable design for the project. The selected configuration provides the best balance between environmental protection, operational efficiency, safety, and regulatory compliance. Although the design requires greater investment and technical oversight, its ability to effectively manage diverse hazardous waste streams and minimize environmental impacts makes it the preferred option for the proposed incineration facility by PAFDA.

CHAPTER # 5. DESCRIPTION OF THE PROJECT

5.1 BACKGROUND

The proposed incineration project at the PAFDA has been initiated to address the growing need for safe and environmentally sound disposal of non-hazardous and hazardous laboratory waste generated from the Authority's forensic and analytical activities. PAFDA conducts extensive testing and research on agricultural inputs, food products, and related materials, which results in the generation of diverse waste streams, including chemical residues, biological specimens, and contaminated laboratory consumables. In the absence of an on-site treatment facility, such wastes pose potential risks to human health and the environment if not properly managed. Therefore, the installation of a dedicated dual-chamber incineration system, along with supporting infrastructure such as a waste storage (Yellow Room), flue gas treatment, and wastewater management systems, has been proposed. This project aims to ensure compliance with environmental regulations while providing a safe, efficient, and sustainable solution for waste management within the institutional framework of PAFDA.

5.2 OBJECTIVE OF THE PROJECT

The primary objective of the proposed project is to establish and operate a safe, efficient, and environmentally sound waste management system at the PAFDA through the installation of an incinerator for the treatment and disposal of non-hazardous and hazardous laboratory wastes generated from its forensic and analytical facilities.

The specific objectives of the project are to:

- Ensure the safe collection, transportation, storage, treatment, and disposal of non-hazardous and hazardous chemical, biological, and laboratory wastes generated at PAFDA's laboratories.
- Minimize environmental and public health risks associated with the improper handling, storage, and disposal of hazardous laboratory waste.
- Achieve substantial volume and mass reduction of waste through high-temperature incineration, thereby reducing the requirement for final disposal.
- Destroy potentially infectious, toxic, and hazardous constituents present in laboratory waste streams through controlled thermal treatment.

- Prevent contamination of air, soil, surface water, and groundwater through the incorporation of appropriate air pollution control and wastewater treatment systems.
- Ensure compliance with applicable environmental laws, regulations, standards, and guidelines governing non-hazardous and hazardous waste management and incineration activities.
- Provide a reliable and sustainable waste treatment solution that supports the operational requirements of PAFDA's forensic, agricultural, food, and I testing laboratories.
- Establish a documented waste tracking and management system through waste scanning, recording, and controlled handling procedures to ensure accountability and traceability.
- Promote occupational health and safety by minimizing direct exposure of workers to potentially infectious wastes.
- Contribute to the protection of public health and the environment through the environmentally sound management of laboratory-generated waste.

5.3 LOCATION AND SITE LAYOUT OF THE PROJECT

The site layout of the project has been attached as Figure 3-2.

5.4 LAND USE ON THE SITE

The proposed project site comprises an open area located within the premises of the PAFDA, designated exclusively for the installation and operation of the incineration facility. The site has been specifically allocated for waste management activities. The proposed development includes the construction of a main incineration hall, a designated hazardous waste storage area (Yellow Room), an operator/control room, an ash management area, and associated utility infrastructure required for the operation of the facility.

- The incinerator will be installed within the main hall.
- The Yellow Room will serve as a temporary storage area for waste received prior to incineration.
- The operator room will facilitate monitoring and control of incineration activities.

A detailed pictorial representation of the facility layout is provided in the project layout drawing.

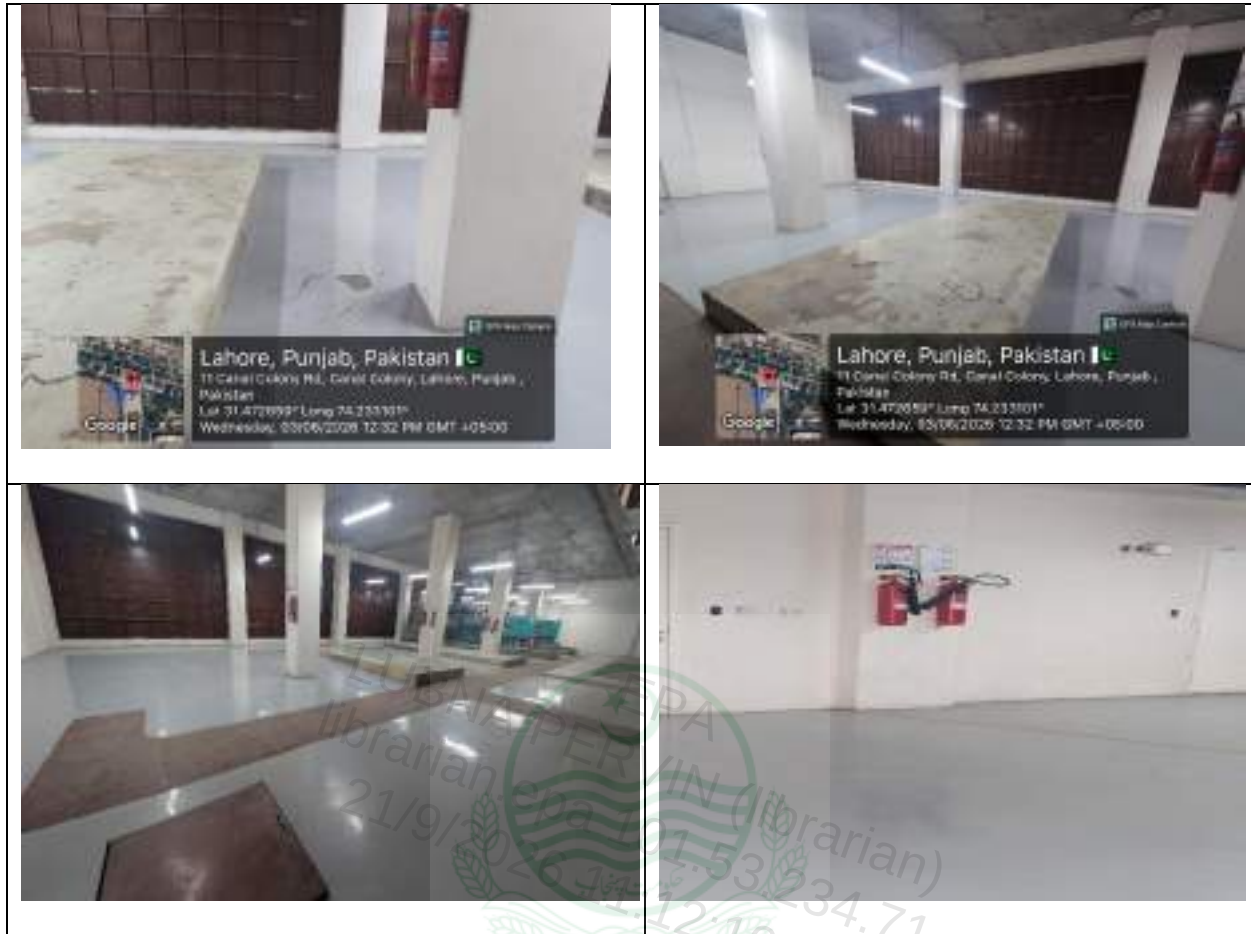


Figure 5-1 Current Land Use

5.5 ROAD ACCESS

The site is well connected through Multan Road, providing direct access to key city nodes including Thokar Niaz Baig Interchange and the Lahore Ring Road system, which facilitates smooth connectivity to all major parts of Lahore. The road network in the vicinity is composed of wide, paved urban arterial roads and service roads, designed to accommodate institutional traffic, laboratory operations, and heavy vehicles required for supply and waste transport.



Figure 5-2 Road Access Near Project Area

5.6 DETAILS OF THE INCINERATOR'S COMPANY

Table 5-1: Company Details

Components	Specifications
<i>Model</i>	C-50 with Wet Scrubbers
<i>Make</i>	Addfield, UK
<i>Country of Origin</i>	United Kingdom
<i>Quantity</i>	01

5.7 TYPE OF WASTE PRODUCED

The laboratories of PAFDA generate both non-hazardous and hazardous waste as a result of its laboratory testing, research, administrative, and support activities. The waste generated varies depending on the nature of laboratory analyses, sample preparation, quality control procedures, and routine office operations. To ensure safe and environmentally sound waste management, all waste is segregated at the source based on its characteristics and handled according to established standard operating procedures.

Non-hazardous waste primarily includes general municipal solid waste such as paper, cardboard, plastic packaging, food waste, glass, office waste, and other recyclable or non-contaminated materials generated from administrative offices, cafeterias, and routine facility operations. This waste is collected separately and disposed of through the municipal waste management system or authorized waste collectors.

Hazardous waste consists of laboratory-generated wastes that may pose risks to human health or the environment due to their chemical, biological, infectious, toxic characteristics. These include contaminated laboratory consumables, chemical residues, expired reagents, biological waste, microbiological cultures, contaminated glassware, sharps, disposable PPE, absorbent materials, and other laboratory wastes generated during analytical testing. Such wastes are segregated into designated containers, properly labeled, temporarily stored in the designated Yellow Room, and subsequently transported to the proposed dual-chamber incinerator for environmentally sound treatment and final disposal.

5.8 COLLECTION OF WASTE

The collection of waste at the proposed incineration facility will be carried out in a systematic and controlled manner to ensure the safe handling of non-hazardous, hazardous, biological, and

laboratory wastes generated from various PAFDA laboratories. Waste will be collected at the source in properly labeled, sealed, and compatible containers to prevent leakage, spillage, or exposure during handling. Each waste package will be scanned and documented to ensure traceability and proper record-keeping before being transferred to the incineration facility.

Upon arrival at the facility, all waste received from the laboratories will be segregated according to its type and characteristics in accordance with the approved waste management procedures. Following segregation, the waste will be temporarily stored in the designated Yellow Room, which serves as the secure storage area prior to incineration. The storage area will be designed to prevent unauthorized access, cross-contamination, and environmental releases while ensuring safe containment of all waste streams.

Trained personnel will be responsible for the collection, segregation, and movement of waste using designated routes and approved handling procedures. The use of appropriate personal protective equipment (PPE) will be mandatory during all waste handling activities to minimize occupational health risks. The segregated waste will remain in the Yellow Room until it is transferred to the incinerator for final treatment. This controlled collection, segregation, and storage system ensures safe containment of waste, maintains regulatory compliance, and minimizes potential environmental and public health impacts.

5.9 TRANSPORTATION OF WASTE

The transportation of waste within the premises of the PAFDA will be carried out in a controlled and secure manner to ensure safe movement of biological and laboratory wastes from the point of generation to the incineration facility. Waste will be properly packed, sealed, and labeled at the source to prevent any leakage, spillage, or exposure during transit.

Designated transport routes within the facility will be used to minimize interaction with general operational areas and to reduce potential risks to staff and visitors. Trained personnel equipped with appropriate PPE will handle the movement of waste containers using suitable trolleys or enclosed transport carts. Strict documentation and tracking procedures will be maintained during transportation to ensure accountability and traceability of all waste streams. This managed transportation system ensures safe handling, minimizes environmental risks, and supports compliance with occupational health and safety standards.

5.10 STORAGE OF WASTE

Prior to incineration, all waste received at the facility will be temporarily stored in a designated waste storage area, referred to as the **Yellow Room**. The Yellow Room will serve as a controlled and secure storage facility for samples generated from PAFDA laboratories all across the Punjab. Upon arrival at the incineration facility, waste bags and containers will be scanned, documented, and recorded in the waste tracking system before being transferred to the Yellow Room.

The storage area will be designed to ensure safe containment of waste pending incineration and to minimize risks associated with accidental releases, unauthorized access, and occupational exposure. Waste will remain sealed in its original containers or bags and will not be opened or manually sorted prior to incineration, thereby reducing handling risks and maintaining containment of potentially hazardous or infectious materials.

5.11 DETAILS OF THE INCINERATOR

5.11.1 Source of Power

The Addfield C50 incinerator operates using **Natural Gas** as the primary fuel source, with LPG as a secondary or backup fuel source, to ensure uninterrupted thermal performance in case of fluctuations or interruptions in gas supply.

5.12 CAPACITY OF THE INCINERATOR

The unit has a nominal waste destruction capacity of **50 kg per hour** and is capable of operating for approximately 12 hours per day.

5.13 INSTALLATION OF THE INCINERATOR

5.13.1 Control System

The proposed incineration system is equipped with an advanced Programmable Logic Controller (PLC)-based control system, which governs and monitors the complete operational process of the incinerator.

5.13.2 Emission and Environmental Performance

The incineration facility is designed to operate in a manner that ensures complete combustion of waste materials, resulting in a system that is free from visible smoke emissions as well as offensive odors under normal operating conditions.

5.13.3 Modular and Packaged Design

The incinerator is designed as a fully integrated packaged unit, with pre-installed electrical wiring and fuel piping systems to facilitate ease of installation at the project site.

5.14 COMBUSTION CHAMBERS

The proposed incineration system is a dual-chamber incinerator, consisting of a primary combustion chamber for initial waste oxidation and a secondary chamber for complete thermal destruction of combustion gases.

5.14.1 Combustion Chamber of Waste

The combustion (primary) chamber of the Addfield C50 incinerator is designed for the first phase of incineration, which involves combustion without air (pyrolytic effect), a process comparable to gasification.

5.14.1.1 Structural Specifications and Materials

The combustion chamber of the proposed incinerator is constructed using heavy-duty steel plates with thicknesses of approximately **8 mm and 10 mm**, ensuring structural strength and durability under high-temperature operating conditions. The total internal volume of the primary combustion chamber is approximately 0.64 m³, which is adequate for controlled batch-wise thermal treatment of hazardous laboratory waste.

To ensure thermal efficiency and long-term operational stability, the chamber is lined with a multi-layer refractory insulation system. The inner refractory layer consists of approximately 180 mm thick high-alumina refractory bricks containing around 42% Al₂O₃, capable of withstanding temperatures up to 1650°C. This is further supported by an additional insulation layer of at least 80 mm thickness, designed to withstand temperatures up to 1000°C, thereby minimizing heat loss and protecting the outer steel shell from thermal stress. This layered construction ensures safe

operation, improved combustion efficiency, and enhanced durability of the incineration system under continuous high-temperature conditions. Moreover, the chamber is fitted with inspection doors to allow for periodic dust cleaning and general maintenance

5.14.1.2 Operating Parameters

The standard operating temperature of the primary combustion chamber is approximately **850°C**, which is maintained to facilitate effective thermal decomposition of waste materials and reduction of emissions.

- The hearth is equipped with an automatic combustion burner system, typically comprising a Max Gas 120 burner unit.
- To ensure complete combustion, the system incorporates primary air nozzles that supply controlled airflow into the combustion chamber.
- The incinerator has a total thermal capacity of approximately 270 kW.

5.14.2 Secondary Combustion Chamber

5.14.2.1 Purpose of the Secondary Chamber

The secondary combustion chamber, also known as the post-combustion or re-combustion chamber, is a critical component of the Addfield C50 incinerator. Its primary function is to ensure the complete oxidation of combustion gases, volatile organic compounds, and products of incomplete combustion generated in the primary chamber. The chamber serves as the final stage of thermal treatment, thereby minimizing pollutant emissions and improving the overall environmental performance of the incineration system.

5.14.2.2 Design and Construction

The secondary chamber is constructed using high-quality refractory and insulating materials capable of withstanding elevated operating temperatures. The chamber is lined with thermal insulation and refractory materials having a minimum thickness of **180 mm**, which provides excellent heat retention, enhances combustion efficiency, and protects the external steel structure from thermal stress. The robust design ensures long-term durability and reliable operation under continuous high-temperature conditions.

5.14.2.3 Operating Conditions

The chamber operates at a minimum temperature of **1100°C** and provides a minimum gas residence time of two seconds. These operating conditions are maintained to ensure complete destruction of hazardous organic compounds, volatile gases, and other combustion by-products. The chamber is equipped with an automatic secondary burner featuring electronic ignition and permanent ventilation to sustain the required operating temperature throughout the combustion cycle.

5.14.2.4 Automated Control and Monitoring

The operation of the secondary chamber is fully automated through a Programmable Logic Controller (PLC) integrated with a Human Machine Interface (HMI). During startup, the secondary chamber is preheated before activation of the primary combustion chamber, ensuring that the required combustion temperature is achieved before waste is processed. The PLC continuously regulates burner operation, air supply, temperature control, and cooling cycles to maintain optimal operating conditions.

The HMI displays real-time chamber temperatures and operational status, while the system continuously records temperature data and operating parameters. The control system is also equipped with safety features, including flame failure detection, combustion air monitoring, and thermocouple fault alarms, ensuring safe and efficient operation of the incinerator.

5.14.2.5 Cooling and Shutdown Sequence

Upon completion of the incineration cycle, the system automatically enters a controlled cooldown phase. During this period, the burners are switched off while the secondary air fans continue operating until the chamber temperature decreases to a safe level. This controlled cooling process protects the refractory lining, maintains equipment integrity, and enhances operational safety.

5.14.3 Scrubbers

The proposed incineration facility is equipped with a wet scrubber system for the treatment of flue gases generated during the combustion process. After passing through the secondary combustion chamber and the flue gas cooling system, the exhaust gases are directed into the wet scrubber for further purification prior to release into the atmosphere. The wet scrubber operates by contacting

the flue gases with a fine water spray, forming a liquid film that facilitates the removal of particulate matter. The system helps in reducing emissions, controlling odor, and minimizing visible smoke from the stack. The water consumption is estimated at approximately 200 kiter per hour. The scrubbing liquid is collected and directed to the existing wastewater treatment plant (WWTP) for further treatment before final disposal or reuse. This integrated system ensures improved air quality and compliance with applicable environmental standards.

5.14.4 Stabilization of Alkalinity

The wet scrubber system generates wastewater (scrubber liquor) that may become acidic due to the absorption of acid gases such as hydrogen chloride (HCl) and sulfur dioxide (SO₂) produced during the incineration process. In order to ensure safe handling and compliance with environmental standards, a pH stabilization process is applied prior to the transfer of this effluent to the WWTP. This process involves the controlled dosing of alkaline neutralizing agents, such as Caustic Soda, to adjust and maintain the pH of the wastewater. The stabilization process helps in reducing the corrosive nature of the effluent, preventing damage to downstream treatment infrastructure, and minimizing potential environmental impacts. The treated and neutralized wastewater is then safely directed to the existing WWTP for further treatment and final disposal in accordance with applicable regulatory requirements.

5.14.5 Chimney

The chimney, also referred to as the stack, is an essential component of the Addfield C50 incinerator designed for the safe discharge of treated flue gases into the atmosphere. The stack is constructed from welded and flanged stainless-steel tubing, ensuring high resistance to corrosion, thermal stress, and chemical exposure from flue gas constituents. The chimney is designed to a minimum height of 15 meters above ground level, which facilitates effective dispersion of emissions and minimizes ground-level pollutant concentrations in the surrounding environment. For monitoring and regulatory compliance purposes, the chimney is equipped with a dedicated sampling port having minimum dimensions of 300 mm × 100 mm, enabling periodic collection and analysis of flue gas samples to verify emission levels and system performance.

All joints associated with the chimney and connected gas treatment system are sealed using silicone gaskets to ensure airtight connections and prevent leakage of flue gases. Depending on

site-specific conditions, additional structural stability measures such as guide wires or supporting restraints may be installed to ensure safe and stable operation of the stack under varying wind and environmental conditions. Design drawings of the incineration system provide detailed dimensional layouts, including the chimney configuration and its integration with the overall incinerator assembly. The chimney serves as the final discharge point for flue gases after they have undergone high-temperature treatment in the secondary combustion chamber and subsequent purification through the wet scrubber system.

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5.15 DESIGN SPECIFICATIONS

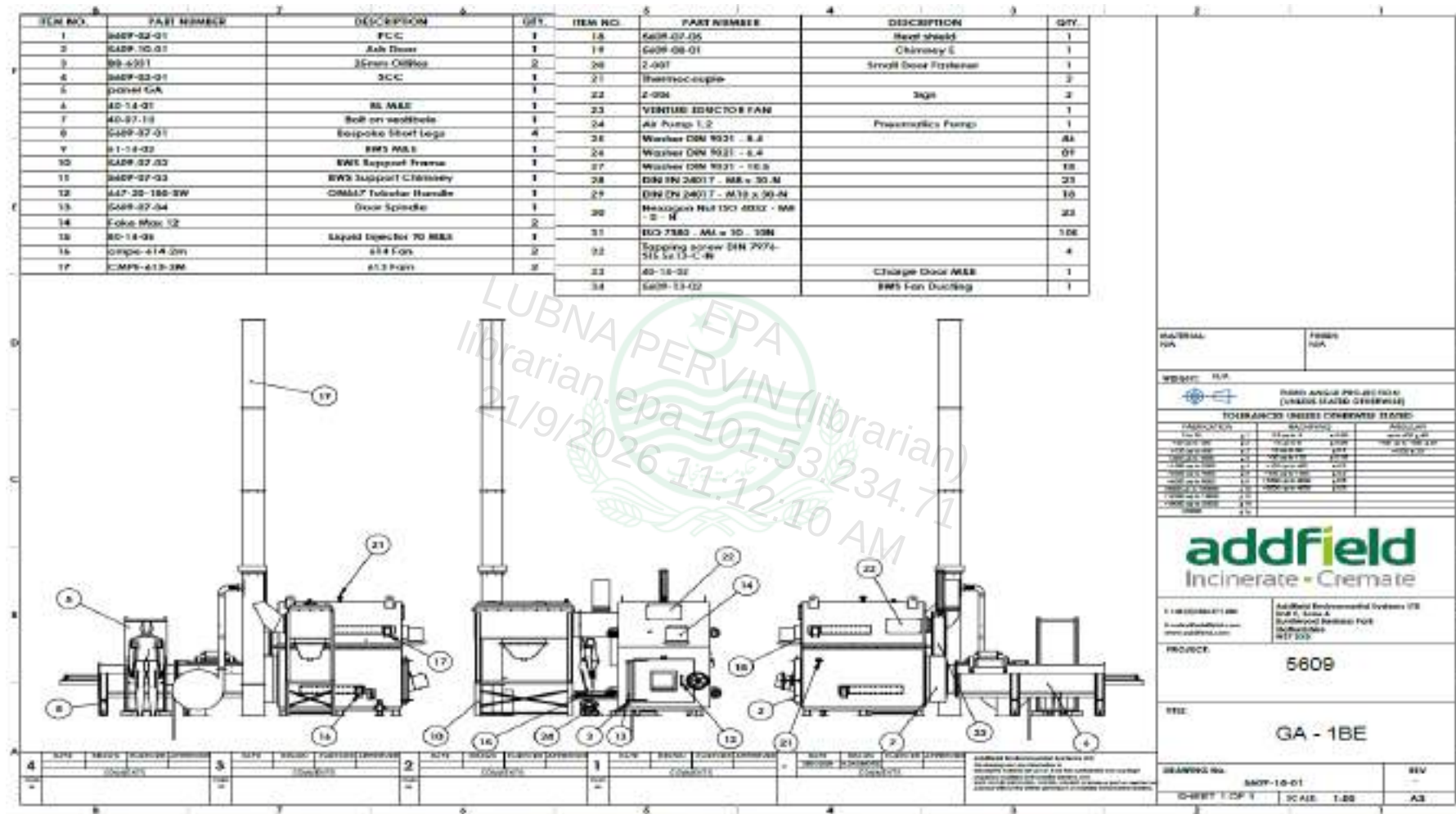


Figure 5-3 Design Specifications

5.16 ASH PITS

The proposed project includes the construction of a dedicated 8 ft × 8 ft ash pit for the temporary storage and management of bottom ash generated from the incineration process.

5.17 VEGETATION FEATURES OF THE SITE

The proposed project site is an already designated and prepared open area within the premises of the PAFDA, Lahore. The site currently does not contain any significant natural vegetation, tree cover, or ecologically sensitive flora. In order to improve the aesthetic value of the site and to contribute positively to the local microclimate, a landscaping and plantation plan has been proposed as part of the project design.

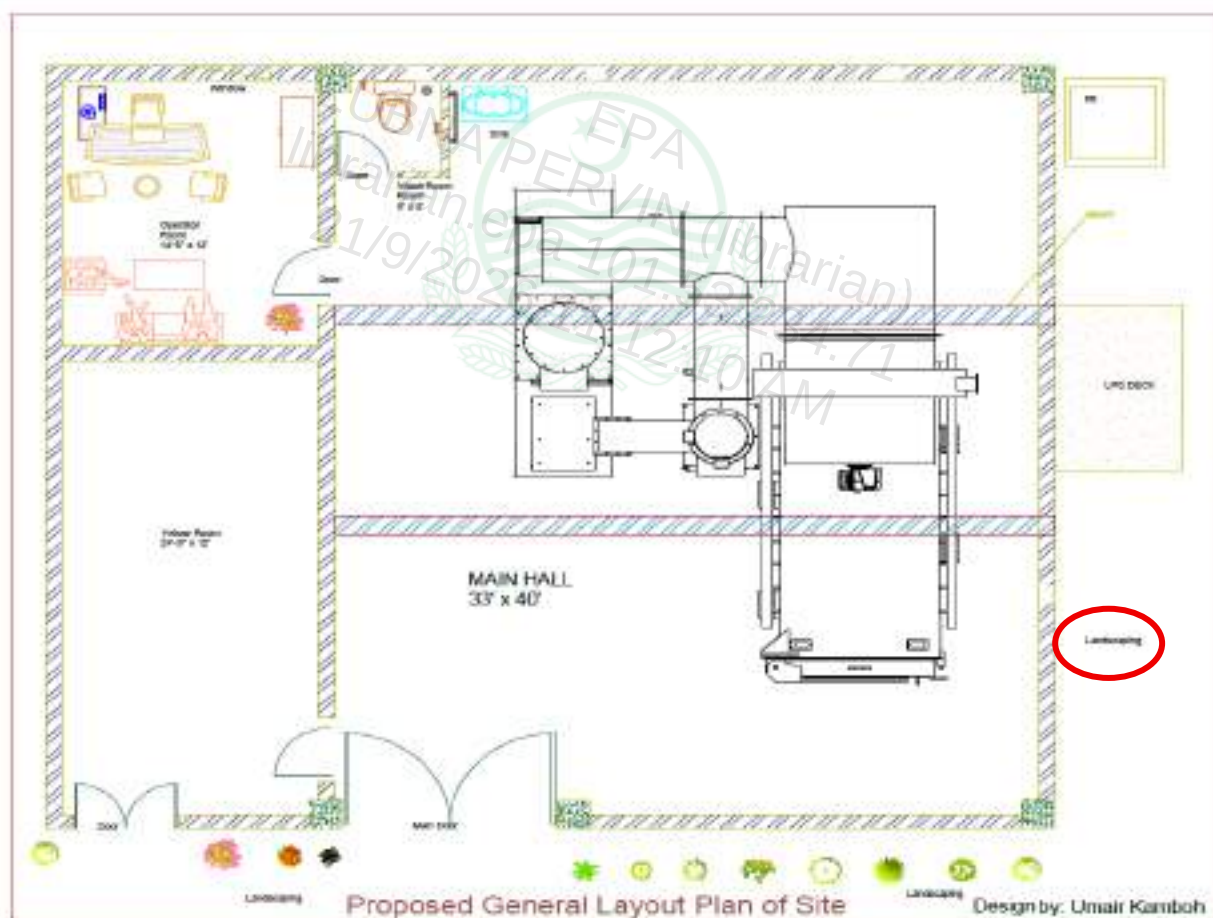


Figure 5-4 Proposed Plantation Area

5.18 COST OF THE PROJECT

The estimated cost of the proposed incineration project is PKR 118,786. This cost covers the procurement, installation, commissioning, and associated operational requirements of the incineration facility.

5.19 LAND ACQUISITION

The proposed incineration facility is located within the premises of the PAFDA, Lahore. The project site is fully owned by PAFDA, and no additional land acquisition, resettlement, or compensation is required for the implementation of the proposed project.

5.20 PROJECT AREA

The total area of the PAFDA is 38 Kanal 9 Marla..

5.21 GREEN ENERGY SOLUTIONS

The PAFDA has installed a solar photovoltaic (PV) system within its premises to support sustainable energy generation and reduce dependency on conventional power sources. The solar installation contributes to the overall energy requirements of the facility, thereby improving energy efficiency and promoting the use of renewable energy in line with modern environmental management practices.

In addition to energy generation, the solar panel structure has been designed as a dual-purpose facility by incorporating a shaded parking area beneath the installed panels. This arrangement provides a covered parking space for vehicles, protecting them from direct sunlight, rainfall, and adverse weather conditions. The shaded parking not only enhances vehicle protection and user convenience but also optimizes land use within the facility by integrating renewable energy infrastructure with functional site development.



Figure 5-5: Environmental Enhancement Measures

5.22 FIRE SAFETY ARRANGEMENTS

The proposed incineration facility is equipped with basic fire safety measures to ensure safe handling of hazardous waste and safe operation of equipment. Some fire extinguishers and safety signage have already been installed at key locations within the facility. In addition, further fire safety equipment, including additional fire extinguishers, emergency response tools, and enhanced safety signage, will be installed during the installation and operational phases as per site requirements and applicable safety standards. These measures will be regularly reviewed and upgraded to ensure adequate fire protection and compliance with occupational health and safety requirements.



Figure 5-6: Fire Fighting Arrangements

CHAPTER # 6. DESCRIPTION OF THE ENVIRONMENT

6.1 GENERAL

A comprehensive understanding of the existing environmental conditions within and around the project area is essential for assessing the potential impacts of the proposed project and identifying appropriate mitigation measures. The environmental baseline provides information on the physical, biological, and socio-economic characteristics of the area that may be influenced by project activities during the installation, waste collection and transportation, and operational phases of the proposed incineration facility. This chapter presents the existing environmental conditions of the project area and its surroundings, including climate and meteorology, topography, land use, air quality, noise levels, water resources, soil characteristics, ecological resources, and socio-economic conditions. The baseline information serves as a reference against which potential environmental impacts associated with the proposed project are evaluated and forms the basis for the development of appropriate environmental management and monitoring measures.

6.2 PHYSICAL ENVIRONMENT

6.2.1 Terrain of the Area

Lahore is situated in the alluvial plains of the Upper Indus Basin and forms part of the fertile Punjab Plain. The topography of the city is generally flat to gently undulating, with ground elevations ranging from approximately 200 to 220 meters above mean sea level. The terrain has been shaped over time by the depositional activities of the Ravi River and its associated floodplains, resulting in extensive alluvial deposits consisting primarily of sand, silt, and clay.

The project area, located within the premises of the PAFDA, exhibits a predominantly level topography with no significant slopes, hills, escarpments, or other notable landforms. The relatively flat terrain is favorable for the installation and operation of the proposed incineration facility, as it minimizes the need for extensive earthworks and facilitates efficient drainage, construction, and infrastructure development. No topographical constraints that could adversely affect the implementation of the proposed project were observed within the project site.



Figure 6-1 Topography of the project

(<https://www.floodmap.net/elevation/ElevationMap/?gi=1172451>)

6.2.2 Climate and Meteorology

Lahore experiences a semi-arid to humid subtropical climate characterized by hot summers, a monsoon season, and mild winters. The city experiences four distinct seasons: a hot summer from April to June, a monsoon period from July to September, a post-monsoon autumn from October to November, and a cool winter from December to February. Summer temperatures frequently exceed 40°C, while winter temperatures may fall below 5°C during cold spells. The average annual rainfall in Lahore ranges between 600 and 700 mm, with the majority occurring during the monsoon months of July and August.

Meteorological conditions in Lahore are influenced by seasonal wind patterns, temperature variations, humidity, and precipitation. Prevailing winds are generally from the northwest during winter and southwest during the monsoon season. Relative humidity remains high during the monsoon period and comparatively lower during the summer months. These climatic and meteorological conditions play an important role in the dispersion of air pollutants, atmospheric stability, and environmental management considerations for the proposed incineration facility. Therefore, local climate and meteorological characteristics have been considered in assessing the

potential environmental impacts of the project, particularly with respect to air quality and emission dispersion.

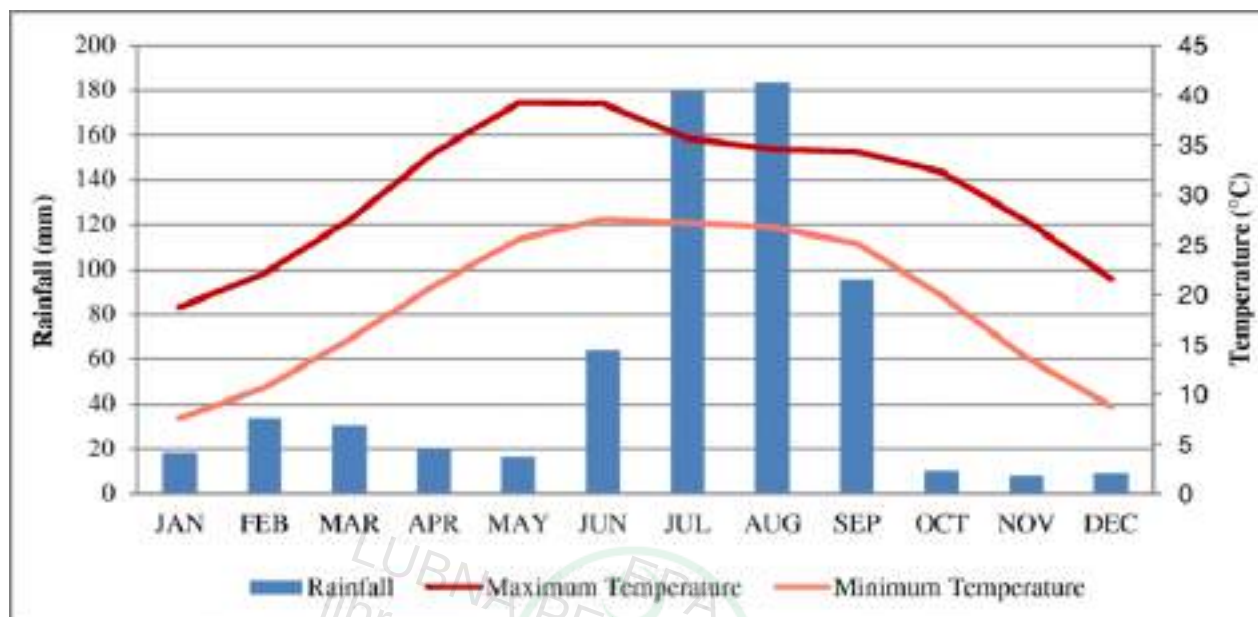


Figure 6-2: Average Temperature and Rainfall of the Area

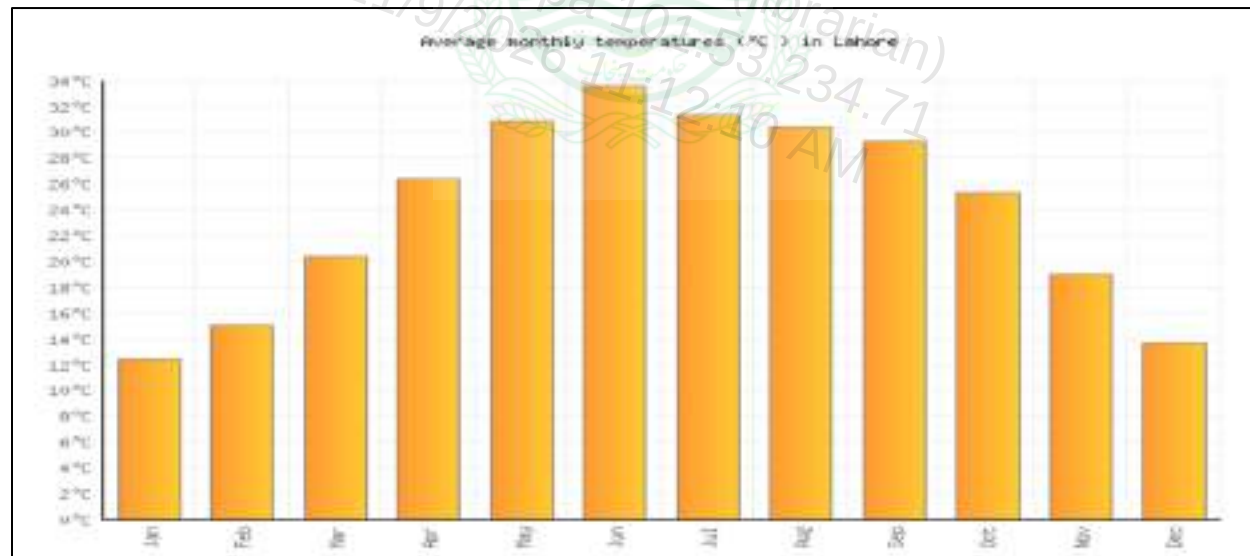


Figure 6-3 Average Monthly Temperature

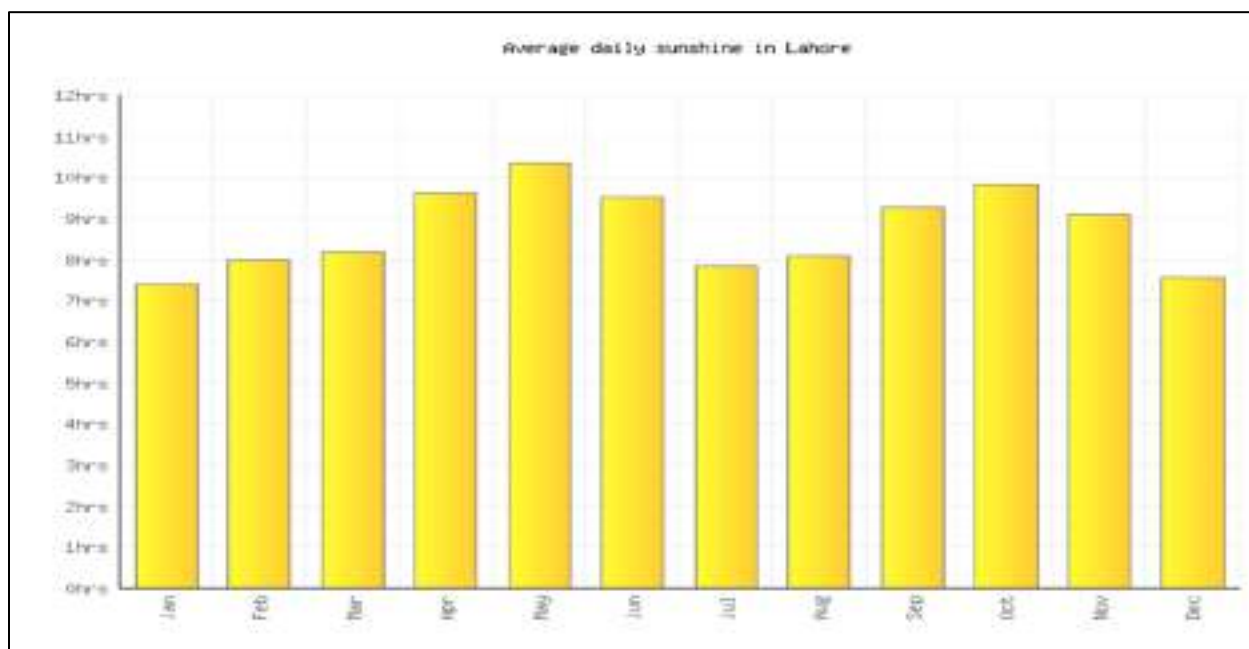


Figure 6-4: Average Sunshine Hours in Lahore

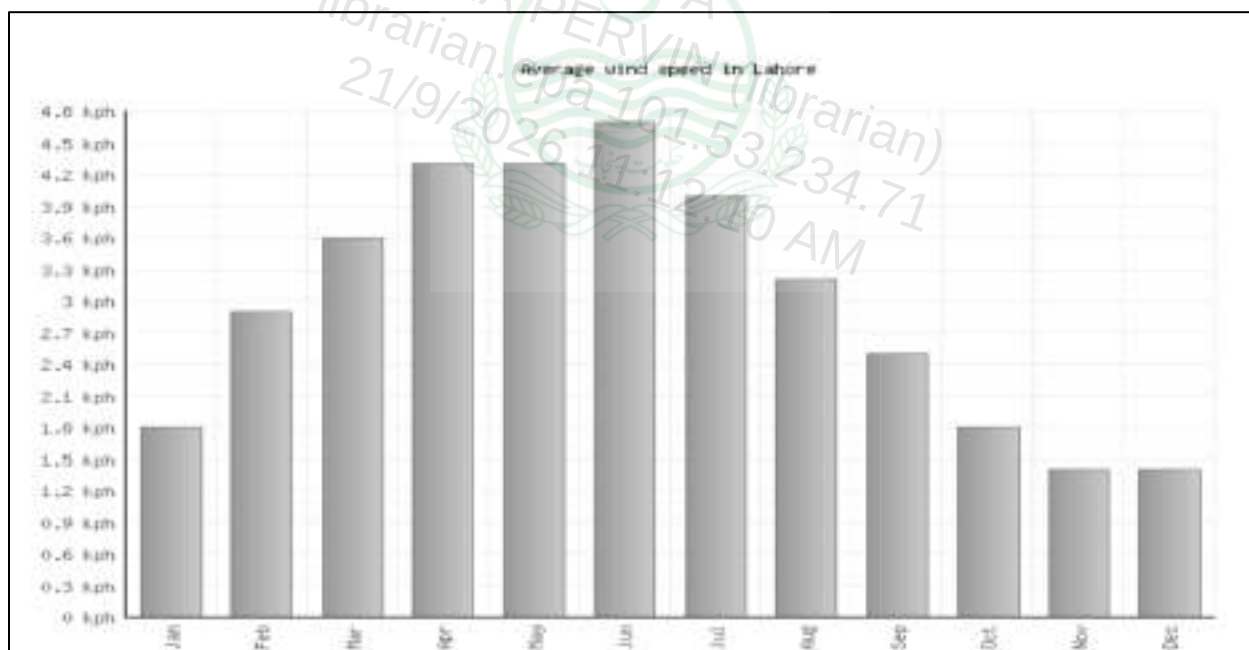


Figure 6-5: Average wind speed in Lahore

(<https://www.weather2visit.com/asia/pakistan/lahore.htm>)

6.2.3 SURFACE AND GROUND WATER

Lahore's surface water resources primarily comprise the River Ravi, which flows along the northwestern boundary of the city, and an extensive network of canals, drains, and irrigation

channels that support agricultural and urban water requirements. Although the Ravi River has historically been an important source of water for the region, its flow is largely seasonal and supplemented by upstream releases. Various canal systems, including branches of the Upper Bari Doab Canal network, contribute to irrigation and groundwater recharge within and around Lahore.

Groundwater is the principal source of water supply for Lahore and is extensively utilized for domestic, commercial, industrial, and institutional purposes. The city is underlain by thick alluvial deposits consisting of sand, silt, and clay, which form a productive aquifer system. Groundwater is generally extracted through tube wells and municipal water supply schemes. However, increasing urbanization, population growth, and intensive groundwater abstraction have resulted in a gradual decline in groundwater levels in certain parts of the city. The groundwater quality is generally suitable for most uses, although localized contamination may occur in densely populated or industrialized areas. The proposed project site is not located near any major surface water body, and with the implementation of appropriate wastewater management measures, no significant impacts on surface or groundwater resources are anticipated.

*Environmental Impact Assessment (EIA) Report
Installation of Incinerator
Thokar Niaz Baig, District Lahore*

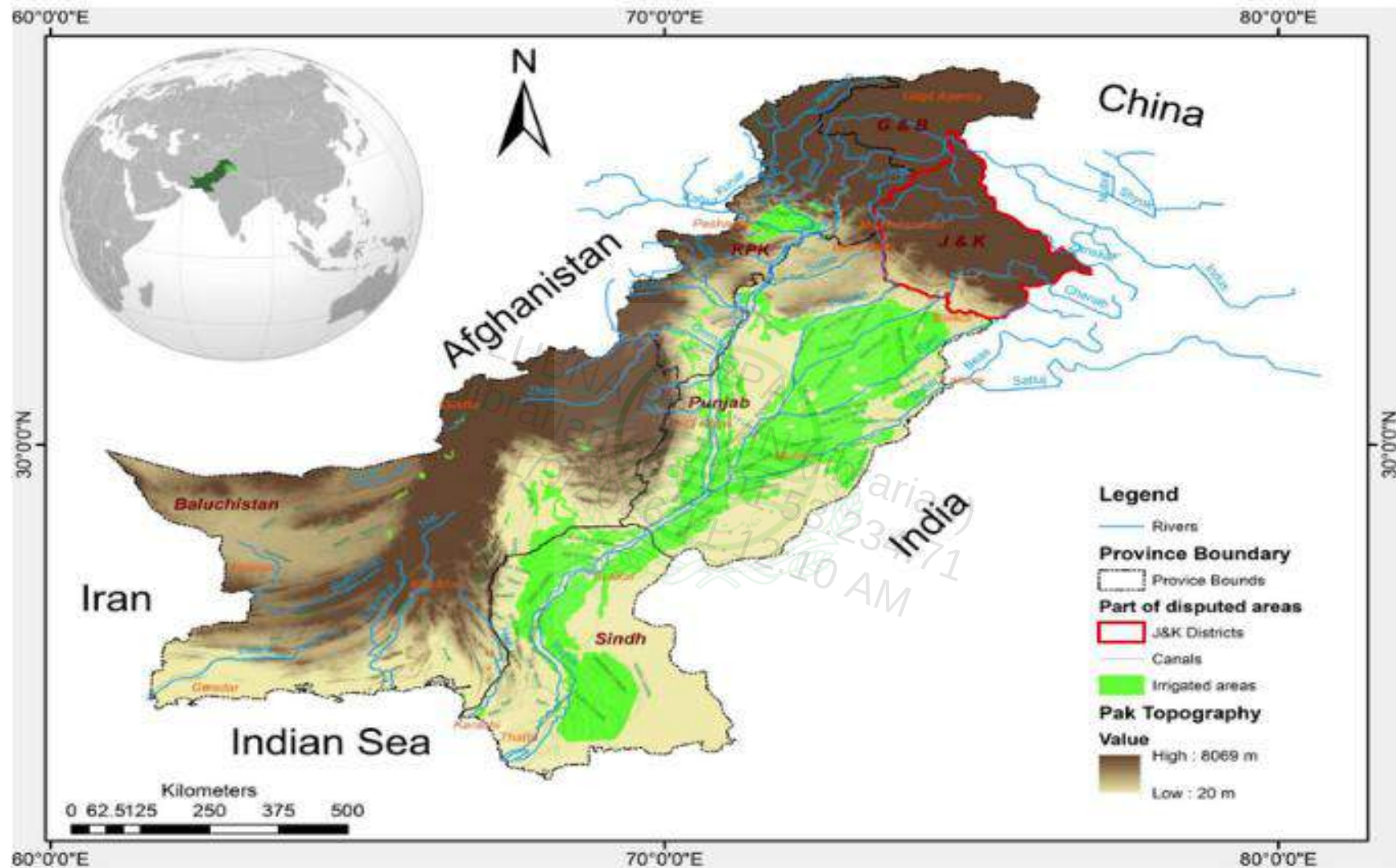


Figure 6-6: Surface and Ground Water

6.3 SEISMOLOGY

Lahore is located in the Indus Basin Seismic Zone, which is considered a moderate seismic activity region in Pakistan. Although the city does not lie directly on a major active fault line, it is influenced by regional tectonic structures associated with the collision of the Indian and Eurasian plates. As a result, seismic waves from nearby fault systems in northern Pakistan and the Himalayan foothills can affect the area. According to seismic zoning maps of Pakistan, Lahore generally falls within Seismic Zone 2B to 3 (low to moderate risk category), where earthquakes of mild to moderate intensity may occur occasionally. Historical records indicate that while Lahore has not experienced frequent severe earthquakes, tremors from distant seismic events have been felt in the region.

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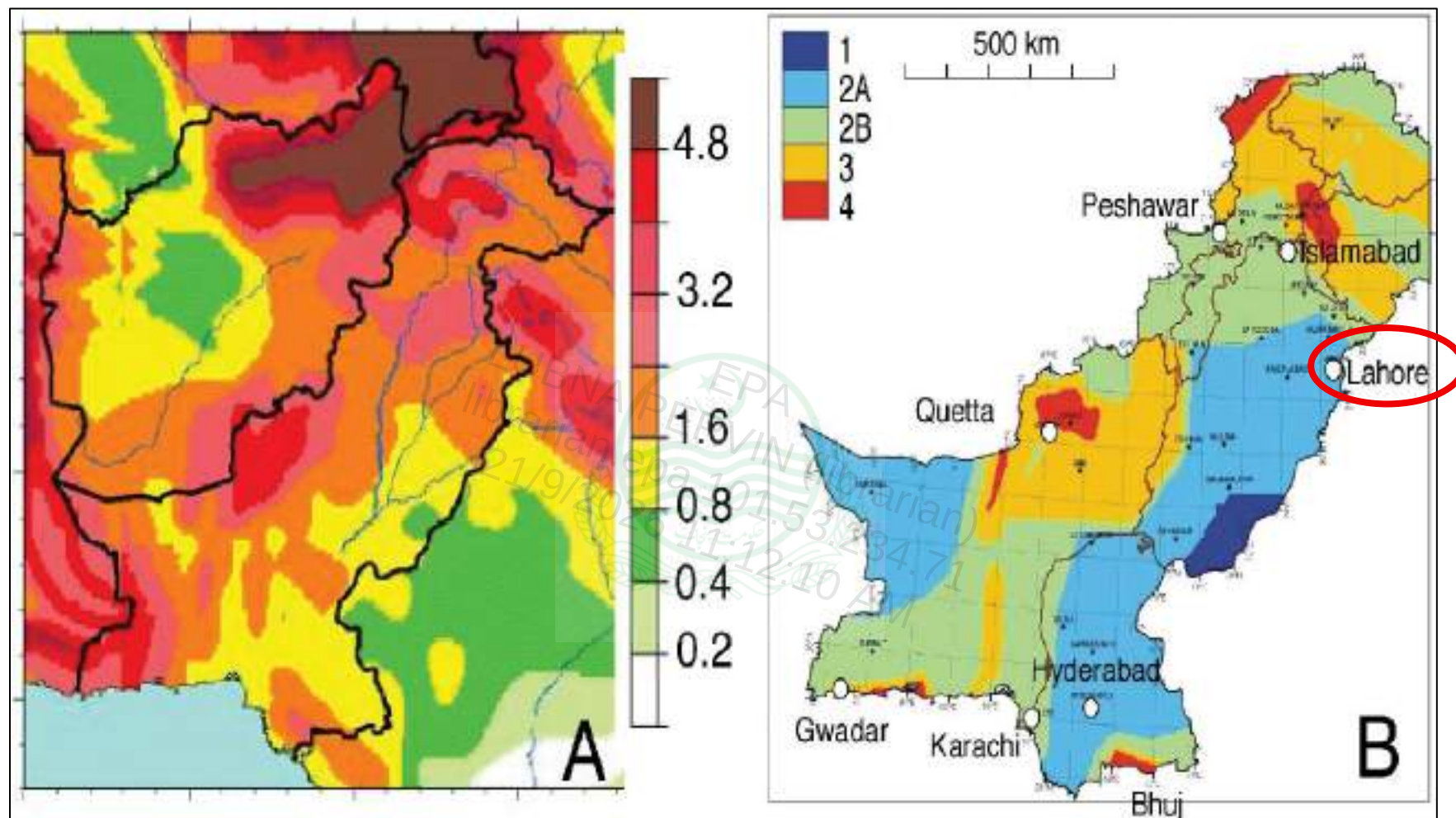


Figure 6-7: Seismic Zones of Pakistan

6.4 ECOLOGICAL RESOURCES

6.4.1 Endangered Species

Lahore city itself is highly urbanized, so it does not support many naturally occurring endangered wildlife species within the city core.

6.5 SOCIO-ECONOMIC ENVIRONMENT

6.5.1 History

Lahore is one of the oldest continuously inhabited cities in South Asia, with a history spanning over a millennium. It is believed to have been founded in ancient times, and historical references to the city appear in early Hindu, Buddhist, and later Islamic periods. Due to its strategic location along major trade and invasion routes, Lahore developed into an important cultural, political, and economic center over time.

The city gained major prominence during the Mughal era (16th–18th century), when it became one of the empire's most important capitals. Many of Lahore's iconic architectural landmarks, including forts, gardens, mosques, and gates, were constructed during this period, reflecting its status as a center of art, architecture, and administration. Later, under Sikh rule and subsequently British colonial administration, Lahore continued to grow as an administrative hub and modern urban center.

After the partition of British India in 1947, Lahore became a key cultural and political city of Pakistan. Today, it serves as the capital of Punjab province and remains a major center for education, industry, governance, and cultural heritage. Despite rapid urbanization and industrial development, Lahore continues to preserve its rich historical identity through its architectural and cultural landmarks.

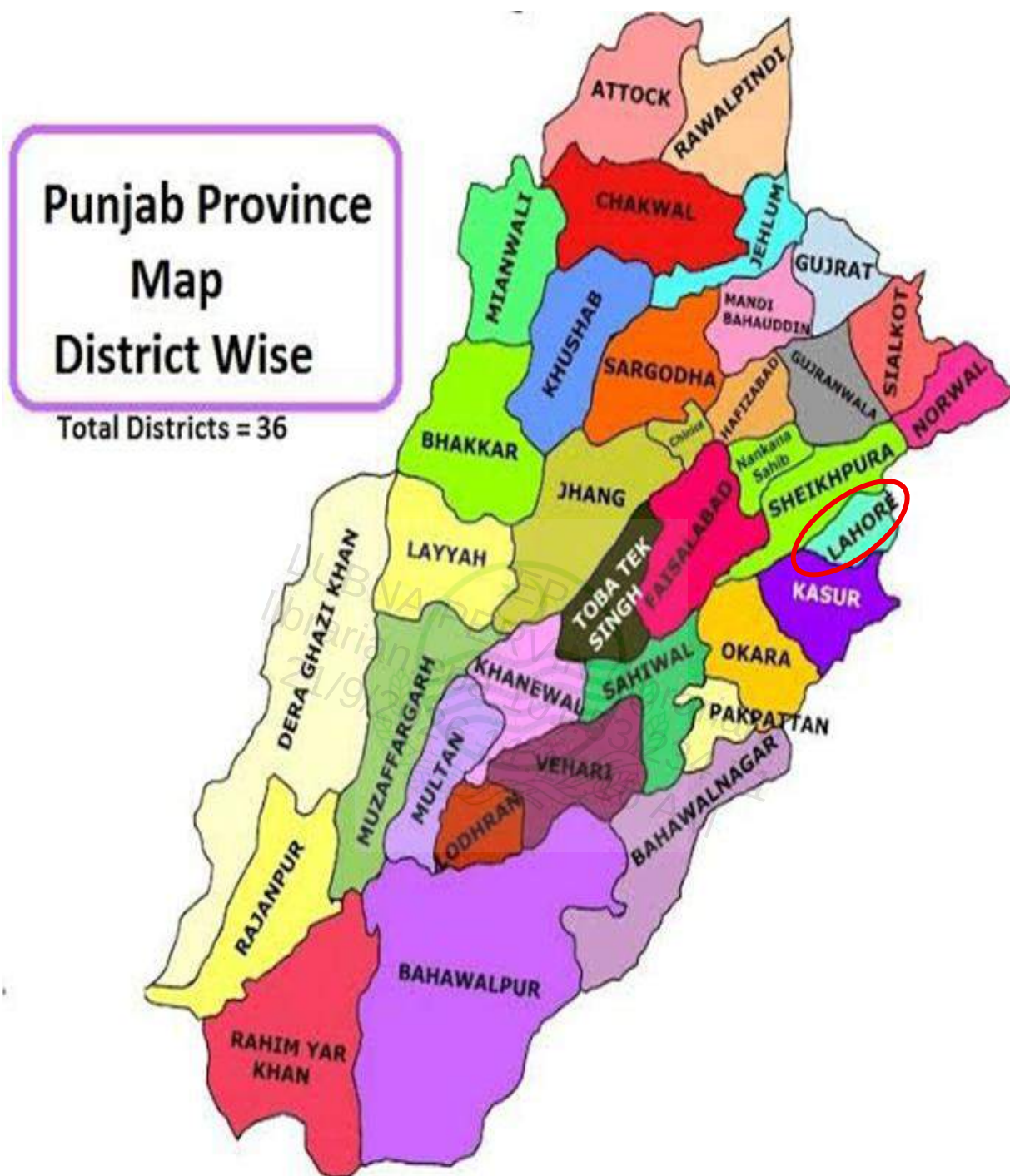


Figure 6-8: Map of Punjab

6.5.2 Political Set Up

Pakistan is a federal parliamentary republic with a multi-tiered system of governance comprising the federal, provincial, and local government levels. The political system is based on a constitution that defines the separation of powers among the executive, legislative, and judicial branches.

At the federal level, the country is governed by an elected Prime Minister, who heads the government, and a President, who serves as the ceremonial head of state. The federal legislature consists of two houses: the National Assembly and the Senate, responsible for law-making, policy formulation, and national governance.

The Province of Punjab, where Lahore is located, has its own provincial government headed by a Chief Minister, who is elected by the Provincial Assembly. The Punjab Provincial Assembly is responsible for legislation and governance at the provincial level, particularly in sectors such as health, environment, agriculture, and infrastructure development.

At the local level, Lahore is administered by local government institutions responsible for municipal services, urban planning, sanitation, and community-level governance functions. Various administrative departments and regulatory bodies operate under the provincial government to implement policies and ensure regulatory compliance.

For environmental regulation specifically, agencies such as the Environmental Protection Department (EPD) Punjab are responsible for enforcing environmental laws, reviewing Environmental Impact Assessments (EIAs), and ensuring compliance with environmental standards for industrial and infrastructure projects such as the proposed incineration facility.

6.5.3 Economic Activities

Lahore is one of the major economic centers of Pakistan and plays a vital role in the provincial and national economy. The city has a diverse economic base that includes industry, trade, services, agriculture-linked commerce, and emerging technology sectors. Its strategic location and well-developed infrastructure make it a key hub for business, administration, and logistics in Punjab.

The industrial sector in Lahore includes textiles, garments, pharmaceuticals, food processing, chemicals, engineering goods, and light manufacturing. Numerous small and medium enterprises (SMEs) operate in industrial estates and surrounding areas, contributing significantly to

employment and economic output. The city also hosts pharmaceutical and laboratory-based industries, which align with research and regulatory activities similar to those conducted by institutions like PAFDA.

The service sector is the largest contributor to Lahore’s economy, encompassing education, healthcare, banking, finance, IT services, and public administration. Lahore is also a major center for trade and commerce, with wholesale markets, retail hubs, and distribution networks supplying goods across Punjab and other regions.

In addition, agriculture-related economic activities in the surrounding peri-urban areas include cultivation of wheat, rice, vegetables, and fruits, supported by extensive canal irrigation systems. These agricultural outputs feed into Lahore’s food processing and supply chains. The city is also experiencing growth in the construction and real estate sector, driven by rapid urbanization and infrastructure development.

Overall, Lahore’s diversified economic structure supports both traditional and modern industries, making it a key contributor to Pakistan’s economic development.

PAFDA is not very far from Lahore’s major industrial zones.

Table 6-1: Distance of Industrial Estate from PAFDA

Industrial Unit	Distance
<i>Sundar Industrial Estate</i>	15–20 km
<i>Kot Lakhpat Industrial Area</i>	10–12 km
<i>Ferozepur Road Industrial Cluster</i>	8–15 km
<i>Multan Road Small Industrial Units</i>	2–6 km

6.6 QUALITY OF LIFE VALUES

6.6.1 Demographic Survey

Lahore is the second-largest city of Pakistan and serves as the capital of Punjab Province. The city has a rapidly growing population characterized by a diverse demographic composition, with the majority of residents engaged in trade, industry, services, education, and government-related occupations. Due to continuous urbanization and economic development, Lahore has experienced

significant population growth, making it one of the country's most important social, cultural, and economic centers.



Figure 6-9: Population of Lahore

(<https://worldpopulationreview.com/cities/pakistan/lahore>)

6.6.2 Literacy Rate

The literacy rate among males is approximately 81.4%, while the literacy rate among females is around 77.6%, indicating a comparatively narrow gender gap in educational attainment. The presence of numerous educational institutions, universities, and vocational training centers has contributed significantly to the city's human resource development and skilled workforce.

Table 6-2: Literacy Rate in Lahore

Literacy Rate	
<i>Male</i>	81.4%
<i>Female</i>	77.6%

6.6.3 Cultural and Social Status

Lahore is widely recognized as the cultural capital of Pakistan and possesses a rich historical, cultural, and social heritage. The city is home to a diverse population representing various ethnic, linguistic, and socio-economic backgrounds, fostering a vibrant and inclusive social environment. Lahore serves as a major center for education, literature, arts, music, and cultural activities, with numerous educational institutions, museums, historical monuments, and recreational facilities contributing to its cultural significance.

The social structure of Lahore is characterized by a mixture of traditional values and modern urban lifestyles. The city provides extensive access to educational, healthcare, commercial, and recreational services, resulting in a relatively high standard of living compared to many other regions of the country. Community cohesion, social interaction, and cultural celebrations are prominent features of the city's social fabric. Due to the urban and institutional nature of the proposed project site within PAFDA premises, no adverse impacts on cultural heritage resources, archaeological sites, or significant social and cultural assets are anticipated.

6.6.4 Educational Institutions & Health Facilities

Lahore is one of Pakistan's leading centers for education and healthcare, providing a wide range of public and private educational and medical facilities. The city hosts numerous schools, colleges, universities, technical institutes, and research organizations that cater to a large student population from across the country. Prominent educational institutions contribute significantly to human resource development and scientific advancement in the region. Similarly, Lahore possesses a well-developed healthcare infrastructure comprising tertiary care hospitals, teaching hospitals, specialized medical centers, clinics, and diagnostic laboratories. Major healthcare facilities provide comprehensive medical services to residents of Lahore and surrounding districts. The availability of these educational and health facilities reflects the city's high level of social development and supports the overall well-being of its population. The proposed incineration facility is located within an institutional setting and is not expected to adversely affect any nearby educational or healthcare establishments, provided that the recommended environmental management measures are effectively implemented.

6.7 ARCHAEOLOGICAL SITES

Lahore possesses a rich historical and cultural heritage and is home to numerous archaeological and historical landmarks. However, the proposed incineration facility is located within the existing premises of the PAFDA on land designated for institutional development. The project site and its immediate surroundings do not contain any known archaeological remains, protected monuments, heritage structures, or culturally significant sites.

6.8 ENVIRONMENTAL MONITORING

Environmental monitoring was conducted as part of the baseline environmental assessment to establish the existing environmental conditions of the project area prior to the implementation of the proposed incineration facility. The baseline monitoring provides a reference against which any future environmental changes associated with the project can be evaluated and assessed. The monitoring program included the assessment of key environmental parameters such as ambient air quality, noise levels, and other relevant environmental indicators within and around the project area. The collected data were used to characterize the existing environmental setting and to support the impact assessment process. The baseline monitoring results provide a foundation for the development of mitigation measures, environmental management strategies, and future monitoring requirements during the installation and operational phases of the project.



Figure 6-10: Pictorial Evidence of Environmental Monitoring

6.9 SITE SUITABILITY

Based on the assessment of the physical, biological, and socio-economic environment, the proposed project site is considered suitable for the installation and operation of the incineration facility. The site is located within the existing premises of the PAFDA on land that is fully owned by the Authority and specifically designated for institutional infrastructure development. The proposed location is compatible with the existing land use and does not require any land acquisition, resettlement, or displacement of population. The site is accessible through an established road network and is supported by the necessary utilities and infrastructure required for project implementation. No environmentally sensitive areas, protected habitats, forests, wetlands, archaeological sites, or significant ecological resources were identified within the project footprint. Furthermore, the incorporation of pollution control measures, including a dual-chamber incineration system, wet scrubber, wastewater treatment facilities, and appropriate waste management practices, will minimize potential environmental impacts. Therefore, from both environmental and operational perspectives, the proposed site is considered suitable for the development and operation of the incineration facility.

CHAPTER # 7. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

7.1 GENERAL

This chapter presents the screening of potential environmental impacts associated with the proposed incineration facility at the PAFDA, along with corresponding mitigation measures. The screening process is an essential step in the Environmental Impact Assessment (EIA) that helps to identify and evaluate the significance of potential impacts arising from project activities during the installation, waste collection and transportation, and operational phases. The assessment focuses on key environmental components including air quality, water resources, soil, noise, occupational health and safety, and waste management. Each potential impact has been reviewed in terms of its likelihood, magnitude, and duration to determine its significance level. Appropriate mitigation and preventive measures have been proposed to minimize adverse environmental effects and ensure compliance with applicable environmental regulations. This chapter forms the basis for developing an effective Environmental Management Plan (EMP) for the project.

7.2 PROJECT AREA OF INFLUENCE

The project area of influence encompasses the zone that may be directly or indirectly affected by the proposed operational activities of the incineration facility at PAFDA.

Primary Impact Zone

The Primary Impact Zone includes the immediate project footprint within the PAFDA premises where all operational activities will take place. This comprises the incineration unit, Yellow Room (waste storage area), operator/control room, ash pit, wet scrubber system, chimney stack, and wastewater treatment facilities. Impacts in this zone are expected to be direct and may include air emissions, heat generation, noise, occupational health and safety risks, and handling of hazardous waste and ash.

Secondary Impact Zone:

The Secondary Impact Zone extends beyond the project boundary and includes surrounding institutional buildings, internal and external access roads used for waste transportation, and nearby urban and commercial areas. Potential impacts in this zone are mainly indirect and may include

vehicle emissions, noise from transportation, and limited dispersion of treated stack emissions. However, due to the controlled nature of operations and installed pollution control systems, significant adverse impacts in the secondary zone are not anticipated.

7.3 METHODOLOGY FOR IMPACT ASSESSMENT

The methodology adopted for the EIA of the proposed incineration facility at PAFDA, Lahore is based on a systematic and structured approach to identify, predict, and evaluate potential environmental and social impacts. The assessment was carried out by reviewing project activities across all phases, including installation, waste collection and transportation, and operational stages, and by analyzing their interaction with the physical, biological, and socio-economic environment.

The process involved baseline data collection, site observations, stakeholder consultations, and review of relevant technical documents and regulatory guidelines. Potential impacts were identified for key environmental components such as air quality, water resources, soil, noise, occupational health and safety, and waste management. Each identified impact was then evaluated based on its likelihood, magnitude, duration, and reversibility. A risk-based approach was used to categorize impacts as significant, moderate, or low, allowing for prioritization of mitigation measures. The assessment also considered the effectiveness of proposed pollution control systems, including the dual-chamber incinerator, wet scrubber, ash handling system, and wastewater treatment facilities, in minimizing environmental impacts.

		Impact →				
		Negligible	Minor	Moderate	Significant	Severe
↑ Likelihood	Very Likely	Low Med	Medium	Med Hi	High	High
	Likely	Low	Low Med	Medium	Med Hi	High
	Possible	Low	Low Med	Medium	Med Hi	Med Hi
	Unlikely	Low	Low Med	Low Med	Medium	Med Hi
	Very Unlikely	Low	Low	Low Med	Medium	Medium

Figure 7-1 Risk Assessment Matrix

7.4 IMPACTS DURING COLLECTION, TRANSPORTATION AND STORAGE

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

Table 7-1: Screening of Possible impacts during Collection, Transportation, and Storage of Waste

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
<i>Exposure of workers to waste during handling and sorting</i>	Likely	Major	Significant
<i>Leakage or spillage of waste during collection, movement, or temporary storage (Yellow Room)</i>	Likely	Major	Significant
<i>Improper segregation and mixing of incompatible waste streams leading to chemical reaction risks</i>	Unlikely	Major	Significant
<i>Fire risk due to flammable solvents,</i>	Unlikely	Major	Significant

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
<i>chemicals, or reactive waste in storage area</i>			
<i>Odor nuisance and minor air quality deterioration during waste handling and storage</i>	Certain	Minor	Low
<i>Injury to staff due to manual handling, lifting, or transport equipment misuse</i>	Likely	Moderate	Medium
<i>Loss of waste traceability or documentation errors during scanning and tracking process</i>	Unlikely	Moderate	Medium
<i>Pest attraction or hygiene issues in</i>	Rare	Minor	Low

<i>Potential Impacts</i>	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
<i>storage area if waste is not promptly transferred</i>			

7.4.1 Occupational Health and Safety of Workers

Exposure to waste may cause acute and chronic health effects in workers, including skin burns, infections, respiratory disorders, eye irritation, and long-term toxicity due to repeated exposure.

Manual handling, lifting, and movement of waste containers may result in physical injuries such as cuts, puncture wounds, back injuries, fractures, and musculoskeletal disorders among workers.

Accidental spills during handling or transportation may cause chemical burns, poisoning, respiratory distress, or direct toxic exposure to personnel involved in waste management activities.

Improper housekeeping and unsafe operational practices may create slip, trip, and fall hazards, increasing the risk of workplace accidents and injuries.

Mitigation Measures

- Mandatory use of full PPE (gloves, masks, goggles, protective clothing, safety shoes) for handling of both hazardous and non-hazardous waste.
- Proper training on waste handling and safety procedures
- Restricted access to authorized and trained personnel only
- Regular health and safety supervision during operations
- Emergency response plan with defined procedures
- Availability of spill kits, fire extinguishers, and first aid stations

- Regular emergency drills and staff training
- Immediate reporting and incident management system

7.4.2 Soil and Groundwater Contamination

Leakage or spillage of waste during collection, transportation, or storage may lead to soil contamination, surface contamination, and potential groundwater pollution, along with direct exposure risks to staff and nearby operational areas.

Mitigation Measures

- Use of sealed, leak-proof, puncture-resistant and clearly labeled containers
- Routine inspection of containers before movement
- Immediate spill containment and cleanup using spill kits
- Proper flooring and containment measures in Yellow Room

7.4.3 Chemical Reactions

Improper segregation or mixing of incompatible waste streams may result in dangerous chemical reactions, release of toxic or corrosive gases, heat generation, or even explosions, posing serious safety risks within the facility.

Mitigation Measures

- Strict segregation of waste at source (chemical, biological etc.)
- Use of color-coded bins and standardized labeling system
- Implementation of scanning/barcoding system for traceability
- Staff training on waste classification and compatibility
- Barcode/scanning system for all waste packages
- Proper digital and manual record keeping
- Chain-of-custody documentation from source to incineration
- Regular audits and record verification

7.4.4 Fire Hazard

Storage of flammable, reactive, or volatile waste in the Yellow Room may create conditions that could lead to fire outbreaks or explosion incidents, especially in the presence of ignition sources or poor ventilation.

Mitigation Measures

- Prohibition of ignition sources (no smoking/open flames in storage areas)
- Installation of fire extinguishers (CO₂ and dry powder types) at strategic locations
- Adequate ventilation in the Yellow Room
- Regular inspection and emergency preparedness drills

7.4.5 Improper segregation of waste

Mitigation Measures

- Segregate hazardous and non-hazardous waste at the point of generation.
- Use color-coded and clearly labeled waste containers.
- Train laboratory and housekeeping staff on waste segregation procedures.
- Conduct routine inspections to verify proper segregation.

7.4.6 Improper disposal of waste

Poor labeling, documentation, or tracking of waste may lead to loss of traceability, improper disposal of hazardous materials, regulatory non-compliance, and increased environmental risk.

Cross-contamination between different waste categories may reduce waste management efficiency and may lead to inappropriate treatment, reduced incineration efficiency, and increased environmental emissions during combustion.

Mitigation Measures

- Separate storage zones for different waste types within the Yellow Room
- Strict labeling and color-coding system
- Standard operating procedures for handling and transfer
- Supervision and compliance monitoring by the Environmental Officer

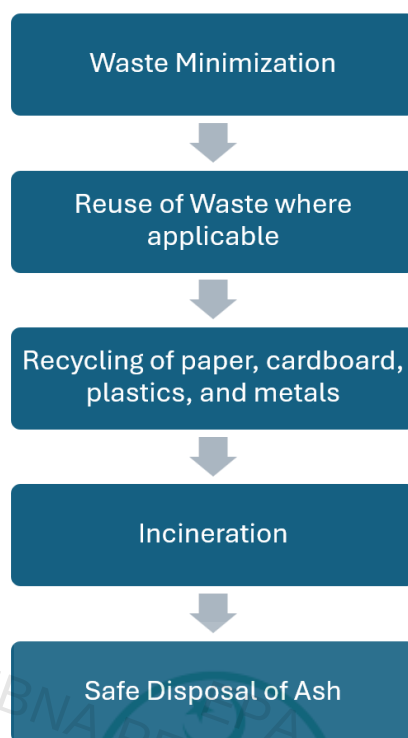


Figure 7-2: Waste Hierarchy

7.4.7 Pest Infection

Inadequate storage hygiene and prolonged waste accumulation may result in odor generation, microbial growth, pest infestation (rodents and insects), and unsanitary working conditions.

Mitigation Measures

- Regular cleaning and disinfection of the Yellow Room
- Use of airtight and sealed containers
- Routine waste evacuation to the incineration unit
- Implementation of pest control measures if required

7.5 IMPACTS DURING INSTALLATION PHASE

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

Table 7-2: Screening of Possible Impacts during the Installation Phase

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
<i>Dust emissions from site preparation, excavation, transportation of construction materials, and civil works leading to temporary deterioration of ambient air quality</i>	Likely	Moderate	Medium
<i>Noise and vibration generated from construction machinery, welding, cutting, and installation activities causing disturbance to workers and nearby receptors</i>	Likely	Moderate	Medium
<i>Occupational accidents such as falls, cuts, burns, crushing injuries, and electrocution during installation of the incinerator, chimney,</i>	Likely	Major	Medium

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
wet scrubber, and electrical systems			
Generation of construction waste, packaging materials, scrap metal, and debris causing visual impacts and improper waste disposal	Certain	Minor	Low
Fire hazards associated with welding, cutting operations, electrical installation, and storage of combustible materials	Unlikely	Moderate	Medium
Temporary visual impacts and deterioration of site aesthetics due to construction activities, equipment, and stockpiled materials	Certain	Minor	Low

7.5.1 Dust Generation and Deterioration of Air Quality

Site preparation, excavation, transportation of construction materials, and civil works may generate dust emissions, resulting in temporary deterioration of ambient air quality within the project area.

Dust may cause respiratory discomfort, eye irritation, and a nuisance to workers and nearby facility occupants.

Mitigation Measures

- Regular water sprinkling shall be carried out on exposed surfaces and unpaved areas.
- Construction materials shall be covered during transportation and storage.
- Construction debris shall be promptly removed from the site.
- Vehicle speeds within the project area shall be controlled to minimize dust generation

7.5.2 Noise Generation from Construction Activities

Installation activities involving machinery, welding equipment, cutting tools, and transportation vehicles may increase noise levels within the project area.

Elevated noise levels may cause temporary disturbance and discomfort to workers and nearby personnel.

Mitigation Measures

- Construction activities shall be restricted to normal daytime working hours.
- Equipment and machinery shall be regularly maintained to minimize excessive noise.
- Workers exposed to elevated noise levels shall be provided with hearing protection devices.
- Unnecessary idling of vehicles and machinery shall be avoided.

7.5.3 Occupational Health and Safety Risks

Installation activities involving heavy equipment, welding, electrical works, and lifting operations may expose workers to risks of injuries, burns, falls, and accidents.

Improper handling of tools and equipment may result in serious occupational incidents.

Mitigation Measures



- Appropriate PPE including helmets, gloves, safety shoes, eye protection, and safety harnesses shall be mandatory.
- Workers shall receive safety induction and toolbox training before commencement of work.
- Warning signs and restricted access barriers shall be installed around work areas.
- All lifting operations shall be supervised by competent personnel.

7.5.4 Slips, Trips, and Falls

Uneven surfaces, scattered materials, and ongoing construction activities may increase the risk of slips, trips, and falls, leading to worker injuries

Mitigation Measures

- Good housekeeping practices shall be maintained throughout the installation phase.
- Construction materials and equipment shall be stored in designated locations.
- Walkways and access routes shall remain free from obstructions.
- Adequate lighting shall be provided where necessary.

7.5.5 Generation of Construction Waste

Civil works and installation activities may generate construction debris, packaging materials, scrap metal, and other non-hazardous waste.

Improper disposal may cause visual impacts and site contamination.

Mitigation Measures

- Waste shall be segregated into recyclable and non-recyclable categories.
- Recyclable materials shall be recovered where feasible.
- Waste shall be collected and disposed of through approved waste management practices.
- Construction areas shall be cleaned regularly.

7.5.6 Soil Contamination from Fuel and Chemical Spills

Leakage of fuels, lubricants, paints, or chemicals from construction equipment may result in localized soil contamination.

Spills may affect site cleanliness and environmental quality.

Mitigation Measures

- Fuels and chemicals shall be stored in designated and secure locations.
- Spill kits shall be available at the site.
- Refueling and maintenance activities shall be carried out in designated areas.
- Any spills shall be immediately contained and cleaned according to established procedures.

7.5.7 Fire Hazards during Installation

- Welding, cutting operations, electrical installations, and temporary storage of combustible materials may increase the risk of fire incidents.
- Fire outbreaks may result in injuries, equipment damage, and project delays.

Mitigation Measures

- A hot work permit system shall be implemented for welding and cutting activities.
- Fire extinguishers shall be placed at strategic locations throughout the site.
- Combustible materials shall be stored away from ignition sources.
- Emergency response procedures shall be communicated to all workers.

7.5.8 Electrical Hazards

Installation of electrical systems, PLC panels, and power connections may expose workers to risks of electric shock, burns, and electrical accidents.

Mitigation Measures

- All electrical works shall be carried out by qualified electricians.
- Proper grounding and insulation of electrical systems shall be ensured.
- Lockout/tagout procedures shall be implemented during maintenance and installation.
- Electrical panels shall remain secured and accessible only to authorized personnel.

7.5.9 Increased Vehicle Movement and Traffic Risks

Transportation of equipment, construction materials, and machinery may temporarily increase vehicle movement within the facility.

Increased traffic may pose safety risks to workers and visitors.

Mitigation Measures

- Designated vehicle routes shall be established within the facility.
- Speed limits shall be enforced for all vehicles.
- Traffic warning signs and safety barriers shall be installed where required.
- Vehicle movements shall be supervised during loading and unloading operations.

7.5.10 Visual Disturbance and Temporary Site Aesthetic Impacts

The presence of construction equipment, stockpiled materials, and ongoing installation activities may temporarily affect the visual appearance of the project area.

Mitigation Measures

- Construction materials shall be stored in an organized manner.
- Waste and debris shall be removed regularly.
- The site shall be restored and cleaned immediately after completion of installation works.
- Landscaping activities proposed for the facility shall be implemented following project completion.

7.6 IMPACTS DURING OPERATIONAL PHASE

Table 7-3: Screening of Possible impacts during Operational Phase

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
<i>Air emissions from the incineration process affecting ambient air quality if combustion or pollution control systems are not properly operated</i>	Likely	Major	Medium
<i>Inadequate flue gas treatment due to malfunction of the wet scrubber, resulting in increased emissions</i>	Unlikely	Major	Medium

<i>and non-compliance with environmental standards</i>			
<i>Generation of wastewater from the wet scrubber causing potential contamination of soil or water resources if not properly treated</i>	Likely	Moderate	Medium
<i>Generation and improper handling or disposal of bottom ash and fly ash resulting in dust generation and potential soil contamination</i>	Likely	Major	Medium
<i>Occupational exposure to high temperatures, hazardous waste, combustion gases, and moving equipment causing burns, respiratory problems, or physical injuries</i>	Likely	Major	Medium
<i>Noise generated by burners, blowers, pumps, fans, and auxiliary equipment causing temporary disturbance to workers</i>	Certain	Minor	Low
<i>Odor generation from temporary waste storage or improper waste handling causing nuisance within the facility</i>	Likely	Minor	Low

7.6.1 Air Emissions from the Incineration Process

The combustion of wastes may generate air pollutants such as particulate matter (PM), nitrogen oxides (NO_x), sulfur oxides (SO_x), carbon monoxide (CO), volatile organic compounds (VOCs), acidic gases, and trace quantities of dioxins and furans if combustion is incomplete.

Poor combustion efficiency or equipment malfunction may result in visible smoke, unpleasant odors, and deterioration of ambient air quality.

Long-term exposure to uncontrolled emissions may adversely affect human health and the surrounding environment.

Mitigation Measures

- Operate the dual-chamber incinerator at the design temperatures of 850°C in the primary chamber and $\geq 1100^{\circ}\text{C}$ in the secondary chamber with a minimum gas retention time of 2 seconds.
- Ensure proper operation and regular maintenance of the burners, combustion chambers, and PLC control system.
- Continuously monitor combustion temperatures and operating parameters through the HMI/PLC system.
- Carry out periodic stack emission monitoring to ensure compliance with applicable environmental standards.

7.6.2 Flue Gas Emissions

Flue gases may contain particulate matter and acidic gases, which, if not adequately treated, may affect ambient air quality.

Inadequate operation of the wet scrubber may reduce pollution control efficiency.

Mitigation Measures

- Operate the wet scrubber continuously during incinerator operation.
- Maintain adequate scrubber water flow and ensure periodic replacement or treatment of scrubber water.
- Regularly inspect spray nozzles, pumps, ductwork, and chimney.
- Maintain the 15 m stack to ensure effective dispersion of treated gases.

7.6.3 Wastewater Generation from Wet Scrubber

The wet scrubber generates wastewater containing suspended solids, dissolved contaminants, and acidic compounds.

Improper disposal may contaminate soil, drains, and groundwater.

Mitigation Measures

- Collect all scrubber wastewater through a dedicated drainage system.
- Stabilize wastewater pH before treatment.
- Treat wastewater in the proposed wastewater treatment plant prior to discharge or reuse.
- Regularly monitor wastewater quality in accordance with regulatory requirements.

Ash Generation and Disposal

Incineration generates bottom ash and fine particulate residues, which may contain hazardous constituents.

Improper handling or disposal may cause dust generation and contamination of soil and surrounding areas.

Mitigation Measures

- Collect ash only after complete cooling.
- Store ash in covered, leak-proof containers or the designated ash pit.
- Workers handling ash shall wear appropriate PPE.
- Dispose of ash through an approved hazardous waste disposal facility in accordance with environmental regulations.

7.6.4 Occupational Health and Safety

Workers may be exposed to high temperatures, hazardous waste, combustion gases, moving mechanical parts, and electrical equipment.

Accidental exposure may result in burns, respiratory illness, chemical exposure, or physical injuries.

Mitigation Measures

- Mandatory use of PPE including gloves, respirators, face shields, heat-resistant clothing, and safety shoes.
- Provide routine health and safety training to all operational staff.

- Install warning signs, emergency exits, eyewash stations, and first-aid facilities.
- Conduct regular occupational health surveillance and emergency drills.

7.6.5 Fire and Explosion Hazards

Leakage of fuel, electrical faults, or improper waste loading may increase the risk of fire or explosion.

Fire incidents may damage equipment and threaten worker safety.

Mitigation Measures

- Install fire extinguishers, smoke detectors, and fire alarm systems at strategic locations.
- Regularly inspect fuel pipelines, burners, and electrical installations.
- Implement preventive maintenance schedules and emergency shutdown procedures.
- Conduct periodic fire safety drills and emergency response training.

7.6.6 Noise Generation

Operation of burners, blowers, pumps, fans, and auxiliary equipment may generate noise.

Continuous exposure may cause discomfort and hearing impairment among workers.

Mitigation Measures

- Maintain equipment to minimize excessive noise.
- Install vibration dampers and acoustic insulation where necessary.
- Provide hearing protection to workers in high-noise areas.
- Conduct periodic workplace noise monitoring.

7.6.7 Odor Generation

Improper storage or delayed incineration of waste may generate unpleasant odors.

Odor nuisance may affect workers and nearby occupants.

Mitigation Measures

- Store waste only in the designated Yellow Room.
- Ensure waste is incinerated promptly after collection.

- Keep waste containers tightly sealed.
- Maintain cleanliness and regular disinfection of the storage area.

7.6.8 Equipment Failure and Operational Malfunction

Failure of burners, thermocouples, PLC system, scrubber, or chimney may reduce combustion efficiency and increase emissions.

Operational downtime may interrupt waste management activities.

Mitigation Measures

- Implement preventive maintenance schedules.
- Calibrate temperature sensors and monitoring instruments regularly.
- Keep critical spare parts readily available.
- Immediately suspend operation if critical operating parameters fall outside acceptable limits.

CHAPTER # 8. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

The Environmental Management Plan (EMP) outlines the framework for managing, mitigating, and monitoring potential environmental impacts associated with the proposed incineration facility at the PAFDA, Lahore. It is an integral component of the EIA and provides practical measures to ensure that all phases of the project including design, installation, waste collection and transportation, and operation are conducted in an environmentally responsible and regulatory-compliant manner. This chapter describes the environmental management strategies and monitoring mechanisms required to minimize adverse impacts on air quality, water resources, soil, noise levels, occupational health and safety, and overall environmental performance. It also defines roles and responsibilities, monitoring indicators, reporting requirements, and corrective actions to ensure effective implementation of mitigation measures. The EMP further aims to support continuous environmental performance improvement and ensure that the project operates in accordance with applicable national environmental laws and best international practices.

8.1 OBJECTIVES OF EMMP

The EMP for the proposed incineration facility at the PAFDA is designed to ensure that all potential environmental and social impacts associated with the project are effectively managed, mitigated, and monitored throughout its lifecycle. The EMP provides a structured framework for implementing mitigation measures identified in the EIA and ensures environmentally responsible project execution.

The specific objectives of the EMP are to:

- Ensure compliance with applicable environmental laws, regulations, and standards governing hazardous waste management and incineration activities.
- Minimize adverse environmental impacts on air quality, water resources, soil, and surrounding ecological and human environments.
- Establish clear roles and responsibilities for environmental management during the installation, waste handling, transportation, and operational phases of the project.

- Implement effective mitigation measures to control emissions, wastewater discharge, noise, and solid waste generation.
- Ensure safe handling, storage, and disposal of hazardous, chemical, biological, and laboratory wastes.
- Promote occupational health and safety by reducing exposure risks for workers and operators through proper procedures and use of PPE.
- Establish a monitoring and reporting system to track environmental performance and ensure continuous compliance.
- Provide a framework for emergency preparedness and response in case of accidental spills, fire incidents, or equipment failure.
- Facilitate continuous improvement in environmental performance through regular audits, inspections, and corrective actions.
- These objectives collectively ensure that the proposed project operates in an environmentally sustainable, safe, and regulatory-compliant manner.

8.2 ROLES AND RESPONSIBILITIES

Table 8-1: Roles and Responsibilities

Designation	Responsibilities
<i>Project Director / Head of PAFDA</i>	Overall supervision of EMP implementation, ensuring regulatory compliance and allocation of necessary resources for environmental management.
<i>Environmental Officer / HSE Officer</i>	Implementation of EMP, monitoring environmental performance, maintaining records, conducting inspections, and ensuring compliance with EIA/EMP requirements.
<i>Incinerator Operator</i>	Safe operation of the incinerator, maintaining operating temperatures, monitoring the control panel (PLC/HMI), and ensuring proper handling of waste during incineration.
<i>Waste Management Supervisor</i>	Supervision of waste collection, segregation, scanning, storage in Yellow Room, and controlled transfer to the incinerator.

<i>Laboratory Coordinator</i>	Coordination with laboratories for safe packaging, labelling, and transfer of waste to ensure proper documentation and traceability.
<i>Maintenance Engineer</i>	Routine inspection and maintenance of the incinerator, wet scrubber, chimney, and auxiliary systems to ensure uninterrupted and safe operation.
<i>Health & Safety Officer</i>	Implementation of occupational health and safety measures, provision of PPE, safety training, and emergency response preparedness.

8.3 ENVIRONMENTAL MANAGEMENT DURING DESIGN RELATED PHASE

During the design phase, environmental considerations are integrated into the planning and engineering of the incineration facility to ensure compliance with environmental standards and minimize potential impacts. This includes the selection of appropriate technology (dual-chamber incinerator with flue gas treatment), proper layout design to ensure safe separation of waste handling, storage, and operational areas, and incorporation of pollution control systems such as wet scrubbers and wastewater treatment connections. The design also ensures adequate stack height, controlled airflow systems, and safe access for operators. In addition, health and safety provisions, fire protection systems, and secure waste handling infrastructure such as the Yellow Room are incorporated at the design stage to reduce operational risks and ensure long-term environmental sustainability.

8.4 ENVIRONMENTAL MANAGEMENT DURING INSTALLATION PHASE

During the installation phase, environmental management focuses on minimizing temporary impacts associated with construction and equipment setup activities. Dust generation, noise, and minor construction waste are controlled through good housekeeping practices, water sprinkling, proper waste disposal, and time-restricted activities. Occupational health and safety measures, including the use of personal protective equipment (PPE), are implemented for all workers involved in installation works. Care is taken to prevent accidental spills, ensure safe handling of equipment, and avoid disturbance to ongoing institutional activities within PAFDA premises. Proper supervision is maintained to ensure that installation activities are carried out in accordance with design specifications and environmental requirements.

8.5 ENVIRONMENTAL MANAGEMENT PLAN DURING COLLECTION AND TRANSPORTATION OF WASTE

During the collection and transportation phase, environmental management measures are implemented to ensure safe handling and movement of hazardous laboratory waste from source laboratories to the incineration facility. Waste is properly segregated, labeled, and sealed in appropriate containers to prevent leakage or exposure. A scanning and documentation system is used to ensure traceability and accountability of all waste streams. Trained personnel handle transportation using designated routes within the facility to minimize risks of spillage, odor, or exposure. Emergency response measures, including spill kits and PPE, are made available to address accidental releases. Strict adherence to occupational health and safety protocols is ensured throughout the process.

8.6 ENVIRONMENTAL MANAGEMENT PLAN DURING OPERATIONAL PHASE

During the operational phase, environmental management focuses on the safe and efficient operation of the incinerator and associated systems to ensure compliance with environmental standards. Continuous monitoring of combustion conditions, emissions, and system performance is carried out through the PLC-based control system and HMI interface. Air pollution control is ensured through high-temperature dual-chamber combustion and wet scrubber treatment, while wastewater from scrubbing is treated in the existing WWTP after pH stabilization. Fly ash and bottom ash are safely collected and disposed of in designated facilities. Regular maintenance, operator training, and implementation of safety protocols are conducted to minimize risks and ensure sustainable, environmentally compliant operation of the facility.

Table 8-2: Environmental Management Plan for Installation Phase

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Installation Phase				
1	Site preparation and civil works resulting in dust generation	Regular water sprinkling on exposed surfaces. Covering of construction materials Proper housekeeping. Prompt removal of debris. Limiting vehicle speed within the site.	Contractor	EHS Officer
2	Noise and vibration from construction equipment and installation activities	Restrict noisy activities to daytime hours. Ensure proper maintenance of machinery. Avoid unnecessary idling of equipment. Provide hearing protection to workers where required.	Contractor	EHS Officer
3	Generation of construction waste, packaging material, and scrap metal	Collect and store waste in designated areas.	Contractor	EHS Officer

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
4	Occupational health and safety risks during the installation of the incinerator, chimney, scrubber, and electrical systems	Mandatory use of PPE (helmets, gloves, safety shoes, eye protection, masks, harnesses) Ensure toolbox talks, safety training, and restricted access to work zones. Placement of warning signs.	Contractor	EHS Officer
5	Accidental fuel, lubricant, paint, or chemical spills	Store fuels and chemicals in designated areas. Provide spill kits Train workers in spill response procedures; immediately contain and clean spills; Prohibit discharge to drains or soil.	Contractor	EHS Officer
6	Electrical hazards during installation of PLC panels, wiring, and equipment commissioning	Ensure installation by qualified electricians; proper grounding and insulation of electrical systems. Lock-out/tag-out procedures during maintenance. Provision of fire extinguishers near electrical installations.	Contractor	EHS Officer

Environmental Impact Assessment (EIA) Report
Installation of Incinerator
Thokar Niaz Baig, District Lahore

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
7	Fire hazards associated with welding, cutting, and hot work activities	Implement hot work permit system. Maintain fire extinguishers at work locations. Remove combustible materials from work areas. Provide fire safety training and emergency response procedures. Display safety signage.	Contractor	EHS Officer

Table 8-3: Environmental Management Plan for the Collection and Transportation of Waste

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Collection and Transportation of Waste				
1	Improper segregation and packaging of laboratory waste	Ensure waste is segregated at source according to its category. Collect general waste separately from hazardous waste. Train laboratory and housekeeping staff on waste segregation procedures. Use color-coded bags. Use leak-proof, puncture-resistant containers and sealed bags. Maintain waste identification records and scanning documentation.	Waste Management Supervisor	EHS Officer
2	Leakage, spillage, or accidental release of waste during collection and transportation	Use sealed containers and secure packaging. Inspect containers before movement. Maintain spill response kits at collection and transportation points.	Waste Management Supervisor	EHS Officer

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Immediately contain and clean any accidental spill using approved procedures.		
3	Occupational exposure of workers to hazardous substances	Workers handling only non-hazardous waste require basic PPE (gloves, safety shoes, masks as needed). Workers handling hazardous waste require enhanced PPE, including chemical-resistant gloves, respirators (where necessary), protective clothing, and eye protection. Provide regular training on safe handling procedures and emergency response measures	Waste Management Supervisor	EHS Officer
4	Improper handling and manual lifting injuries	Use suitable trolleys, carts, and handling equipment for waste movement. Train personnel in proper lifting techniques and safe handling practices. Avoid overloading containers and transport equipment.	Waste Handling Personnel	EHS Officer

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
5	Unauthorized access, theft, or loss of waste during transportation	Implement a barcode/scanning and tracking system for all waste packages. Maintain transportation records and chain-of-custody documentation. Restrict access to authorized personnel only.	Waste Management Supervisor	EHS Officer
6	Generation of odors and nuisance conditions during waste storage and movement	Ensure timely collection and transportation of waste to the Yellow Room. Keep waste containers properly sealed and maintain good housekeeping practices. Regularly clean collection and transport equipment.	Waste Management Supervisor	EHS Officer
7	Emergency incidents such as spills, fire, or exposure during transportation	Establish emergency response procedures, provide spill kits and fire extinguishers, display emergency contact information, and conduct periodic emergency response drills. Ensure personnel are trained in incident reporting and response actions.	Waste Management Supervisor	EHS Officer

Table 8-4: Environmental Management Plan for Operational Phase

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	Monitoring
Operational Phase				
1	Air emissions from the incineration process	Operate dual-chamber incinerator at 850°C – 1100°C to ensure complete combustion. Regular inspection and maintenance of burners and combustion chambers.	Incinerator Operator	EHS Officer
2	Flue gas emissions and air pollution	Install and operate a wet scrubber system for the removal of particulate matter and acidic gases. Ensure a 15 m high chimney for proper dispersion of treated gases. Conduct periodic stack emission monitoring.	Incinerator Operator	EHS Officer
3	Generation and disposal of ash (bottom ash and fly ash)	Collect ash in a designated 8×8 ft ash pit with impermeable lining. Store ash in sealed containers to prevent dust dispersion. Dispose of ash through landfilling.	Incinerator Operator	EHS Officer

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
4	Wastewater from the wet scrubber system	Treat scrubber effluent in the existing WWTP before discharge. Apply pH stabilization using caustic soda before treatment. Prevent direct discharge of untreated effluent.	WWTP Operator	EHS Officer
5	Occupational health and safety risks	Mandatory use of PPE for all operators and maintenance staff. Regular safety training and emergency response drills. Installation of safety signage and restricted access zones.	Incinerator Operator	EHS Officer
6	Fire hazards and equipment malfunction	Install fire extinguishers at key locations (incinerator, control room, Yellow Room). Conduct routine inspection of electrical systems and burners. Maintain emergency shutdown procedures and alarm systems.	Incinerator Operator	EHS Officer

Environmental Impact Assessment (EIA) Report
Installation of Incinerator
Thokar Niaz Baig, District Lahore

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
7	Noise, odor, and nuisance impacts	Ensure proper sealing of waste handling areas (Yellow Room). Maintain equipment to minimize vibration and noise generation. Regular cleaning and housekeeping to prevent odor buildup.	Incinerator Operator	EHS Officer

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8.7 ENVIRONMENTAL MONITORING PROGRAM

The Environmental Monitoring Program is designed to ensure continuous assessment of the environmental performance of the proposed incineration facility at PAFDA. The program aims to verify the effectiveness of mitigation measures, ensure compliance with environmental standards, and identify any potential adverse environmental impacts at an early stage. It also provides a mechanism for corrective action and continuous improvement in environmental performance throughout the operational life of the project.

8.7.1 Aim

- To monitor key environmental parameters during installation, waste handling, and operational phases to ensure compliance with environmental regulations.
- To evaluate the effectiveness of pollution control measures such as the dual-chamber incinerator, wet scrubber system, and wastewater treatment processes.
- To ensure protection of human health, occupational safety, and surrounding environmental resources including air, water, and soil.
- To provide a systematic basis for early detection of environmental issues and implementation of corrective actions.

8.8 ENVIRONMENT MANAGEMENT TEAM

Table 8-5: Environmental Management Team

Sr. No.	Personal	Responsibilities
1	Project Director / Head of PAFDA	Overall supervision and decision-making authority for environmental compliance.
2	EHS Officer	Implementation of EMP, environmental monitoring, reporting, and compliance verification.
3	Incinerator Operator	Day-to-day operation of incinerator and monitoring of combustion parameters.
4	Maintenance Engineer	Maintenance of incineration system, scrubber, chimney, and supporting equipment.

Sr. No.	Personal	Responsibilities
5	Waste Management Supervisor	Supervision of waste collection, storage (Yellow Room), and transportation activities.

8.9 MONITORING PARAMETERS AND FREQUENCY

Table 8-6: Environmental Monitoring Plan

Environmental Component	Monitoring Parameters	Monitoring Frequency	Responsibility
<i>Ambient Air Quality</i>	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , VOCs	Quarterly	Environmental / EHS Manager
<i>Noise Levels</i>	dB(A)	Quarterly	Environmental / EHS Manager
<i>Wastewater Quality</i>	COD, BOD, TDS and TSS	Quarterly	Environmental / EHS Manager
<i>Solid & Hazardous Waste</i>	Waste type, quantity, disposal method	Monthly (Internal Inspection)	EHS Manager
<i>Groundwater</i>	----	Annually	Environmental / Maintenance Team
<i>Occupational Health & Safety</i>	PPE usage, exposure to noise and vapors	Monthly (Internal Inspection)	EHS Manager
<i>Emergency & Spill Response</i>	Availability and condition of spill kits, firefighting systems	Monthly (Internal Inspection)	EHS Manager

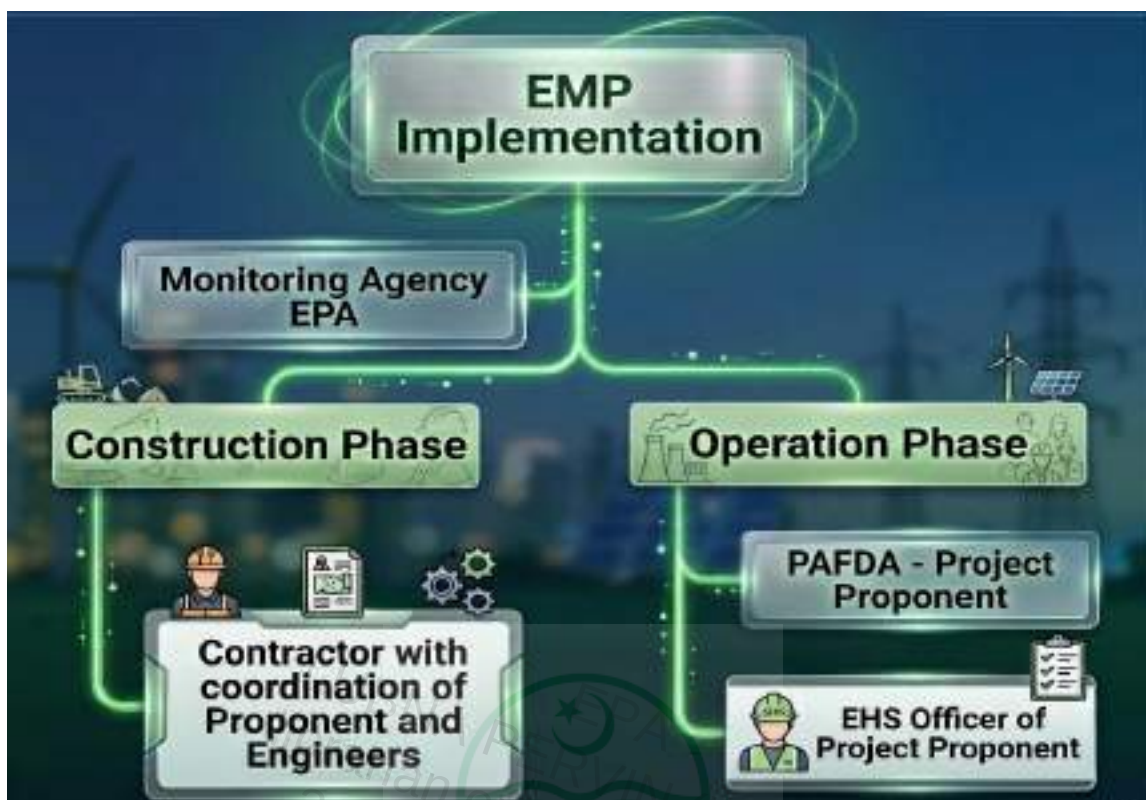


Figure 8-1: Organogram for Implementation of the Environmental Management Plan (EMP)

8.10 ENVIRONMENTAL POLICY

The environmental policy for the proposed incineration facility by PAFDA is committed to ensuring environmentally sound, safe, and regulatory-compliant management of hazardous, chemical, biological, and laboratory waste. The project will comply with all applicable national environmental laws and guidelines and will adopt best available practices for pollution prevention and control. The policy emphasizes the minimization of environmental impacts on air, water, and soil through the use of a dual-chamber incinerator, wet scrubber system, proper ash management, and wastewater treatment. It also promotes occupational health and safety, continuous environmental monitoring, emergency preparedness, and continuous improvement in environmental performance.

8.11 EQUIPMENT MAINTENANCE DETAILS

Regular maintenance of the incineration facility is essential to ensure safe and efficient operation. The incinerator, including primary and secondary combustion chambers, burners, and refractory lining, will be inspected routinely for wear, damage, and operational efficiency. The wet scrubber

system will be cleaned and checked for proper spray nozzle function, pump efficiency, and removal performance. The chimney stack will be inspected for blockage and structural integrity, while the PLC control system and sensors (thermocouples, alarms, and HMI) will be calibrated periodically. Preventive maintenance schedules will be followed to avoid breakdowns, ensure optimal combustion conditions, and minimize emissions. All maintenance activities will be properly recorded for monitoring and compliance purposes.

8.12 TRAINING NEEDS

Training is a key requirement for the safe and effective operation of the incineration facility. Staff will be trained in safe handling of hazardous waste, operation of the incinerator and control systems, use of PPE, and emergency response procedures. Specialized training will also be provided on fire safety, spill management, waste segregation, and operation of the wet scrubber and wastewater treatment systems. Operators and maintenance staff will receive technical training on PLC-based control systems and equipment troubleshooting. Regular refresher training will be conducted to ensure continuous awareness and skill enhancement.

8.13 TRAINING SCHEDULES

Training activities will be conducted on a structured and continuous basis to ensure all personnel remain competent and aware of environmental and safety requirements. Initial induction training will be provided to all staff prior to project commissioning, covering basic safety procedures, waste handling protocols, and emergency response. Operational training sessions will be conducted quarterly for incinerator operators and maintenance staff. Health and safety refresher training will be held biannually, while emergency drills such as fire and spill response exercises will be conducted at least twice a year. Additional training sessions will be arranged whenever new equipment is installed or operational procedures are updated.

Table 8-7: Training Schedules

Training Module	Target Audience	Frequency	Duration	Responsible Personnel
<i>Hazardous Waste Handling & Safety Procedures</i>	Waste handlers, laboratory staff, transport personnel	Quarterly	3–4 hours	Waste Management Supervisor / EHS Officer
<i>Incinerator Operation & PLC Control System Training</i>	Incinerator operators and maintenance engineers	Quarterly/refreshers	1–2 days	Equipment Supplier / Maintenance Engineer
<i>Fire Safety & Emergency Response Training</i>	All operational staff	Biannually	1 day	EHS Officer / Fire Safety Team
<i>PPE Usage & Occupational Health Safety Training</i>	All site workers and contractors	Quarterly	2–3 hours	EHS Officer
<i>Spill Prevention & Response Training</i>	Waste handlers and transport staff	Biannually	3–4 hours	Environmental Officer / EHS Officer
<i>Environmental Monitoring & Compliance Reporting Training</i>	Environmental staff and supervisors	Annually	1 day	Environmental Officer / External Consultant

8.14 EMERGENCY RESPONSE & DISASTER MANAGEMENT PLAN

Emergency Scenarios Identified

- Fire or explosion
- Chemical spill or leak

- ETP malfunction
- Power failure
- Medical emergency
- Response Measures
- Installation of fire detection and firefighting systems
- Clearly marked emergency exits and evacuation routes
- Spill containment kits and trained response teams
- Emergency shutdown procedures
- Coordination with local emergency services
- Regular emergency drills and mock exercises

An Emergency Response Team (ERT) will be established with clearly defined roles and responsibilities.

8.15 ENVIRONMENTAL BUDGET

Table 8-8: Environmental Budget

Component	Estimated Cost (PKR)	Remarks
<i>Environmental Monitoring Equipment</i>	220,000	Air, water, and noise monitoring.
<i>Tree Plantation</i>	90,000	Planting native species and buffer zones.
<i>Health & Safety Trainings</i>	120,000	Capacity building for on-site staff.
<i>Waste Management and Disposal</i>	180,000	Proper handling and recycling.
<i>Provision of PPEs</i>	145,704	PPEs for Workers
<i>Fire Safety Arrangements</i>	130,000	Fire arrangements

CHAPTER # 9. OCCUPATIONAL HEALTH AND SAFETY PLAN

The OHS Plan has been developed for the proposed incineration facility at the PAFDA to ensure a safe and healthy working environment for all personnel involved in installation, operation, maintenance, and waste handling activities. The plan provides a structured framework for identifying occupational hazards, assessing associated risks, and implementing effective control and preventive measures to minimize accidents, injuries, and health impacts. Given the nature of hazardous waste management and incineration processes, workers may be exposed to risks such as chemical exposure, fire hazards, high temperatures, mechanical injuries, and emissions-related health effects. Therefore, this OHS Plan establishes standard operating procedures, personal protective equipment requirements, training needs, emergency preparedness measures, and monitoring mechanisms to ensure compliance with national occupational safety standards and international best practices. The ultimate objective of this plan is to safeguard human health, enhance workplace safety, and promote a culture of risk prevention and continuous improvement throughout the project lifecycle.

9.1 OBJECTIVES OF OCCUPATIONAL HEALTH AND SAFETY PLAN

- To ensure a safe, healthy, and risk-controlled working environment for all personnel involved in installation, operation, maintenance, and waste handling activities at the incineration facility.
- To identify, assess, and control occupational hazards associated with hazardous waste handling, incineration processes, mechanical operations, electrical systems, and chemical exposure.
- To prevent occupational injuries, illnesses, fatalities, and incidents through the implementation of effective preventive and protective measures.
- To establish standardized safe work procedures (SOPs) for all operational activities, including waste collection, transportation, incineration, ash handling, and equipment maintenance.
- To ensure the proper use of personal protective equipment (PPE) by all workers and enforce compliance with safety requirements at all times.
- To minimize risks related to fire, explosion, toxic exposure, heat stress, and mechanical hazards through engineering and administrative controls.

- To develop and implement emergency preparedness and response procedures for incidents such as fire outbreaks, chemical spills, equipment failure, and accidental exposure.
- To provide regular training and capacity building for all staff on occupational health and safety practices, hazard awareness, and emergency response.
- To ensure compliance with applicable national occupational health and safety regulations and relevant international best practices and guidelines.
- To establish monitoring, reporting, and documentation systems for occupational incidents, near-misses, and corrective actions to support continuous improvement.
- To promote a culture of safety awareness, responsibility, and accountability among all employees and contractors working at the facility.

9.2 POTENTIAL IMPACTS

The implementation of incineration and associated waste management activities at the PAFDA facility may result in several occupational health and safety impacts if not properly managed. These impacts are mainly related to the handling of hazardous materials, operation of high-temperature equipment, and use of mechanical and electrical systems.

- Workers may be exposed to hazardous, chemical, and biological waste, leading to health effects such as skin irritation, respiratory problems, infections, or long-term toxicity.
- Operation of the incinerator may expose staff to high temperatures and thermal radiation, potentially causing heat stress, burns, and dehydration.
- Emissions and fugitive gases during operation may result in inhalation of toxic pollutants, affecting respiratory health if control systems are not properly maintained.
- Handling of ash and residues may cause dust exposure and contamination, leading to respiratory and dermal health risks.
- Use of mechanical equipment, lifting devices, and transport tools may result in physical injuries such as cuts, fractures, sprains, and musculoskeletal disorders.
- Electrical installations, including PLC panels and control systems, may pose risks of electric shock, short circuits, and electrical burns.
- Fire and explosion hazards may arise due to fuel leakage, flammable waste, or equipment malfunction, posing severe safety risks to workers.

- Accidental spills or leaks of hazardous waste may result in chemical burns, poisoning, or acute exposure incidents.
- Noise generated from machinery such as burners, blowers, and pumps may lead to hearing impairment and long-term noise-induced health effects.
- Poor housekeeping or unsafe practices may increase the likelihood of slips, trips, and falls, resulting in minor to serious injuries.
- Inadequate emergency preparedness may lead to delayed response during accidents, increasing the severity of injuries and environmental damage.

9.3 MITIGATION MEASURES

To prevent occupational hazards and minimize risks associated with the incineration facility, the following mitigation measures will be implemented throughout the installation, operational, and waste handling phases:

- Mandatory use of Personal Protective Equipment (PPE) including gloves, masks/respirators, safety goggles, helmets, protective clothing, and safety shoes for all workers.
- Implementation of standard operating procedures (SOPs) for all activities including waste handling, incinerator operation, ash management, maintenance, and transportation.
- Regular occupational health and safety training for all staff on hazard awareness, safe handling of waste, equipment operation, and emergency response.
- Installation of fire safety systems including fire extinguishers, smoke detectors, fire alarms, and clearly marked emergency exits.
- Strict enforcement of hot work permits for welding, cutting, and other high-risk activities.
- Provision of first aid facilities, eyewash stations, and emergency showers within the facility.
- Regular maintenance and inspection of equipment including incinerator, PLC system, burners, electrical installations, and wet scrubber to prevent failures and accidents.
- Proper waste segregation, labeling, and secure storage in the Yellow Room to avoid exposure and cross-contamination.
- Implementation of engineering controls such as ventilation systems, temperature control, and enclosed handling systems to reduce exposure risks.

- Safe handling and disposal of ash using sealed containers and designated ash pits to prevent dust exposure and contamination.
- Establishment of restricted access zones and clear warning signage in hazardous areas.
- Development and implementation of a comprehensive emergency response plan including fire, spill, explosion, and exposure incidents.
- Conduct of regular safety drills and mock exercises to ensure preparedness for emergencies.
- Enforcement of proper housekeeping practices to prevent slips, trips, falls, and general workplace hazards.
- Continuous occupational health monitoring and medical checkups for workers exposed to hazardous materials.
- Appointment of dedicated HSE personnel responsible for monitoring compliance, reporting incidents, and ensuring implementation of safety measures.

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Table 9-1: Personal Protective Equipment

Activity / Step	Hazard Type	Required PPE	Purpose of PPE
<i>Waste collection at source (laboratories)</i>	Exposure to chemical, and biological,	Gloves, lab coat/gown, face mask, safety goggles, closed shoes	Prevent direct contact, inhalation exposure, and splash injuries
<i>Transportation of waste</i>	Spillage, leakage, manual handling injuries	Heavy-duty gloves, safety shoes, reflective vest, face mask	Protection from contamination, physical injury, and improved visibility
<i>Waste storage (Yellow Room) handling</i>	Exposure to mixed hazardous waste, odor, spills	Chemical-resistant gloves, respirator mask, goggles, protective coverall, safety shoes	Prevent inhalation, skin contact, and chemical exposure
<i>Incinerator operation</i>	High temperature, toxic emissions, mechanical hazards	Heat-resistant gloves, flame-retardant clothing, safety helmet, face shield, safety shoes	Protection from burns, heat stress, and accidental contact with hot surfaces
<i>Ash handling and disposal</i>	Dust exposure, toxic residues	Dust mask/respirator, gloves, goggles, coverall, safety shoes	Prevent inhalation of ash particles and skin exposure
<i>Maintenance of incinerator and electrical systems</i>	Electrical shock, mechanical hazards, hot surfaces	Insulated gloves, safety helmet, safety goggles, safety harness (if height work), protective clothing	Protection from electrical hazards, falls, and mechanical injuries
<i>Wet scrubber and wastewater handling</i>	Chemical exposure, corrosive liquids	Chemical-resistant gloves, rubber boots, goggles, apron, face shield	Protection from corrosive liquids and splashes

Activity / Step	Hazard Type	Required PPE	Purpose of PPE
<i>Emergency response (spill/fire incidents)</i>	Chemical exposure, fire, smoke	Full-body protective suit, respirator mask, gloves, helmet, fire-resistant clothing	Protection during high-risk emergency situations
<i>Fire safety operations</i>	Heat, flame, smoke exposure	Fire-resistant suit, helmet, gloves, safety boots, respirator	Protection from burns and smoke inhalation
<i>General site movement and supervision</i>	Minor physical hazards, dust	Safety shoes, helmet, basic mask	Basic protection from slips, dust, and minor impacts

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CHAPTER # 10. STAKEHOLDER CONSULTATION

Stakeholder consultation is a key component of the Environmental Impact Assessment (EIA) process and plays a vital role in ensuring environmentally sustainable and socially responsible project development. For the proposed project, stakeholder consultation was conducted to engage relevant stakeholders, including local communities, workers, nearby businesses, and concerned authorities. The process aimed to share information about the project, identify potential environmental and social concerns, and incorporate stakeholder feedback into project planning and mitigation measures. This consultative approach supports transparency, informed decision-making, and compliance with national environmental regulations as well as international best practices, thereby enhancing the overall acceptability and sustainability of the project.

10.1 OBJECTIVES OF STAKEHOLDER CONSULTATION

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

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

In line with the principles of Agenda 21 and national environmental regulations, stakeholder consultation for the proposed project was undertaken with the following objectives:

- To inform stakeholders about the nature, scope, and potential environmental and social impacts of the proposed project
- To identify concerns, expectations, and perceptions of affected communities and relevant stakeholders at an early stage
- To incorporate stakeholder feedback into project planning, design, and mitigation measures where feasible
- To promote transparency, trust, and accountability between the project proponent and local communities

- To ensure compliance with environmental legislation and international best practices related to public participation
- To reduce potential conflicts by fostering mutual understanding and cooperation
- To enhance the project's environmental and social sustainability through inclusive decision-making

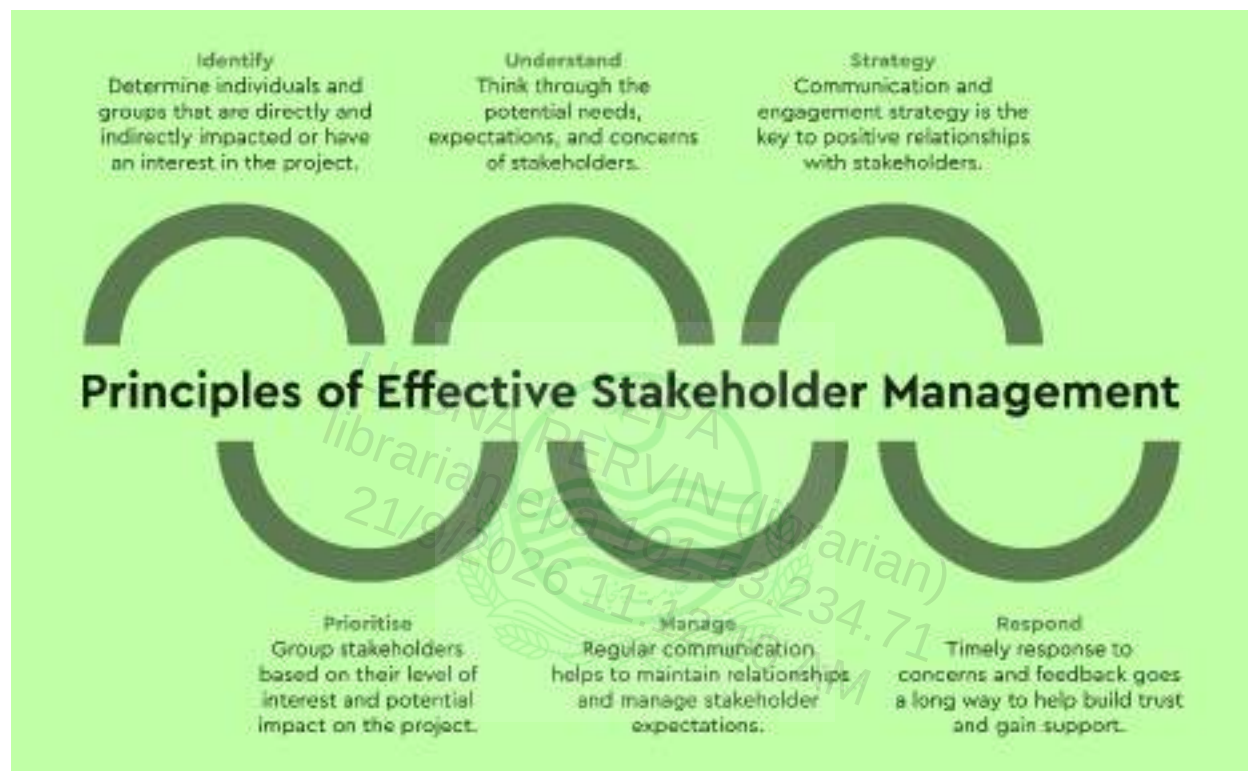


Figure 10-1: Stakeholder Management

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

10.2 METHODOLOGY

1. Meetings were held with key representatives of PAFDA's management and government regulatory authorities.
2. Structured interviews were used to collect specific concerns and suggestions from stakeholders.

3. All comments, concerns, and suggestions were recorded and analyzed to inform project planning and mitigation strategies.

10.3 THE RESPONSIBLE AUTHORITY

Table 10-1: Stakeholders and Their Roles and Responsibilities

Stakeholders	Roles
<i>Proponent/Responsible Authority</i>	Engaged in discussions regarding the project's design, proposed mitigation measures, and alternative options to minimize environmental, social, and operational disparities. The proponent conducted site surveys to collect environmental and social data, assessed perspectives of nearby industrial employees, and evaluated potential socio-economic and environmental impacts of the project.

10.4 ENVIRONMENTAL PRACTITIONERS AND EXPERTS

The team carried out systematic site visits to assess existing environmental conditions, including soil, water, air quality, vegetation, and fauna. They also evaluated the land use, infrastructure, and surrounding industrial activities to understand the operational context of the project.

In addition, the experts conducted structured consultations with key stakeholders, including the proponent, government authorities, and employees of nearby industrial units, to gather information on perceived environmental, social, and occupational concerns. These consultations helped in identifying potential risks, opportunities for mitigation, and strategies to minimize adverse impacts during both the construction and operational phases.

The findings from the field surveys and stakeholder consultations were analyzed and integrated into the EMP, ensuring that the project design incorporates effective measures to protect the environment, safeguard worker health and safety, and comply with PEQS regulations.



Figure 10-2: Pictorial Evidence of Stakeholder Consultation

CHAPTER # 11. GRIEVANCE REDRESS MECHANISM

The Grievance Redress Mechanism (GRM) is an essential component of the project's EIA. It provides a formal, transparent, and accessible process for addressing complaints, concerns, or suggestions from stakeholders, including local communities, workers, contractors, and other interested parties. The GRM ensures that any issues arising during the construction or operational phases of the project are identified, recorded, and resolved in a timely and effective manner.

11.1 KEY FEATURES OF GRM

- Stakeholders can submit grievances through multiple channels, including in-person at the project office, email, telephone, or suggestion boxes placed within the facility.
- All grievances are recorded in a grievance register, including details of the complainant, nature of the grievance, and date of submission.
- Each grievance is acknowledged within a predefined time frame (e.g., 5 working days) to inform the complainant that their concern has been received.
- Grievances are investigated promptly by the project management team, in coordination with relevant departments, and appropriate corrective measures are implemented.
- Stakeholders are informed of the resolution and any action taken. If the grievance requires further escalation, it can be referred to higher management or local authorities.
- The GRM process is monitored regularly, and periodic summaries of grievances and resolutions are included in project environmental and social monitoring reports.

11.2 OBJECTIVES OF GRIEVANCE REDRESS MECHANISM

The GRM is designed to ensure that all concerns, complaints, and suggestions from stakeholders related to the project are addressed in a timely, transparent, and effective manner. The main objectives of the GRM are:

- Provide a structured platform for stakeholders, including local communities, employees, contractors, and visitors, to voice grievances related to project activities.
- Ensure timely acknowledgment and resolution of complaints to minimize potential environmental, social, and operational impacts.

- Promote transparency and accountability in project management by maintaining proper records of all grievances and their outcomes.
- Strengthen stakeholder trust and engagement by demonstrating responsiveness to concerns and proactive problem-solving.
- Support compliance with national and international environmental, social, and occupational health standards, ensuring sustainable and responsible project implementation.

11.3 MECHANISM OF FILING COMPLAINT

To ensure that all stakeholders can easily and effectively submit grievances, the project has established multiple accessible channels for complaint submission. The mechanism is designed to be simple, transparent, and responsive to address issues in a timely manner.

Stakeholders may file complaints through the following channels:

- Written complaints submitted at the project site or administrative office
- Verbal complaints communicated directly to site management or designated grievance focal persons
- Telephone or mobile contact numbers displayed at prominent locations within the project site
- Email communication, where applicable, for documented submission and follow-up
- Suggestion or complaint register maintained at the project site for record-keeping

Upon receipt, each complaint will be formally recorded in a grievance log, including details of the complainant, the nature of the issue, and the date of submission. The complaint will be reviewed by the designated Grievance Redress Committee (GRC), which will assess the issue and determine appropriate corrective actions.

11.4 ROLES AND RESPONSIBILITIES

Table 11-1: Roles and Responsibilities

PAFDA's Management / Proponent	Responsible for receiving, documenting, and tracking all grievances and ensuring their resolution within specified timelines.
GRM Officer / Committee	Evaluates grievances, coordinates with relevant departments, and ensures timely resolution.
Stakeholders	Provide clear information about the grievance and cooperate during the resolution process.

11.4.1 Grievance Resolution Procedure

The grievance resolution procedure has been established to ensure that all complaints received from stakeholders are addressed in a fair, transparent, and timely manner. The procedure follows a structured approach to promote effective communication and accountability throughout the grievance handling process.

- All grievances received through verbal, written, telephone, or electronic means will be formally recorded in the grievance register, noting the date, nature of the complaint, and contact details of the complainant (if provided).
- An acknowledgment of receipt will be communicated to the complainant within a specified timeframe, confirming that the grievance has been registered for review.
- The GRC will review the complaint to assess its nature, severity, and potential environmental or social implications, and determine the appropriate course of action.
- Where required, site inspections, consultations, or internal reviews will be conducted to investigate the issue and identify corrective or preventive measures.
- Based on the findings, appropriate corrective actions will be implemented in a timely manner to resolve the grievance and prevent recurrence.
- The outcome of the grievance, along with actions taken, will be communicated to the complainant through the appropriate channel.

- Follow-up will be carried out to verify the effectiveness of the resolution. Once the complainant confirms satisfaction or reasonable efforts have been made to resolve the issue, the grievance will be formally closed and documented.
- If a grievance remains unresolved, it may be escalated to higher management or relevant regulatory authorities for further review.



Figure 11-1: Grievance Redress Mechanism

CHAPTER # 12. CONCLUSION AND RECOMMENDATION

The EIA for the proposed project indicates that the project is environmentally and socially feasible. The site is barren land with minimal ecological or cultural significance, and the project is fully compatible with existing industrial land use. Baseline studies show that air, water, noise, and soil conditions are within acceptable limits, and no endangered species, protected habitats, or archaeological sites are present.

With the implementation of recommended mitigation measures during construction and operational phases, including dust and noise control, waste management, wastewater treatment, green belt development, and adherence to occupational health and safety standards, the project is expected to have minimal adverse environmental or social impacts.

Recommendations:

- Implement the Environmental Management Plan (EMP) fully, including monitoring of air, water, soil, noise, and occupational health parameters.
- Maintain the Grievance Redress Mechanism (GRM) to ensure timely resolution of stakeholder concerns and promote transparent communication.
- Develop green belts and landscaping within the facility to restore minor ecological functions and improve aesthetics.
- Ensure proper storage, handling, and disposal of industrial waste and chemicals to prevent contamination of soil and groundwater.
- Conduct regular environmental audits and reporting to ensure compliance with national regulations and continuous improvement in environmental performance.
- Provide training and awareness programs for all staff and contractors regarding environmental protection, health, and safety measures.
- Continuously review and update the EMP and GRM to address any emerging environmental or social issues during the project lifecycle.

Glossary

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

Evaluation	The making of a judgment about the amount, number, or value of something; assessment.
Ground water	Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solid content of 10,000 milligrams per liter or less, and are not "exempted aquifers.
Hazardous	Substance or material, which could adversely affect the safety of the public, handlers or carriers during transportation
Impact	Effect on someone or something
Land acquisition	The process whereby a person is compelled by a public agency to cede all or part of the land a person owns or possesses, to the ownership and possession of that agency, for public purpose in return for compensation.
Mitigation	The action of reducing the severity, seriousness, or painfulness of something
Occupational health	Maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs
Project area	The area specified by the funding and/or implementing agency according to the official gazette notification and includes the areas within the administrative limits of the provincial government.
Proponent	A person who advocates a theory, proposal, or course of action.

Scope	The extent of the area or subject matter that something deals with or to which it is relevant
Social Environment	It includes the culture that the individual was educated or lives in, and the people and institutions with whom they interact.
Stakeholders	Include affected persons and communities, proponents, private and public businesses, NGOS, host communities and EPA.
Topography	Details of the surface features of land. It includes the mountains, hills, creeks, and other bumps and lumps on a particular hunk of earth.

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References

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

1. Information and data provided by project proponents;
 2. Project Pre-Feasibility Study Report;
 3. Technical Design Data related to the project.
 4. Information gathered through discussions with the project related persons of the project proponent;
 5. Information collected from the technical documents of various suppliers of machinery/equipment.
 6. National Environment Quality Standards for Ambient Air August 2016;
 7. Punjab Environment Quality Standards Noise Levels August 2016;
 8. Punjab Environment Quality Standards for Drinking Water August 2016;
 9. Pakistan Environmental Protection Act, 1997;
 10. The Punjab Environmental Protection (Amendment) Act 2012 covers aspects related to:
 - The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development;
 - Establishing complete regulatory and monitoring bodies, policies, rules, regulations and national environmental quality standards; and
 - To ensure enforcement, the act establishes regulating bodies i.e. Punjab Environmental Protection Council (PEPC) and responsible bodies i.e. Punjab Environmental Protection Agency (Punjab EPA) at Provincial level.
- i. Environment related Laws in Pakistan and the Province of Punjab;
 - ii. Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review and Approval of Environmental Assessment, 2022;
 - iii. Google earth, maps.
 - iv. Guidelines for Public Consultations - These guidelines cover:

- Consultation, involvement and participation of Stakeholders
 - Techniques for public consultation (principles, levels of involvements, tools, building trust)
 - Effective public consultation (planning, stages of EIA
 - where consultation is appropriate)
 - Consensus building and dispute resolution.
1. workplace safety and health act 2011
 2. Land Acquisition Act (LAA) of 1894
 3. The forest Act 1927
 4. Pakistan Penal Code, 1860
 5. Provincial Wildlife Act, 1974
 6. Drugs Act 1976

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Term of References

1. The Proponent is required to carry out an Environment Assessment Study of the Project as required under section 12 of Pakistan Environmental Protection Act 1997/ Punjab Environmental Protection Act 2012.
2. The Study should be comprehensive and should cover all aspects which are envisaged under the relevant national and provincial's laws & regulations including but not limited to:
 - Identification and recommendation for suitable solution/treatment/mitigation measures of emissions and effluents such as waste water and sludge etc. in accordance with Punjab Environmental Quality Standards (PEQS).
 - Identification and recommendation for suitable solution/treatment/mitigation measures of solvents, oils (tar), hazardous waste, organic compounds, steam, flue gases, particulate matter and chemical compounds harmful for the environment and other substances leading to air, noise, water and soil pollution in accordance with PEQS.

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

ANNEXURE-A

Google Map

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Punjab Agriculture Food and Drug Authority (PAFDA)

Punjab Science Enclave, Old Multan Road, Behind Toyota Ravi Motors, Thokar Niaz Baig, District Lahore
31°28'20.55"N
74°13'59.59"E

Legend

 Access Road

 Access Road

 Incinerator by PAFDA

 PAFDA

 Proposed Area



ANNEXURE-B

Monitoring Reports

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CHEMICAL ANALYSIS TEST REPORT (AMBIENT AIR)



Reference Number: ESPAK/00589P/26/AA/05001/00315 Date: 11/06/2026
 Name of Industry/Client: Punjab Agriculture, Food & Drug Authority (PAFDA)
 Address: Punjab Science Enclave, Multan Road, Thokar Niaz Baig, Lahore.
 Telephone No: -----
 Nature of Sample: Ambient Air Monitoring Location: Near Boundary Wall
 Date of Sample Collection: 03/06/2026 (GPS: 31.469024°N, 74.233523°E)
 Sample Collected/Sent By: Shahzad Ali, Analyst (Field), ESPAK Grab / Composite: Continuous - 24 Hours
 Date of Completion of Analysis: 04/06/2026

S. No	Parameters	Limit Values (PEQS-24 Hours)	Concentration	Method / Equipment Used	Remarks
1	Carbon Monoxide (CO)	5 mg/m ³ (8 Hours)	0.2 mg/m ³	Non-Dispersive Infrared Absorption (NDIR)	Within Prescribed Limits
2	Sulfur Dioxide (SO ₂)	120 µg/m ³	9.2 µg/m ³	UV Fluorescence (UVF)	Within Prescribed Limits
3	Ozone (O ₃)	130 µg/m ³ (1 Hour)	36.5 µg/m ³	Non-Dispersive UV Absorption	Within Prescribed Limits
4	Oxides of Nitrogen as NO	40 µg/m ³	6.6 µg/m ³	Chemiluminescence Detection	Within Prescribed Limits
5	Oxides of Nitrogen as NO ₂	80 µg/m ³	24.5 µg/m ³	Chemiluminescence Detection	Within Prescribed Limits
6	Particulate Matter PM _{2.5}	35 µg/m ³	40.7 µg/m ³	β Ray Attenuation Method	Exceeding Prescribed Limits
7	Particulate Matter PM ₁₀	150 µg/m ³	138 µg/m ³	β Ray Attenuation Method	Within Prescribed Limits
8	Suspended Particulate Matter (SPM)	500 µg/m ³	457 µg/m ³	High Volume Sampler (HVS)	Within Prescribed Limits

PEQS: Punjab Environmental Quality Standards for Ambient Air, 2016

Note:

- The report should be reproduced as a whole and not in parts.
- Report Limitation: This report is not valid for court cases.

1. Sample Analyzed By: Shahzad Ali
Analyst (Field)

2. Name of Chief Analyst with Seal: Muhammad Arfan

3. Signature of Incharge of the Environmental Laboratory:

Name: Imran Malik
General Manager
Date: 11/06/2026



----- End of Report -----

Reference Number	ESPAK/00589P/26/AA/05001/00315
Name of Industry/ Client	Punjab Agriculture, Food & Drug Authority (PAFDA)
Address	Punjab Science Enclave, Multan Road, Thokar Niaz Baig, Lahore .
Monitoring Location	Near Boundary Wall
GPS Coordinates	(31.469024°N, 74.233523°E)
Monitoring Date	03-06-2026 to 04-06-2026

Date - Time	CO	SO ₂	O ₃	NO	NO ₂	PM _{2.5}	PM ₁₀	SPM	Temp.	RH	Wind Speed	Wind Direction
	mg/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	°C	%	m/s	
03/06/2026 12:30	0.2	8.2	36.5	7.0	25.0	28.5	136	457	39	42	2.1	NE
03/06/2026 13:30	0.2	8.9		6.5	24.5	25.5	90		36	39	2.4	NE
03/06/2026 14:30	0.3	9.2		7.3	24.8	35.5	23		35	38	2.4	NE
03/06/2026 15:30	0.3	9.1		5.3	24.4	75.5	41		34	37	3.57	NE
03/06/2026 16:30	0.2	8.5		7.4	24.9	36.5	37		33	35	3.37	NE
03/06/2026 17:30	0.2	8.9		8.0	25.5	40.5	86		32	35	4.1	NE
03/06/2026 18:30	0.3	9.2		5.5	23.0	38.5	123		31	34	3.7	NE
03/06/2026 19:30	0.3	9.6		6.1	23.6	24.5	185		31	33	3.57	S
03/06/2026 20:30		10.0		6.7	24.2	16.5	185		30	33	3.17	S
03/06/2026 21:30		9.6		6.1	23.6	4.5	127		29	32	4.87	S
03/06/2026 22:30		9.6		7.5	23.5	33.5	152		29	32	2.97	S
03/06/2026 23:30		8.5		7.4	23.5	13.5	173		30	33	2.87	SE
04/06/2026 0:30		9.8		6.3	25.4	7.5	150		32	34	2.87	SE
04/06/2026 1:30		9.8		6.3	23.8	86.5	178		31	34	3.4	SE
04/06/2026 2:30		8.6		6.3	23.8	89.5	149		32	35	3.2	SE
04/06/2026 3:30		9.0		5.2	24.3	23.5	160		33	36	3.27	W
04/06/2026 4:30		9.1		5.9	25.0	48.5	154		34	37	3.47	W
04/06/2026 5:30		9.2		6.5	24.0	26.5	199		35	37	3.27	W
04/06/2026 6:30		9.2		6.1	25.2	43.5	173		36	39	3.57	W
04/06/2026 7:30		9.9		6.1	25.2	86.5	158		36	39	2.87	W
04/06/2026 8:30		8.1		6.3	25.4	60.5	117		38	40	2.84	W
04/06/2026 9:30		9.9		7.5	25.0	44.5	149		37	40	2.5	W
04/06/2026 10:30		9.9		7.6	25.1	49.5	196		38	41	2.0	W
04/06/2026 11:30		8.0		7.8	25.3	38.5	174		39	42	2	W
Average	0.2	9.2	36.5	6.6	24.5	40.7	138	457				
Maximum	0.3	10.0	36.5	8.0	25.5	89.5	199	457				
Minimum	0.2	8.0	36.5	5.2	23.0	4.5	23	457				

Monitored By: Shahzad Ali



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www.espak.com.pk

info@espak.com.pk



NOISE MONITORING REPORT



Reference Number: **ESPAK/00589P/26/N/05002/00299** Date: **11/06/2026**

Name of Industry/Client: **Punjab Agriculture, Food & Drug Authority (PAFDA)**

Address: **Punjab Science Enclave, Multan Road, Thokar Niaz Baig, Lahore**

Telephone No: **---**

Nature of Sample: **Noise**

Date of Sample Collection: **03/06/2026** Grab / Composite: **Continuous 24-Hours**

Sample Collected/Sent By: **Shahzad Ali, Analyst (Field), ESPAK**

Date of Completion of Analysis: **04/06/2026**

Method/Equipment Used: **Sound Level Meter**

S. No	Measurement Point	Limit Values (PEQS)	Noise Level in dB(A) Leq	Remarks
1	Near Boundary Wall (GPS: 31.469024°N, 74.233523°E) - Day time	75 dB(A)	65 dB(A)	Within Prescribed Limits
2	Near Boundary Wall (GPS: 31.469024°N, 74.233523°E) - Night time	65 dB(A)	57 dB(A)	Within Prescribed Limits

PEQS: Punjab Environmental Quality Standards for Noise in Industrial Area, 2016 Day Time Hours (6:00 am to 10:00 pm) Night Time Hours (10:00 pm to 6:00 am)

Note:

- The report should be reproduced as a whole and not in parts.
- Report Limitation: This report is not valid for court cases.

- Sample Analyzed By: **Shahzad Ali**
Analyst (Field)
- Name of Chief Analyst with Seal: **Muhammad Arfan**
- Signature of Incharge of the Environmental Laboratory:

Name: **Imran Malik**
General Manager
Date: **11/06/2025**

End of Report

Reference Number		ESPAK/00589P/26/N/05002/00299
Client Name		Punjab Agriculture, Food & Drug Authority (PAFDA)
Address		Punjab Science Enclave, Multan Road, Thokar Niaz Baig,
Monitoring Location		Near Boundary Wall
GPS Coordinates		(31.469024°N, 74.233523°E)
Monitoring Date		03-06-2026 to 04-06-2026
Day/Night	Date & Ending Hour	Noise dB (A) Leq
Day Time	03/06/2026 16:30	70.9
	03/06/2026 17:30	73.2
	03/06/2026 18:30	71.0
	03/06/2026 19:30	73.3
	03/06/2026 20:30	61.3
	03/06/2026 21:30	62.6
	03/06/2026 22:30	54.1
	04/06/2026 7:30	57.5
	04/06/2026 8:30	58.7
	04/06/2026 9:30	66.1
	04/06/2026 10:30	64.4
	04/06/2026 11:30	62.3
	03/06/2026 12:30	64.9
	03/06/2026 13:30	65.8
	03/06/2026 14:30	71.6
	03/06/2026 15:30	69.8
Average Day time		65
Night Time	03/06/2026 23:30	58.7
	04/06/2026 0:30	60.2
	04/06/2026 1:30	54.0
	04/06/2026 2:30	62.1
	04/06/2026 3:30	54.9
	04/06/2026 4:30	55.1
	04/06/2026 5:30	55.1
	04/06/2026 6:30	55.0
Average Night time		57
Monitored By:		Shahzad Ali

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CHEMICAL ANALYSIS TEST REPORT (GROUND WATER)



Reference Number: **ESPAK/00589P/26/GW/05003/00637** Date: **11/06/2026**

Name of Industry / Client: **Punjab Agriculture, Food & Drug Authority (PAFDA)**

Address: **Punjab Science Enclave, Multan Road, Thokar Niaz Baig, Lahore**

Telephone No: **---**

Nature of Sample: **Ground Water from Motor Pump**

Date Sample Received: **04/06/2026** Grab / Composite: **Grab**

Date of Sample Collection: **03/06/2026**

Sample Collected / Sent By: **Shahzad Ali, Analyst (Field), ESPAK**

Date of Completion of Analysis: **09/06/2026**

S. No	Parameters	Limit Values (DW-PEQS)	Concentration	Method / Equipment Used	Remarks
1	Total Coliforms	---	ND	SMWW 9222 B	---
2	Fecal Coliform Bacteria	Must not be detectable in any 100mL sample	ND	SMWW 9222 H	Within Limits
3	E. Coli	Must not be detectable in any 100mL Sample	ND	SMWW 9222 H	Within Limits
4	Taste	Non Objectionable / Acceptable	Objectionable	Organoleptic	Exceeding Limits
5	Odor	Non Objectionable / Acceptable	Acceptable	Organoleptic	Within Limits
6	pH*	6.5-8.5	7.5	SMWW 4500H*B	Within Limits
7	Turbidity	<5 NTU	ND	SMWW 2130B	Within Limits
8	Color	≤15 TCU	ND	SMWW 2120 C	Within Limits
9	Total Dissolved Solids (TDS)*	<1000 mg/L	1914 mg/L	SMWW 2540C	Exceeding Limits
10	Total Hardness as CaCO ₃ *	<500 mg/L	232 mg/L	SMWW 2340C	Within Limits
11	Residual Chlorine	0.2-0.5 mg/L	ND	SMWW 4500-Cl G	Within Limits
12	Chloride (as Cl ⁻)*	<250 mg/L	171 mg/L	SMWW 4500ClB	Within Limits
13	Fluoride (F ⁻)*	≤1.5 mg/L	0.38 mg/L	U.S. EPA 9214	Within Limits
14	Cyanide (CN ⁻)	≤0.05 mg/L	ND	SMWW 4500 CN ⁻ F	Within Limits
15	Nitrate (NO ₃ ⁻)	≤50 mg/L	0.2 mg/L	SMWW 4500NO ₃ ⁻ B	Within Limits
16	Nitrite (NO ₂ ⁻)	≤3 mg/L	ND	SMWW 4500NO ₂ ⁻ B	Within Limits
17	Phenolic Compounds (as Phenols)	NGVS	ND	SMWW 5530 C	---
18	Aluminum (Al)	≤0.2 mg/L	ND	SMWW 3111	Within Limits
19	Antimony (Sb)	≤0.005 mg/L	ND	SMWW 3111	Within Limits
20	Arsenic (As)	≤0.05 mg/L	ND	SMWW 3114 B	Within Limits
21	Barium (Ba)	0.7 mg/L	ND	SMWW 3111	Within Limits
22	Boron (B)	0.3 mg/L	ND	SMWW 4500-B B	Within Limits

Page 1 of 2

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CHEMICAL ANALYSIS TEST REPORT (GROUND WATER)

Reference Number:

ESPAK/00589P/26/GW/05003/00637

Date: 11/06/2026

Name of Industry / Client:

Punjab Agriculture, Food & Drug Authority (PAFDA)



S. No	Parameters	Limit Values (DW-PEQS)	Concentration	Method / Equipment Used	Remarks
23	Cadmium (Cd)	0.01 mg/L	ND	SMWW 3111	Within Limits
24	Chromium (Cr)	≤0.05 mg/L	ND	SMWW 3111	Within Limits
25	Copper (Cu)	2.0 mg/L	ND	SMWW 3111	Within Limits
26	Lead (Pb)	≤0.05 mg/L	ND	SMWW 3111	Within Limits
27	Manganese (Mn)	≤0.5 mg/L	ND	SMWW 3112	Within Limits
28	Mercury (Hg)	≤0.001 mg/L	ND	SMWW 3111	Within Limits
29	Nickel (Ni)	≤0.02 mg/L	ND	SMWW 3111	Within Limits
30	Selenium (Se)	0.01 mg/L	ND	SMWW 3114 B	Within Limits
31	Zinc (Zn)	5.0 mg/L	0.33 mg/L	SMWW 3111	Within Limits

DW-PEQS: Punjab Environmental Quality Standards for Drinking Water, 2016

SMWW: Standard Methods for the Examination of Water and Waste Water, American Public Health Association, American Water Works Association, Water Environment Federation

USEPA: United States Environmental Protection Agency

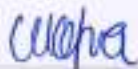
ND: Not Detected

- Laboratory tests and measurements were carried out at 25 ± 5 °C and ±75 % Relative Humidity conditions unless required otherwise.
- Uncertainty of Measurement (UoM) data will be provided on request, where available. The statement of conformity, if provided in the report, is based on the decision rule of simple acceptance or rejection with equal shared risk due to measurement uncertainty.

Note:

- The report should be reproduced as a whole and not in parts.
- Only parameters marked with asterisk (*) are ISO 17025:2017 accredited.
- Report Limitation: This report is not valid for court cases.

1. Sample Analyzed By: M. Shahid Analyst (Chemical) Nageen Arshad Analyst (Chemical) Amina Aslam Analyst (Chemical) Romalsa Rafique Analyst (Chemical) Zirwa-tuz-Zahra Analyst (Chemical) Khizra Bano Analyst (Microbiology)

2. Name of Chief Analyst with Seal: Muhammad Arfan 

3. Signature of Incharge of the Environmental Laboratory:

Name: Imran Malik
General Manager
Date: 11/06/2026

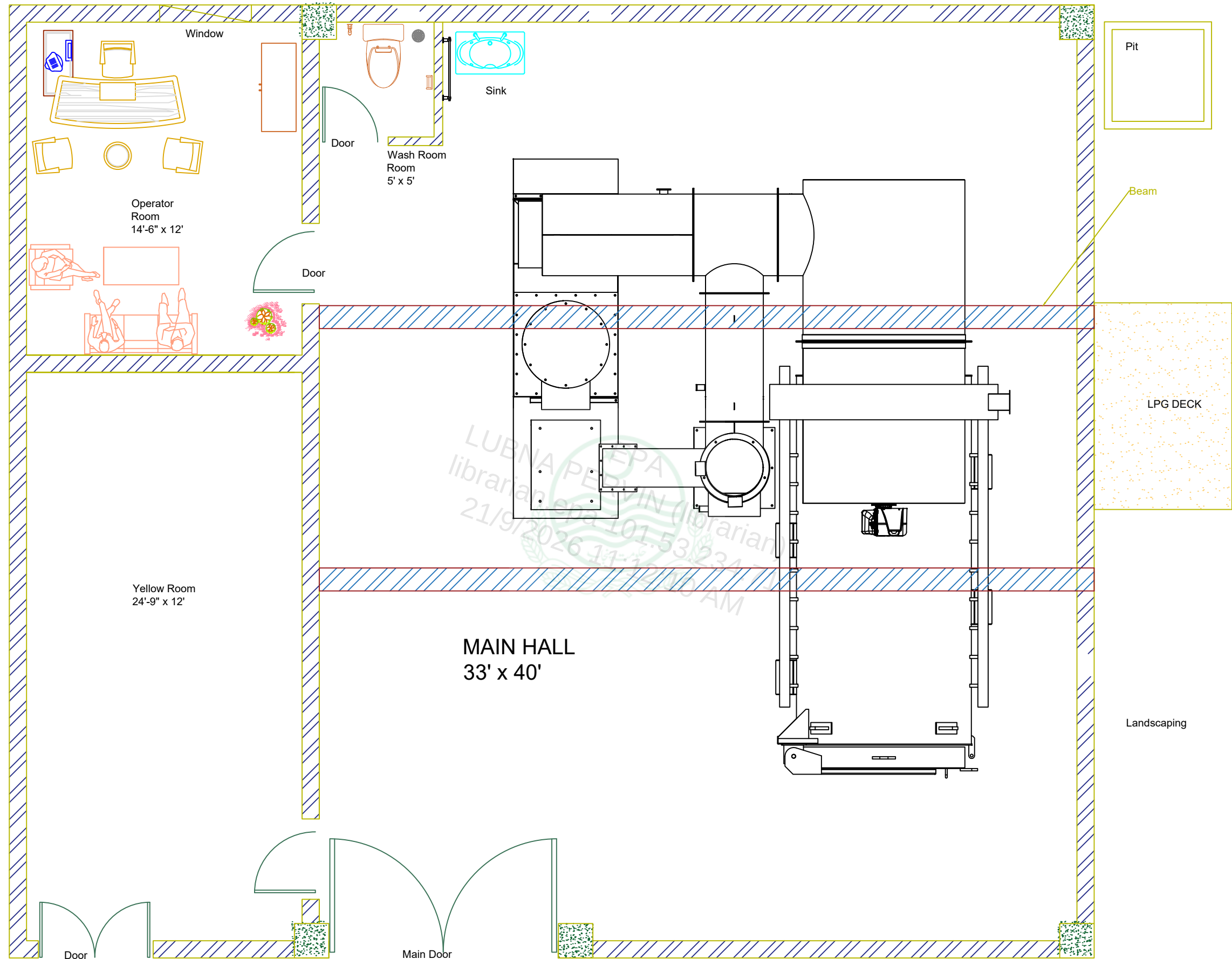


End of Report

ANNEXURE-C

Layout Map

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Proposed General Layout Plan of Site

Design by: Umair Kamboh

ANNEXURE-D

Land Documents

LIBRARIAN PERVIN (librarian)
librarian.epa 101.53.234.71
21/9/2026 11:12:10 AM

OFFICE OF MR. MUHAMMAD ARSHAD BHATTI,
Land Acquisition Collector, District Lahore.

Award No. 05 of 2016

Dated: 25-11-2016

PA/DS (W)
S&GA-D
Dy. No. _____
Date 28-11-16 4173

Award under Section 11 of the Land Acquisition Act, 1894 in respect of land measuring 38 Kanal 09 Marla, situated in Mauza Niaz Baig, Tehsil City, District Lahore acquired for public purpose namely "**Establishment of Punjab Agriculture, Food and Drug Authority (PAFDA), Lahore**", by Government of the Punjab, S&GA Department (Welfare Wing), Lahore.

PRELIMINARY.

The acquisition proceedings in instant case were initiated with issuance of preliminary Notification u/s 4 of the Land Acquisition Act, 1894 read with Corrigendum issued by the Collector, Lahore District Lahore vide No. LAC/734-2016 dated 21-05-2016 and No. LAC/734-2016/4647 dated 24-06-2016 published in the Punjab Gazette Extra Ordinary Issue on 24-05-2016 and 28-06-2016 respectively for public purpose namely "**Establishment of Punjab Agriculture, Food and Drug Authority (PAFDA), Lahore**", by Government of the Punjab, S&GA Department (Welfare Wing), Lahore.

NOTIFICATION U/S 5 OF THE LAND ACQUISITION ACT, 1894.

2. The Subsequent Notification u/s 5 of the Land Acquisition Act, 1894 was issued by the Commissioner, Lahore Division, Lahore vide No. SR/4392 dated 27-07-2016, which was also published in the Punjab Gazette Extra Ordinary dated 29-07-2016. The land in question is being acquired on request of Government of the Punjab, Food Department. But the Food Department, has clarified vide letter No. SOF(Dev)PAFDA/2016 dated 02-09-2016 that requisite proceedings for acquisition of land may be made in the name of Punjab Agriculture, Food and Drug Authority S&GA Department, Lahore.

PROCEEDINGS U/S 5-A OF THE LAND ACQUISITION ACT, 1894.

3. In pursuance of Notification u/s 5 of the Land Acquisition Act, 1894, Notices were issued to the affected landowners for the date of 19-09-2016 to file their objections before the undersigned with regard to acquisition of land for Establishment of Punjab Food, Agriculture and Drug Authority (PAFDA), Lahore. A Notice was also issued to the acquiring agency i.e. Government of the Punjab, S&GA Department (Welfare Wing), Lahore to participate in acquisition proceedings. In response to Notices, different land owners appeared before the predecessor of undersigned. After considering the objections and reply of acquiring agency, an inquiry report u/s 5-A(2) of the Land Acquisition Act, 1894 was sent to the

8
25-11-16
S.O. (Coord)



Commissioner, Lahore Division, Lahore on 19-10-2016 through District Collector, Lahore with the recommendations that above mentioned acquisition proceedings is absolutely necessary for completion of project. After considering the recommendations, the Commissioner, Lahore Division, Lahore vide letter bearing No. SR/6805 dated. 24-10-2016 directed the predecessor of undersigned to proceed further in the matter strictly in accordance with law.

NOTIFICATION U/S 6 OF THE LAND ACQUISITION ACT, 1894

4. In compliance with the approval of enquiry report by the Commissioner, Lahore Division, Lahore vide letter No. SR/6805 dated. 24-10-2016, the Deputy Secretary (Welfare), Government of the Punjab, S&GA Department, Lahore vide letter No. PAVDS(Rent)/Misc./2016 dated. 28-10-2016 submitted draft Notification u/s 6 of the Land Acquisition Act, 1894 for its approval and publication in the Punjab Gazette Extra Ordinary Issue, which was sent to the Commissioner, Lahore Division, Lahore by the District Collector, Lahore vide letter No. LAC/737-2016/207 dated. 28-10-2016 for approval and publication in the Punjab Gazette Extra Ordinary Issue. The said Notification was accordingly issued by the Commissioner, Lahore Division, Lahore vide No. SR/6965 dated. 28-10-2016, which was also published in the Punjab Gazette on 01-11-2016.

AREA.

5. According to measurement of land under acquisition carried out by revenue field staff in collaboration with representative of acquiring agency, the area works out as under:-

SPECIFICATION

Mauza	Khasra No.	AREA	
		K	M
Niaz Baig, Tehsil City District Lahore	10026 Min	00	15
	10028 Min	00	10
	10029 Min	00	17
	10030	01	12
	10053	06	12
	10054	03	08
	10055	02	01
	10056	03	06
	10057	02	17
	10058	01	17
	10072	01	09
	10073	05	08
	10074	02	18
	10075	00	06
	10076	00	11
	10077 Min	04	02
Total		39	09



**PROCEEDINGS UNDER SECTION 8 TO 11 OF THE LAND
ACQUISITION ACT, 1894.**

6. Notices u/s 8 to 11 of the Land Acquisition Act, 1894 were issued to affected land owners/interested persons individually for 18-11-2016 through the revenue field staff requiring them to file their objections with regard to measurements, discrepancies if any and claims for compensation relating to land under acquisition. A proclamation u/s 9(i) of the Act ibid was also got published in the daily "Naw-e-Waqt" & The "Nation" on 04-11-2016 for information of affected land owners and General Public to file their objections with regard to measurements, and claim for compensation before the undersigned on 04-11-2016.

7. A Notice as required under Para 50 of the Financial Commissioner's Standing Order No. 28 (Land Acquisition) was also served upon the acquiring agency i.e Government of the Punjab, S&GA Department (Welfare Wing), Lahore, requiring him to take part in the acquisition proceedings on above mentioned date.

8. In response to said notices, the following affected land owners / interested persons filed their objections:-

M/s Muhammad Ashraf, Jahangir Hussain, Muhammad Aslam, Munir Hussain, Ifikhar Hussain Zulfiqar Ali (sons), Shahnaz Bibi, Azra Bibi daughters of Sarwar Khan etc.

They are owners of land measuring 07 Kanal, comprising Khasra Nos. 10077 (04-K 02-M) & 10074 (02-K 18-M), situated in Mauza Niaz Baig Tehsil City, District Lahore, which is being acquired for the purpose. The above mentioned land is situated in the middle of Multan Road and Katar Bund, Lahore, which is surrounded by houses and Government offices. Therefore, they claimed compensation of their land @ Rs. 5,00,000/- per Marla alongwith cost of structure etc. However, they did not produce any documentary evidence in support to their claims.

Mr. Muhammad Akram s/o Nawab Din.

He claimed compensation of his land measuring 11 Marla out of Khasra No. 10076 according to the market rate, which is being acquired for the purpose. But he did not produce any documentary evidence in support to his claims.

M/s Punjab Cooperative Board of Liquidation.

The PCBL has requested that Khasra No. 10035 (01-K 17-M) and 10281 (01-K 10-M) may not be acquired for the reason that if these Khasra Nos are acquired, remaining land has become land locked and no space will be available for use of passage.

M/s Sharifan Bibi (widow), Sajjad Haider (son), Musarrat Rani, Rifat Batool, Iffat Batool and Saima Batool daughters of Muhammad Asiraf.

They claimed to be owners of land measuring 05 Kanal 08 Marla comprising Khasra No. 10073. They have objected price of land assessed by the District Price Assessment Committee, Lahore. In support to their claims, they have produced following documents:-

- A). Copy of Agreement to Sell executed by the M/s Sajjad Haider etc in favour of Malik Nazir Hussain s/o Farzand Ali, whereby land measuring 11 Kanal 15 Marla has been sold @ of Rs. 5,00,000/- per Marla.
- B). Copy of sale deed dated.17-03-2010, whereby land measuring 20 Kanal 15 Marla has been purchased by the Home Department from PCBL for Establishment of Punjab Forensic Science Agency @ Rs. 35,16,000/- per Kanal (Rs. 1,75,800/- per Marla).
- C). Copy of Notification dated. 02-08-2016, issued by the Government of Pakistan, Revenue Division, Federal Board of Revenue, Islamabad, According to which, price of land in question is notified as Rs. 2,41,750/- per Marla.

M/s Sultan Niaz-ul-Hassan, Sultan Fayyaz-ul-Hassan, Sultan Ijaz-ul-Hassan sons of Sultan Muhammad Hussain through M.A Umar Usman Shami, Advocate, Lahore High Court, Lahore.

They have requested for cancellation of Notice issued to them u/s 8 to 11 of the Land Acquisition Act, 1894 on the ground that they are owners of Khasra Nos. 10023 & 10024, whereas, Notice has been issued in respect of Khasra Nos. 10028, 10029 & 10026.

9. Mr. Abdul Hafeez, Section Officer (Welfare-I), Government of the Punjab, S&GA Department, Lahore appeared before the undersigned as a representative of acquiring agency. A copy of claims/objections filed by land owners/interested persons was handed over to the representative of acquiring agency for reply/comments. In reply thereto, the Deputy Secretary (Welfare), S&GA Department, Lahore has submitted his written statement According to which, land in question is required for public purpose namely "Establishment of Punjab Agriculture, Food and Drug Authority (PAFDA), Lahore" by Government of the Punjab, S&GA Department, Lahore, at public expenses, which involves public interest and essentially required for this purpose. As regards payment of compensation is concerned, he has stated that price of land under acquisition may be awarded to the affected land owners as per approval of Board of Revenue Punjab contained in letter No. 1479-2016/937-S.IV dated. 22-11-2016.

10. I have gone through the objections of affectees as well as written statement of acquiring agency. The claims regarding compensation made by affected land owners are very exorbitant. The documents produced by M/s Sharifan Bibi etc were also examined. The copy of Agreement to sell has also been examined, which shows that same has been executed on 10-09-2014. The said Agreement to Sell is not registered in office of the Sub-Registrar concerned and tried to manipulate the same just to show value of the land. As regards, copy of sale deed dated. 17-03-2010, land involved therein is located on front of Main Multan Road, Lahore, whereas, land owned by M/s Sharifan Bibi etc is located adjacent to the Punjab Forensic Science Agency. The above mentioned documents including Notification dated. 02-08-2016, issued by the Government of Pakistan, Revenue Division, Federal Board of Revenue, Islamabad can not be made basis of assessment of price of land in question according to provisions of Section 23 & 24 of

the Land Acquisition Act, 1894 read with Rule 10 (1) (iii), (a), (b) & (c) of the Punjab Land Acquisition Rules 1983. In the instant case, preliminary Notification u/s 4 of the Act, 1894 was published in the Punjab Gazette Extra Ordinary Issue on 24-05-2016. The date of publication of Notification u/s 4 of the Act ibid is material date for determination of price of acquired land and the affected land owners failed to produce any documentary evidence/proof i.e Registered Sale Deed effected during the crucial/relevant period in the closed proximity of the land in question in support of their contentions, due to which the undersigned is unable to ascertain the validity of the objections. The undersigned has also given consideration to the objection filed by PCBL. The Khasra Nos. 10281 & 10035 is not mentioned in the aforesaid Notifications. These Khasra Nos. are part of acquisition in respect land measuring 26 Kanal, which is separate project and above mentioned objection was also considered therein. In order to ascertain validity of objection of PCBL, an enquiry was made through Revenue Officer concerned, who stated vide his report dated. 23-11-2016 that land owned by PCBL situated in the vicinity has already been acquired by the S&GA Department for PAFDA and Home Department for Punjab Forensic Science Agency (PFSA). Due to such acquisitions already undertaken and the instant acquisition proceedings, no land remains under the ownership of PCBL at the site. Further due to acquisition of land bearing Khasra No. 10035 and 10281 for the project in question, no land to be used as passage is affected. Under these circumstances, objection filed by PCBL is against the facts and hence does not carry any weight. The objection filed by M/s Sultan Niaz-ul-Hassan was also considered, which is premature, as rightful land owner will be determined at time of payment of compensation.

11. In view of my above observations, the objections filed by land owners/interested persons do not hold any water, hence these are filed.

VALUATION.

12. I have gone through data of average sale price, market price and price notified in the Valuation Table prepared by the revenue field staff. I have also examined decision of the District Price Assessment Committee, Lahore dated. 06-06-2016 and estimated cost of acquired land worked out by the Collector, Lahore District, Lahore vide No. LAC/734-2016/4250 dated. 08-06-2016 read with No. LAC/734-2016/8117 dated. 03-11-2016 under provisions of Section 23 & 24 of the Land Acquisition Act, 1894 read with Rule 10 (1) (iii), (a), (b) & (c) of the Punjab Land Acquisition Rules, 1983 by classifying land under acquisition into three categories according to its merits and potential duly endorsed by the Commissioner, Lahore Division, Lahore vide No. SR/7085 dated. 03-11-2016 and approved by the Board of Revenue Punjab, Lahore vide letter No. 1479-2016/937-S.IV dated. 22-11-2016, which are quite reasonable, fair and adequate prices.



COMPULSORY ACQUISITION CHARGES.

13. The land owners are also entitled to get 15% compulsory acquisition charges in addition to cost of land, as required under Section 23(2) of the Land Acquisition Act, 1894.

CONCLUSION.

14. After considering all relevant factors of the case and provisions of Section 23 & 24 of the Land Acquisition Act, 1894 read with Rule 10 (1) (iii), (a), (b) & (c) of the Punjab Land Acquisition Rules, 1983 and approval of Board of Revenue, Punjab vide its letter No. 1479-2016/937-S.IV dated. 22-11-2016, the compensation is accordingly awarded as under:-

Name of Mauza	Locality/Category	Area		Rate per Marla	Cost of Land
		K	M		
Niaz Baig	(A) Main Multan Road (upto 50-Feet in Depth) Khasra Nos. 10025 (15-M), 10026 (01-M)	00	16	Rs. 10,00,000/-	Rs. 1,60,00,000/-
	(B) After Category "A" Upto 300-Feet Khasra Nos. 10028 (09-M), 10029 (17-M), 10030 (01-K 12-M), 10053 (10-M) & 10054 (05-M)	03	13	Rs. 5,00,000/-	Rs. 3,65,00,000/-
	(C) After Category "B" Remaining Land Khasra Nos. 10055 (05-K 02-M), 10056 (03-K 03-M), 10055 (02-K 01-M), 10059 (03-K 06-M), 10067 (02-K 17-M), 10068 (01-K 17-M), 10072 (01-K 06-M), 10073 (05-K 06-M), 10074 (02-K 16-M), 10075 (08-M), 10076 (11-M) & 10077 (04-K 02-M)	34	00	Rs. 1,50,000/-	Rs. 10,20,00,000/-
	Total	38	09		Rs. 15,45,00,000/-
15% Compulsory Acquisition Charges.					Rs. 2,31,75,000/-
Grand Total					Rs. 17,76,75,000/-
Rupee Seventeen Crore Seventy Six Lac & Seventy Five Thousand only					

COST OF SUPERSTRUCTURE.

15. The affected land owners have also claimed cost of structure. In this respect, the District Officer (Buildings), City Division No. II, Lahore vide letter Nos. 4885/DOB-II dated. 09-08-2016 has assessed the cost superstructure amounting to Rs. 11,78,000/- (Rupee Eleven Lac & Seventy Eight Thousand only) existing on Khasra Nos. 10026, 10028 & 10029, which will be paid to the affected land owners in addition to cost of acquired land.

(ABSTRACT)

I.	Cost of land measuring 38 Kanal 09 Marla, situated in Mauza Niaz Baig, Tehsil City, District Lahore including 15% compulsory acquisition charges.	Rs. 17,76,75,000/-
II.	Cost of Structure	Rs. 11,78,000/-
III.	Total	Rs. 17,88,53,000/-
Rupee Seventeen Crore Eighty Eight Lac & Fifty Three Thousand only		

POSSESSION.

16. The Tehsildar (Mohal), Lahore City is being directed to deliver possession of acquired land to the representative of the S&GA Department (Welfare Wing), Lahore, immediately and a copy of Rapat Rozenamcha Waqiali should be supplied to this office at the earliest.

APPORTIONMENT.

17. The compensation will be apportioned to land owners according to the entries of latest Register Haqdarar Zameen and Mutation sanctioned thereafter. The payment of compensation of land under litigation will be paid after the final disposal of cases by the courts of competent jurisdiction.

LAND REVENUE.

18. The land revenue assessed for the land in question stands abated from the date of taking possession by the acquiring agency.

THE LAND MEASURING 38 KANAL 08 MARLA, SITUATED IN MAUZA NIAZ BAIG, TEHSIL CITY, DISTRICT LAHORE IS HEREBY ACQUIRED FOR PUBLIC PURPOSE, NAMELY "ESTABLISHMENT OF PUNJAB AGRICULTURE, FOOD AND DRUG AUTHORITY (PAFDA), LAHORE", BY GOVERNMENT OF THE PUNJAB, S&GA DEPARTMENT (WELFARE WING), LAHORE.

Note: Any inadvertent clerical or numerical mistake in the award arising from any accidental slip or omission or on the pointation of any of the affectees shall be rectified by the undersigned as provided under Section 12(A) of the Land Acquisition Act, 1894.

Announced on:
25-11-2016

(Muhammad Arshad Bhatti)
Land Acquisition Collector,
Lahore District.

It is certified that the above award consists of 08 pages and each page has been dictated, corrected and signed by me.

(Muhammad Arshad Bhatti)
Land Acquisition Collector,
Lahore District.

No. LAC/734-2016/112

Dated. 25-11-2016

A copy is forwarded to:-

1. The Commissioner, Lahore Division, Lahore.
2. The District Coordination Officer, Lahore.
3. The Additional Collector, Lahore.
4. The Town Municipal Officer, Allama Iqbal Town, Lahore.
for information.

(Muhammad Arshad Bhatti)
Land Acquisition Collector,
Lahore District.

No. LAC/734-2016/113

Dated. 25-11-2016

A copy is forwarded to the Deputy Secretary (Welfare), Government of the Punjab, S&GA Department, Lahore, for information. He is requested to contact the Tehsildar (Mohal), Lahore City for taking over possession of acquired land and to get the acquired land mutated in favour of S&GA Department, Lahore.



(Muhammad Arshad Bhatti)
Land Acquisition Collector,
Lahore District.

No. LAC/734-2016/114

Dated. 25-11-2016

A copy is forwarded to the Tehsildar (Mohal), Lahore City for information and immediate action. He is requested to direct the revenue field staff concerned to prepare "Qabzul Wasool/Statement of Award" to enable this office to proceed further in the matter. The rightful land owner may be informed to receive compensation from my office on any working day subject to fulfillment of requirements for payment of compensation. The possession of the land under acquisition may also be delivered to the representative of the S&GA Department (Welfare Wing), Lahore and its effect may also be carried out in revenue record and copy of "Rapt Rozenamcha Waqiat/Mutation" should be supplied to this office at the earliest.

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(Muhammad Arshad Bhatti)
Land Acquisition Collector,
Lahore District.

ANNEXURE-E

Undertaking for Tree Cutting and Wastewater

LIBRARY PERVIA (Librarian)
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E-STAMP



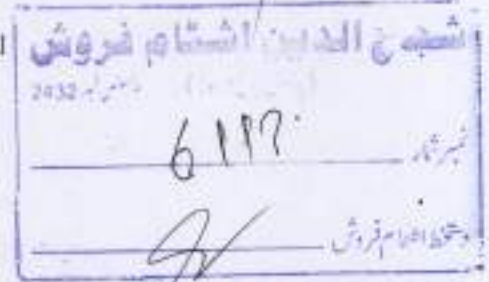
ID : PB-LHR-3ADGE50EK3979DAF
Type : Low Denomination
Amount : Rs 100/-



Scan for online verification



Description : CERTIFICATE OR OTHER DOCUMENT-19
Applicant : Punjab Agriculture Food And Drug Authority [35201-1481628-3]
Representative From : Punjab Agriculture Food And Drug Authority
Agent : Self
Address : Lahore
Issue Date : 24-Jun-2026 11:16:29 AM
Delisted On/Validity : 1-Jul-2026
Amount in Words : One Hundred Rupees Only
Reason : CERTIFICATE
Vendor Information : Shuja Ud Din I PB- LHR-2432 I Badami Bagh



نوٹ : یہ الرقہ مکمل تاریخ اجرا سے سہ ماہوں تک کے لئے قابل استعمال ہے اور اس کا استعمال ایک بار ہی کیا جاسکتا ہے۔



UNDERTAKING

I, **Sabahat Nisar, S/o Nisar Ahmad R/o House No 32/11-A, Lawrence Road, Lahore,** proponent of the project "**Collection, Transportation, and Incineration of Waste by M/s Punjab Agriculture, Food and Drug Authority (PAFDA), at Punjab Science Enclave, Old Multan Road, Behind Toyota Ravi Motors, Thokar Niaz Baig, District Lahore**", do hereby solemnly declare that:

1. I fully accept and undertake to comply with the directions of the Honorable Lahore High Court, Lahore, in W.P. No. 227807/2018 dated 22-02-2023, which imposes a complete ban on the cutting or removal of green trees. No tree shall be cut or removed within the project area under any circumstance.
2. The wastewater generated from the facility will be treated through a waste treatment plant.

Dated: - ____/____/____-2026

Sabahat Nisar
General Manager Finance / Proponent
M/s Punjab Agriculture, Food and Drug Authority (PAFDA)

Sabahat Nisar
DEPUTY DIRECTOR
ADMIN & FINANCE
PMO, PAFDA

ANNEXURE-F

Public Consultation Forms

LIBRARY PERVIN (librarian)
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PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "M/S PAFDA"

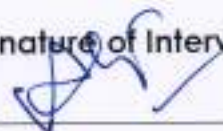
Name:	Asad Zubair
Residence:	Judicial colony .
Gender:	☒ Male ☐ Female
Qualification:	ACCA
Profession:	Accountant .

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☒	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☒	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☒	☐
Level of satisfaction?	☐	☒	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☒	☐
Will the project cause any type of pollution in the area?	☐	☒	☐	☐	☐
Will the project promote social and economic development in the area?	☐	☒	☐	☐	☐

Signature of Interviewed



Signature of Interviewer

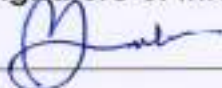


PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "M/S PAFDA"

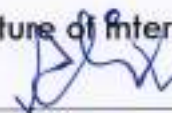
Name:	Ch. Mukhtar
Residence:	Gulshan Town.
Gender:	☒ Male ☐ Female
Qualification:	BBA
Profession:	Businessman.

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☒	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☐	☒	☐	☐
Will the project affect the environment of the area?	☐	☐	☐	☒	☐
Level of satisfaction?	☐	☒	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☒	☐	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☒	☐
Will the project promote social and economic development in the area?	☐	☐	☐	☒	☐

Signature of Interviewed



Signature of Interviewer



PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "M/S PAFDA"

Name:	Hameed-ullah
Residence:	Gopi Rai, Lahore
Gender:	☒ Male ☐ Female
Qualification:	F-A
Profession:	Factory worker

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☒	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☒	☐	☐	☐
Will the project affect the environment of the area?	☐	☐	☒	☐	☐
Level of satisfaction?	☐	☒	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☒	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☒	☐
Will the project promote social and economic development in the area?	☐	☐	☐	☒	☐

Signature of Interviewed

Hameed-ullah

Signature of Interviewer

[Signature]

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "M/S PAFDA"

Name:	Hamid Aftab
Residence:	Multan Road
Gender:	☒ Male ☐ Female
Qualification:	M.A
Profession:	School Teacher

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☒	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☐	☐	☒	☐
Will the project affect the environment of the area?	☐	☐	☒	☐	☐
Level of satisfaction?	☐	☒	☐	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☒	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☒	☐
Will the project promote social and economic development in the area?	☐	☐	☐	☒	☐

Signature of Interviewed

Hamid

Signature of Interviewer

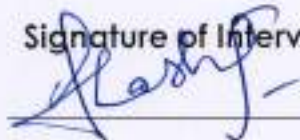
[Signature]

PUBLIC CONSULTATION / STAKEHOLDER PARTICIPATION REGARDING EIA OF "M/S PAFDA"

Name:	Doctor. Kashif .
Residence:	/ Westwood Colony .
Gender:	☒ Male ☐ Female
Qualification:	MBBS -
Profession:	Doctor

	Strongly Agree	Agree	No Comments	Disagree	Strongly Disagree
Are you in favor of project?	☐	☒	☐	☐	☐
Will the project help to improve the living standards of the area?	☐	☐	☒	☐	☐
Will the project affect the environment of the area?	☐	☐	☒	☐	☐
Level of satisfaction?	☐	☐	☒	☐	☐
Will the project affect the plant species of the area?	☐	☐	☐	☒	☐
Will the project cause any type of pollution in the area?	☐	☐	☐	☒	☐
Will the project promote social and economic development in the area?	☐	☐	☐	☒	☐

Signature of Interviewed



Signature of Interviewer

