

(2026)

Environmental Impact Assessment Report

(SCIENTIFIC LANDFILL SITE)

M/S SB Engineering JV

(Sandhu Brothers Enterprises-Golden Jubilee Enterprises (Pvt) Limited)

Chak No. 134 NP Tehsil Liaqatpur District Rahim Yar Khan



Submitted By:

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Prepared By:



Enviro Stewards Company (Pvt) Limited

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EXECUTIVE SUMMARY

The executive summary is an outline of the key outcomes of EIA (Environmental Impact Assessment). The proposed project involves the establishment of scientific landfill site by M/s SB Engineering JV (Sandhu Brothers Enterprises-Golden Jubilee Enterprises (Pvt) Limited) at Chak No. 134 NP Tehsil Liaqatpur District Rahim Yar Khan with following coordinates: 29.033402 N, 70.898481 E. The total area of the site is 100 Kanal. The total estimated cost of this project is approx. 192 million PKR.

The proposed project will be implemented under the Suthra Punjab Program and aims to improve the overall cleanliness, sanitation, and environmental conditions of Tehsil Liaqatpur through the proper disposal of municipal solid waste in scientific landfill site. At present, unregulated waste handling and open dumping practices contribute to environmental pollution, public health risks, and visual degradation of urban and peri-urban areas. Enviro Stewards Company (Pvt.) Limited has been engaged as the environmental consulting firm responsible for preparing this assessment.

The implementation of this project is significant as it will lead to improved public hygiene, reduction in disease vectors, minimization of indiscriminate dumping, and enhancement of the overall urban environment in line with the objectives of the Suthra Punjab Program. The adoption of controlled dumping practice such as site demarcation, waste spreading, and periodic soil cover will substantially reduce environmental and social impacts compared to existing practices. The project will also contribute to compliance with local environmental regulations, improve service delivery at the municipal level, and support sustainable urban management by promoting cleaner surroundings and better quality of life for residents of Tehsil Liaqatpur.

According to projects categorization for environmental assessment studies, the proposed project falls under Schedule II (list of projects requiring an EIA), Category G (Waste Storage and Disposal) Subsector 1 (Landfill sites) of the IEE / EIA Regulations 2022 made under section 12 of Punjab Environment Protection Act 1997 (Amended),

under which the Environmental Impact Assessment (EIA) for the proposed project is mandatory for getting Environmental Approval. The Environmental Impact Assessment report is prepared to assess the potential impacts likely to occur from the project's entire life cycle on the local environmental quality and communities. The assessment produced a list of impacts and mitigation measures for the project to undertake to minimize the detrimental impacts on the environment and communities nearby.

Title and location of the project

The proposed project involves the establishment of scientific landfill site by M/s SB Engineering JV (Sandhu Brothers Enterprises-Golden Jubilee Enterprises (Pvt) Limited) at Chak No. 134 NP Tehsil Liaqatpur District Rahim Yar Khan with following coordinates: 29.033402 N, 70.898481 E.

Name of the Proponent

The detail of the proponent is given below:

Table 1 Proponent Detail

Details of the Proponent	
Proponent name	Mr. Toqeer Javed S/O Javed Ahmad
Designation	Proponent

Brief outline of the Project

Table 2 Brief of Project

Title of the Project	Establishment of scientific landfill site by M/s SB Engineering JV (Sandhu Brothers Enterprises-Golden Jubilee Enterprises (Pvt) Limited).
Proponent	Mr. Toqeer Javed S/O Javed Ahmad
Total Area of dumping site	100 Kanal
Location	Chak No. 134 NP Tehsil Liaqatpur District Rahim Yar Khan
GPS Location	29.033402 N, 70.898481 E (Google map is attached to A3 size with file)
Cost of the project	Approx. 192 million PKR

Dumping Site Capacity	Approx. 600,000 m ³
Waste type	Domestic Waste
Current status	Open Land
Manpower	Pre-operation: 8-10 Persons
	Operation: 380-420 Persons

Legal and Administrative Framework

The proposed project has been planned and assessed in accordance with the applicable national and provincial environmental laws, policies, and regulations of Pakistan. The relevant policy framework includes the National Conservation Strategy (1992), National Environmental Policy (2005), and the Pakistan Labour Policy (2010), which emphasize sustainable development, environmental protection, and occupational health and safety. The project also falls under the jurisdiction of the Punjab Environmental Protection Act (PEPA), 1997, as amended in 2026, which governs environmental assessment and regulatory compliance for development projects in Punjab.

In addition, the project has been evaluated for compliance with the Punjab Environmental Quality Standards (PEQS), the Land Acquisition Act (1894) (where applicable), the Punjab Wildlife Act (1974), the Prohibition of Cutting of Trees Act (1975), the Punjab Plantation and Maintenance of Trees Act (1974), and the Antiquities Act (1975) to ensure protection of ecological, cultural, and natural resources. A review of the applicable environmental legislation confirms the mandatory submission of an environmental assessment report under Section 12(1) of the Punjab Environmental Protection Act (1997), as amended in 2026, which requires projects likely to cause environmental impacts to obtain prior approval (NOC) from the Punjab Environmental Protection Agency. Accordingly, this Environmental Impact Assessment has been prepared for the proposed domestic solid waste management project under the Suthra Punjab Program, with due consideration of all relevant legal and administrative requirements.

Assessment of Major Environmental Impacts

Pre-Operational Phase

As the proposed disposal facility at Liaquatpur is a scientific landfill site, the pre-operational phase will involve limited site preparation activities. Potential environmental impacts during this phase may include minor soil disturbance, localized dust generation, and temporary noise due to site demarcation, minor leveling, and access track preparation. These impacts are expected to be short-term, localized, and of low significance.

Operational Phase

During the operational phase, the primary environmental impacts will be associated with the controlled disposal of municipal solid waste. Potential impacts include odor generation, attraction of disease vectors, dust emissions from waste handling and vehicle movement, and localized noise due to operational vehicles and equipment. There is also a potential risk of soil and groundwater contamination if waste is not managed properly, particularly during rainfall events. Increased traffic due to waste collection vehicles may result in minor air emissions and noise along collection routes; however, these impacts are considered manageable through proper operational controls.

Proposed Mitigation Measures

Mitigation Measures during Pre-Operational Phase

- **Dust Control:** Water sprinkling will be carried out, where required, during site leveling and access preparation to minimize dust emissions.
- **Noise Management:** Use of properly maintained equipment and restriction of activities to daytime hours.
- **Soil Protection:** Site leveling will be limited to the designated dumping area to avoid unnecessary land disturbance.
- **Occupational Health & Safety:** Workers will be provided with appropriate personal protective equipment (PPE) and basic safety training.

Mitigation Measures during Operational Phase

- **Solid Waste Management:** Waste will be disposed of in a controlled manner with proper spreading, compaction, and periodic soil cover to reduce odor, vector breeding, and visual impacts.
- **Leachate and Runoff Control:** Natural drainage patterns will be maintained, and surface runoff will be diverted away from waste heaps to minimize leachate infiltration.
- **Odor and Vector Control:** Regular soil covering, site cleanliness, and controlled tipping will be practiced.
- **Air Quality Management:** Vehicle speeds within the site will be controlled, and water sprinkling will be used during dry conditions.
- **Health and Safety:** PPE including gloves, masks, boots, and reflective jackets will be provided to workers.
- **Traffic Management:** Collection routes and disposal timings will be planned to minimize disruption to local traffic and communities.

Proposed Monitoring Framework

Given the nature of the project and its potential environmental impacts, a structured Environmental Management and Monitoring Plan (EMMP) has been proposed. The monitoring program will cover key environmental parameters including dust levels, noise, site hygiene, vector presence, and waste handling practices during the operational phase. Monitoring activities will ensure compliance with Punjab Environmental Quality Standards (PEQS) and relevant environmental regulations. The project proponent is committed to the effective implementation of all proposed mitigation measures. Environmental monitoring will be conducted on a regular basis to assess compliance and operational performance. Detailed monitoring parameters, responsibilities, and frequency are provided in Chapter 06 of the EIA report.

Conclusions and Recommendations

The proposed project under the Suthra Punjab Program is expected to result in significant positive environmental and social benefits for Tehsil Liaqatpur. These include improved sanitation conditions, reduction in indiscriminate dumping,

enhanced public health, and improved aesthetic conditions of urban and peri-urban areas. The project will also generate employment opportunities for local residents and strengthen municipal service delivery.

Any potential adverse environmental impacts associated with the project are expected to be minor, localized, and manageable through the implementation of the proposed mitigation and monitoring measures. It is therefore concluded that the project is environmentally acceptable, provided that all mitigation measures and monitoring requirements are strictly implemented. It is strongly recommended that the project proponent obtain the required No Objection Certificate (NOC) from the Punjab Environmental Protection Agency (Punjab-EPA) prior to commencement of project activities to ensure full legal and regulatory compliance.

1. Introduction

1.1 Background

Landfill Site (A project by Suthra Punjab) located at Tehsil Liaqatpur, is intending to develop a site where waste will be dumped from whole tehsil. The study has been carried out to estimate the potential environmental and social impact assessment, both positive and negative, on the environment as well as socio-economic fabric of the surrounding environment during construction as well as operational phase. This report intends to provide satisfactory mitigation measures to avoid/eliminate any chance of adverse environmental impact on the socio-cultural, economic and environmental components.

Given its scale and potential impact, an Environmental Impact Assessment (EIA) is being undertaken to assess and address any environmental and social concerns, in compliance with the Punjab Environmental Protection Act and IEE/EIA Regulations 2022.

1.1. Purpose of the Report

This report has been prepared to conform to the requirements of the Punjab Environmental Protection Act, 1997 (Amended 2026), which states that:

"No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an Initial Environmental Examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Provincial Agency approval in respect thereof."

The proponent feels its social, moral, and legal obligation to protect the environment. It is in this context that the company initiated the process of gaining Environmental Approval from the Punjab EPA. According to the direction, as detailed in the preceding para under "Introduction" this EIA (Environmental Impact Assessment) is being submitted for issuance of the said Environmental Approval in compliance with the Punjab Environmental Protection Act -1997 (Amended 2026) Section 12. The

proponent affirms that environmental management order will prevail both during construction and regular operation in accordance with the Punjab Environment Quality Standards (PEQS).

The report considers socio economic, physical, and environmental, land use, forestry, crops, water bodies, biodiversity (flora and fauna), heritage, and other relevant aspects associated with the project itself and the area around the project. The report also describes mitigation measures that will be adopted to undo environmental impacts on any segment of the environment, i.e., human health and environmental health around the project site both during installation and normal operation of the project. The report provides relevant information, as required under the officially approved format, to help the decision makers before issuing the desired environmental approval.

1.2 Screening of the project

According to projects categorization for environmental assessment studies, the proposed project falls under **Schedule II (list of projects requiring an EIA), Category G (Waste Storage and Disposal) Subsector 1 (Landfill sites)** as per Review of IEE and EIA Regulations 2022) made under section 12 of Punjab Environment Protection Act 1997 (Amended 2026) under which the Environmental Impact Assessment (EIA) for the proposed project is mandatory for getting Environmental Approval.

1.3 Identification of the project and proponent

Table 3 Project & Proponent Detail

Details of the Proponent & Project	
Proponent name	Mr. Toqeer Javed S/O Javed Ahmad
Proponent designation	Proponent
Address	House No.43, Block A2, Mohallah Model City, Sadiqabad District Rahim Yar Khan
Project title	Establishment of scientific landfill site by M/s SB Engineering JV (Sandhu Brothers Enterprises-Golden Jubilee Enterprises (Pvt) Limited)

Location of the project	Chak No. 134 NP Tehsil Liaqatpur District Rahim Yar Khan.
Purpose of the project	The purpose of the proposed project is to properly dispose of municipal Solid Waste.
Type of waste	Municipal Solid Waste
Dumping Site Capacity	Approx. 600,000 m ³

1.4 Consultant Information

The initiator has contracted with M/s Enviro Stewards Company (Private) Limited for the execution of an Environmental Impact Assessment (EIA) for the aforementioned project, in alignment with the standards and guidelines set forth by the Environmental Protection Agency (EPA) of Punjab. To fulfill this objective, M/s Enviro Stewards Company (Private) Limited has assembled a team of experts, including environmental specialists, environmental engineers, and chemical engineers. Further information on the consultancy team is provided below:

Details of the Consultant	
Company name	Enviro Stewards Company (Private) Limited
Address	134-A, Block A-1, Guru Mangat Road Gulberg III, Lahore.
Contact No.	0301-1199600

1.5 Nature, Size & Location of the project

The proposed project involves the establishment of scientific landfill site by M/s SB Engineering JV (Sandhu Brothers Enterprises-Golden Jubilee Enterprises (Pvt) Limited)" at Chak No. 134 NP Tehsil Liaqatpur District Rahim Yar Khan, over an area of 100 Kanal. The coordinates of project site are 29.033402 N, 70.898481 E.



Figure 1 Location of Map

1.6 Scope of the EIA Study, Area of Influence, and Magnitude of Efforts

The Environmental Impact Assessment (EIA) study has been undertaken to evaluate the potential environmental and social impacts associated with the proposed development of project. The primary objective is to ensure that the project complies with environmental regulations and integrates mitigation measures from the planning stage.

The scope of this study includes assessment of baseline environmental conditions, identification of potential impacts during construction and operational phases, and formulation of practical mitigation and monitoring strategies. It also addresses compliance with the Punjab Environmental Protection Act, 1997 and the Review of IEE & EIA Regulations, 2022.

The area of influence covers the project site and its immediate surroundings, extending up to a 2-3 km radius, encompassing local settlements, natural features, and infrastructure likely to be affected by project activities, such as air quality, water resources, noise levels, traffic flow, and waste disposal

The magnitude of effort involved includes baseline surveys, consultations with stakeholders, site reconnaissance, and technical assessments of environmental components. The study aims to support informed decision-making for environmental approval and ensure long-term sustainability of the project.

2 POLICY, LEGISLATION, LEGAL & ADMINISTRATIVE FRAMEWORK

2.1 General Overview

This section deals with the current policy as well as legal and administrative framework related to carrying out EIA of various projects. Several laws exist in Pakistan, containing several clauses concerning protection of the environment. Like other Projects, this project is also required to go through an Environmental Assessment for getting a NOC under Section 12 of the Punjab Environmental Protection Act - 1997 (Amended 2026).

According to environmental laws of the country development projects must undergo the process of Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) to predict and mitigate the impacts of the development at an early stage.

2.2 Screening/Category of the project

According to projects categorization for environmental assessment studies, the proposed project falls under Schedule II (list of projects requiring an EIA), Category G (Waste Storage and Disposal) Subsector 1 (Landfill sites) as per Review of IEE and EIA Regulations 2022 made under section 12 of Punjab Environment Protection Act 1997 (Amended 2026), under which the Environmental Impact Assessment (EIA) for the proposed project is mandatory for getting Environmental Approval. Details of the process description are given in Chapter 3 under the heading process description.

2.3 Scoping of the project

A scoping exercise was undertaken to identify the potential issues that are to be considered in the environmental impact assessment. The scoping exercise includes the following indispensable tasks.

2.3.1 Spatial and temporal boundaries of the project:

The proposed project site is located at Chak No. 134 NP Tehsil Liaqatpur District Rahim Yar Khan and comprises a designated area for municipal solid waste collection,

transportation, and controlled disposal operations. The project area includes facilities for waste receiving, controlled dumping, internal access roads, drainage, administrative infrastructure, and associated utilities.

The construction phase of the project is expected to be completed within the planned implementation schedule. During this phase, environmental impacts will be temporary and localized, mainly associated with site preparation, earthworks, movement of construction machinery, dust generation, noise, and construction waste. These impacts are expected to be of low to moderate significance and can be effectively managed through the implementation of appropriate mitigation measures.

The operational phase represents the long-term component of the project and involves the disposal of municipal solid waste generated within the service area. Environmental impacts during this phase will primarily relate to waste handling, transportation, dust emissions, odour generation, stormwater runoff, traffic movement, and occupational health and safety. These impacts will be minimized through proper operational practices and implementation of the Environmental Management Plan (EMP).

The scope of the Environmental Impact Assessment (EIA) for the proposed project includes the following:

- Identification and assessment of potential environmental and social impacts during the pre-construction, construction, and operational phases.
- Evaluation of significant impacts on air quality, water resources, soil, noise, traffic, public health, and surrounding communities.
- Assessment of potential cumulative impacts associated with project activities.
- Identification of practical mitigation measures to avoid, minimize, or compensate for adverse environmental impacts.
- Consultation with relevant stakeholders and incorporation of their concerns into project planning.

- Preparation of an Environmental Management Plan (EMP), including monitoring requirements, institutional responsibilities, and emergency response measures.
- Development of environmental monitoring and reporting procedures for compliance with applicable environmental regulations.
- Preparation and submission of the Environmental Impact Assessment (EIA) Report to the Punjab Environmental Protection Agency (EPA) for environmental approval.

2.4 Existing Regulation and Framework

This EIA study has been carried out in the light of the policy guidelines for the preparation of IEE/EIA Reports under the procedure and practices formulated by the Provincial Environmental Protection Agency (EPA).

2.5 Relevant Legal / Institutional Framework

The applicable laws for the environmental study of the project are briefly given below. The proponent of the project will abide by the applicable laws and regulations.

2.5.1 National Conservation Strategy, 1992

On March 1, 1992, the Cabinet of Pakistan approved the National Conservation Strategy. It describes the stark reality of the country's deteriorating resource base and its implications for what is still largely a natural resource-based economy. It sets forth the beginnings of a plan to integrate environmental concerns into virtually every aspect of Pakistani economic life. The strategy has three overriding objectives: conservation of natural resources, sustainable development, and improved efficiency in the use and management of resources.

2.5.2 PEPO 1983, PEPA 1997 (Amended 2026)

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO), which was replaced by the Pakistan Environmental Protection Act (PEPA) 1997, through an Act of Parliament. Now the PEPA 1997 has been replaced by Punjab Environmental Protection Act 1997 (Amended 2026) on 18th April 2012.

Under Sec. 8 of Environment Protection Ordinance (EPO) 1983, it was necessary to carry out EIA/IEE for all development projects, but there were no EIA/IEE regulations under that ordinance.

Under section 12 of the Punjab Environmental Protection Act, 1997 (Amended 2026) it is mandatory to take an Environmental Approval Environmental Protection Agency for commencement of any construction of project.

2.5.3 National Environmental Policy 2005

The Government of Pakistan (GOP) has notified National Environmental Policy 2005, for different projects/aspects in which guidelines/priorities have been given to undertake the projects having significant environmental impacts.

2.5.4 Review of EIA and IEE Regulations 2022

The GOP has issued Review of Initial Environmental Examination and Environmental Impact Assessment Regulations 2022, to review the Initial Environmental Examination (IEE) / Environmental Impact Assessment (EIA) Reports.

2.5.5 Guidelines for the Preparation and Review of Environmental Reports, 1997

The GOP has also framed guidelines for the preparation and review of IEE/EIA of projects in various developmental sectors.

2.5.6 Punjab Environmental Quality Standards (PEQS)

According to Punjab Environmental Protection Act, 1997 (Amended 2026), Punjab Environmental Quality Standards (PEQS) were established for municipal and industrial effluents and air emissions.

2.5.7 Guidelines for Sensitive and Critical Areas

GOP issued Guidelines for Sensitive and Critical Areas in October 1997. The objective of the guideline is to provide guidance to project proponents and other stakeholders in the environmental assessment process, so that the projects are planned and sited in a way that protects the values of sensitive and critical areas.

2.5.8 Policy and procedures for the Filing, Review and Approval of Environmental Assessments, November-1997

Environmental Assessment is the Primary means of managing the approval of new development proposals in Pakistan. Environmental Assessment allows for the systematic examination of proposals, clear procedures which provide for the interests of relevant Government Departments and other stakeholders to carefully consider.

2.5.9 Guidelines for Public Consultation, Pakistan Environmental Protection Agency October 1997

This guideline is part of a package of regulations and guidelines which include:

- Punjab Environmental Protection Act, 1997 (Amended 2026)
- Policy and Procedures for filing, review, and approval of environmental assessments
- Guidelines for the preparation and review of Environmental Reports
- Guidelines for sensitive and critical areas
- Punjab Environmental Quality Standards (PEQS)

2.5.10 Punjab Wildlife Protection Act, 1974

This act was framed in 1974 by the province Punjab and is about of protection and conservation of Wildlife.

2.5.11 Forest Act, 1927

This act was framed in 1927. The Forest Act, 1927 is still the basic charter for the forest departments in Pakistan. This law empowers provincial governments to manage forest areas.

2.5.12 Explosive Act, 1884

This act deals with explosives in prohibiting either absolutely or subject to conditions, the manufacture, possession, or importation of any explosive which is so dangerous in

character that, in the opinion of the appropriate Government, it is expedient for public safety to issue the notification.

2.5.13 Punjab Local Government Ordinance, 2022

Schedules 4 and 8 of this Ordinance pertain to environmental pollution. Under the Ordinance, the local councils are authorized to restrict projects causing pollution to air, water, or land. They may also initiate schemes for improving the environment.

2.5.14 Pakistan Penal Code, 1860

This defines the penalties for violations concerning pollution of air, water bodies and land. Sections 268 to 291 are about offences affecting public health. The offences relating to public Health safety and environment are as under.

Sec 268: Public Nuisance

Sec 269: Negligent act likely to spread infection of disease dangerous to life.

Sec 270: Malignant act likely to spread infection of disease dangerous to life.

Sec 278: Making atmosphere noxious to health.

Sec 284: Negligent conduct with respect to poisonous substance.

Sec 290: Punishment for public nuisance in cases not otherwise provided for.

Sec 291: Continuance of nuisance after injunction to discontinue.

2.5.15 Punjab Land Use Rules 2009

In January 2009 the Punjab Government notified "Punjab Land Use Rules 2009" for the clarification of Lahore Master Plan. In these rules permissible land use according to area type is defined.

2.5.16 Antiquities Act 1975

The law relates to protection of Antiquities, monuments, National & International heritage. Compliance with this Act is mandatory for the Installation of Generators. Under section 22 of the Act no development plan or scheme or new construction can

be done within distance of 200ft from the boundary of the monuments/ National Heritage. There is no historical Site or monuments in the proximity of the project.

2.5.17 Solid Waste Management Rules 2005

The Solid Waste Management Department, CDGF, has notified these rules for proper waste management.

2.5.18 Labor Law

The labor laws apply on child labor and measuring instruments.

2.5.19 Safety & Civil Defense Laws

The civil defense laws provide details about safety, fire protection and civil defense.

2.5.20 Guidelines for Critical and Sensitive Area

These guidelines have been prepared under section 12 of Punjab Environmental Protection Act 1997 (Amended 2026) for protection and safety of critical and sensitive localities.

3 PROJECT ALTERNATIVES

Project alternatives are evaluated to identify the most suitable option for achieving the project objectives while minimizing environmental and social impacts. The assessment considers technical feasibility, environmental sustainability, economic viability, and compliance with applicable environmental regulations. The alternatives examined for the proposed Project are discussed below.

3.1 No Project Option:

Under the "No Project" scenario, the proposed disposal site would not be implemented. Consequently, municipal solid waste would continue to be disposed of through open dumping, illegal disposal practices, and uncontrolled burning. Such practices would contribute to environmental degradation, foul odours, vector breeding, soil and groundwater contamination, blockage of drainage systems, and deterioration of public health.

In addition, the project would fail to create employment opportunities, improve municipal sanitation services, and enhance the overall environmental quality of the area. Therefore, the "No Project Option" is not considered a practical or environmentally acceptable alternative.

3.2 Build as Proposed:

The proposed project involves the disposal of municipal solid waste at a designated scientific landfill site. The selected approach provides an organized waste management system that minimizes environmental pollution and improves public health and sanitation.

Although some temporary impacts may occur during project implementation, these can be effectively managed through the mitigation measures proposed in this Environmental Impact Assessment (EIA). Therefore, implementation of the project as proposed represents the most suitable alternative.

3.3 Site Alternatives

Several potential locations were considered for the scientific landfill site. The selected site was preferred based on the following considerations:

- Availability of sufficient land.
- Adequate distance from residential settlements.
- Good road accessibility for waste collection vehicles.
- Minimal disturbance to surrounding communities.
- Absence of environmentally sensitive areas, forests, wetlands, and protected habitats.
- Compliance with applicable land-use planning requirements.

Considering these factors, the selected site is the most appropriate location for the proposed project.

3.4 Operational Alternatives

Various municipal solid waste management approaches were evaluated before selecting the proposed system.

3.4.1 Open Dumping

Open dumping is the uncontrolled disposal of waste directly on land without engineering controls.

Advantages

- Low initial investment.
- Simple operation.

Limitations

- Causes air, soil and groundwater pollution.
- Produces foul odours.
- Attracts rodents, insects and stray animals.
- Creates serious public health risks.

- Non-compliance with environmental regulations.

3.4.2 Scientific Landfill Site (Selected Option)

Controlled dumping involves the organized disposal of municipal solid waste with proper waste placement, compaction, drainage management, and periodic soil cover wherever applicable.

Advantages

- Better environmental protection than open dumping.
- Reduced odour and litter dispersion.
- Improved control of disease vectors.
- Easier site management and monitoring.
- Lower operational cost compared to sanitary landfills.
- Suitable for the local waste generation rate and available resources.

Limitations

- Requires regular supervision and maintenance.
- Long-term monitoring is necessary.
- Proper stormwater management is required.

3.4.3 Conclusion

After evaluating the available alternatives, scientific landfill site has been selected as the preferred option because it provides an effective balance between environmental protection, operational feasibility, and economic viability. The selected approach is suitable for the anticipated waste quantities, available financial resources, and local operating conditions while ensuring compliance with applicable environmental regulations.

3.5 Environmental Alternative

The selected project site is located away from forests, wildlife habitats, wetlands, protected areas, and other environmentally sensitive locations. No significant impacts on biodiversity, flora, fauna, migratory birds, or cultural heritage sites are anticipated.

Environmental management measures including controlled waste placement, regular site maintenance, dust suppression, stormwater drainage, and plantation of indigenous trees along the project boundary will further minimize environmental impacts.

3.6 Economic Alternative

The proposed project offers significant economic and social benefits by improving municipal waste management services and reducing the costs associated with uncontrolled waste disposal. The project will generate direct and indirect employment opportunities for local residents and improve the overall cleanliness and attractiveness of the area.

Energy-efficient equipment, proper route planning for collection vehicles, and regular maintenance will reduce fuel consumption and operational costs. Tree plantation around the disposal site will enhance the landscape, provide a natural dust and noise barrier, and improve the local microclimate.

Overall, the project represents an economically viable and environmentally responsible solution for municipal solid waste management in the project area.

4 PROJECT DESCRIPTION

4.1 Overview

The proposed project involves the establishment of scientific landfill site by M/s SB Engineering JV (Sandhu Brothers Enterprises-Golden Jubilee Enterprises (Pvt) Limited) at Chak No. 134 NP Tehsil Liaqatpur District Rahim Yar Khan over an area of 100 Kanal. This is necessitated by the increased demand for proper waste disposal and the desire for maintenance of a clean environment.

4.2 Type & Category of the project

The proposed project is the establishment of scientific landfill site by M/s SB Engineering JV (Sandhu Brothers Enterprises-Golden Jubilee Enterprises (Pvt) Limited) which falls under **Schedule II (list of projects requiring an EIA), Category G (Waste Storage and Disposal) Subsector 1 (Landfill sites)** as per Review of IEE and EIA Regulations 2022 made under section 12 of Punjab Environment Protection Act 1997 (Amended 2026).

4.3 Objective of the project

The objectives of the aforesaid project are given below:

- To ensure proper collection and disposal of municipal solid waste
- To keep the environment clean and safe for all the living being
- To properly manage the municipal solid waste of tehsil Liaqatpur

4.4 Alternative Consideration

Alternative assessment is an essential component of environmental planning, as it supports informed decision making by identifying potential environmental and social implications at the earliest stage of project development. For the proposed Dumpsite in Tehsil Liaqatpur, the assessment focused on site suitability, design and layout considerations, environmental safeguards, and economic feasibility. Emphasis was

placed on long-term sustainability, public health protection, and compliance with applicable legal and regulatory requirements.

4.4.1 Site Alternatives

For the proposed Municipal Solid Waste Landfill site in Tehsil Liaquatpur, alternative site was considered but the proposed site is suitable and available for the said use. The selected site was finalized in consultation with the concerned authorities based on technical feasibility, land availability, and regulatory compliance.

The consideration of alternative sites was not pursued due to the following reasons:

- The selected land falls within the jurisdiction of the local municipal authority and is compatible with approved land use zoning and regional planning guidelines.
- The site is located away from densely populated residential areas, educational institutions, healthcare facilities, and other sensitive receptors, thereby minimizing potential social and health impacts.
- The land is non-agricultural and does not fall within any protected ecosystems, wetlands, water bodies, or culturally significant areas, reducing the risk of ecological and heritage-related impacts.
- The land availability of the scientific landfill site for the tehsil Liaquatpur.
- Availability of access routes and proximity to waste generation centers make the site operationally viable and reduce transportation time and fuel consumption.

Considering these factors, the selected location was found to be the suitable and feasible option for waste disposal in Tehsil Liaquatpur with proper mitigation measures.

4.5 Project location & site layout

The project site is located near the Chak No. 134 NP Tehsil Liaquatpur District Rahim Yar Khan. The Google map of the project site is given below in Figure 2. The coordinates of the project site are 29.033402 N, 70.898481 E.

East: Open Land

West: Open Land

North: Green area/ Open Land

South: Open Land

4.6 Land use of the site

The land selected for the project is currently open land and there is no activity going on.

4.7 Road Access

The proposed project site is well-connected through paved roads, specifically providing direct and reliable access to the area. This road infrastructure is vital for facilitating the transportation of construction materials, machinery, and workforce during the development phase, and will also support smooth vehicular access. The road access enhances the project's feasibility and aligns with sustainable planning objectives. A detailed road access map is included to illustrate the site's connectivity with the surrounding transport network.

4.8 Vegetation features of the site

The project site has no vegetation cover; however, there are various species of trees surrounding the project side which will not be cut during construction. In fact it will act as buffer and the company is also actively working on enhancing its environment through more plantation activities. No tree will be cut due to the project as the site for the incinerator will be on the vacant land.



Figure 2 Project Site

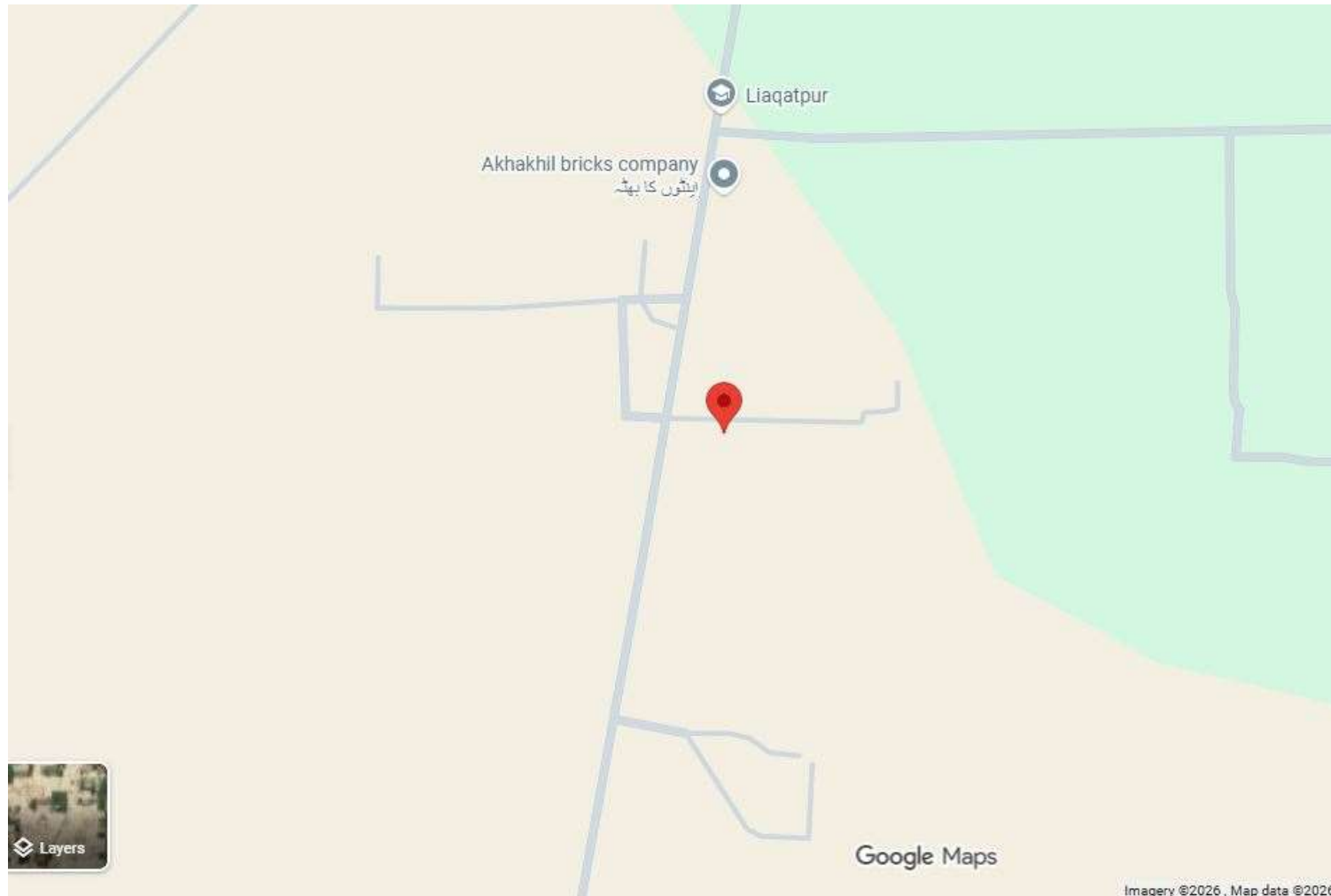


Figure 3 Road Acce

4.9 Plantation Plan

To enhance environmental sustainability and aesthetic appeal, the proposed project includes the plantation of approximately 1,000 to 2,000 trees and shrubs within and around the site. The plan emphasizes shade-providing, ornamental, and native species, ensuring long-term ecological balance and improved air quality.

Key Features

Boundary Plantation: Fast-growing, pollution-tolerant species such as Neem and Peepal will be planted along the perimeter for screening, dust control, and noise reduction.

Ornamental Trees and Shrubs: Selected for visual appeal, seasonal flowering, and biodiversity support.

Native Species Priority: Focus on low-maintenance, drought-tolerant plants suited to climate.

Maintenance Plan

Watering: Efficient irrigation to meet species-specific needs and minimize water wastage.

Pruning & Trimming: Regular maintenance to ensure healthy growth and landscape aesthetics.

Annual Evaluation: Yearly health assessments with prompt replacement of dead or unhealthy plants.

Landscaping Considerations

Sustainability: Use of natural fertilizers and drought-resistant species to reduce resource consumption.

Seasonal Variety: Integration of flowering plants for year-round color and visual interest.

Soil Health: Maintenance of fertility using organic methods to support long-term plant growth.

4.10 Magnitude & Cost of Project

The Proposed project spans a total area of, marking it as a significant urban development initiative in the region. The project carries an estimated total capital investment of 192 million PKR, covering land development, infrastructure construction, utilities installation, and operational setup. The financial plan includes all costs associated with ensuring operational safety and environmental protection, eliminating the need for separate allocations for these aspects. Strong emphasis will be placed on the safe management of equipment and operations through rigorous and proactive practices. This integrated financial and operational planning underscores the project's commitment to both economic viability and environmental responsibility.

Table 4 Cost & Magnitude

Description	% age of cost
Fuel Cost	28.80
HR Cost	38.01
Other Operational Cost	33.19
Total Cost	100 %

4.11 Proposed Schedule of Implementation

Stage I: Preliminary Phase

In the initial eight weeks, the site will be cleared, surveyed, and prepared for development. Feasibility assessments, soil testing, and basic site planning will be carried out, along with initial project documentation and mobilization plans.

Stage II: Design and Approval Phase

Over the next 12 weeks, the detailed engineering design of the safety systems, and utility infrastructure will be finalized. Simultaneously, regulatory approvals and NOCs will be obtained from Punjab EPA, and local authorities.

Stage III: Construction and Infrastructure Development Phase

Spanning approximately 16 weeks, this phase involves civil construction, and purchasing of vehicles and equipment, will also be completed during this time.

Stage IV: Testing & Operations Start

In the final 8 weeks, equipment installation, safety inspections, and trial runs will be conducted. Operational staff will be recruited and trained, and after successful safety checks, the commissioning and official operations will commence.

ACTIVITY	TIME FRAME					
	Four Week	Four Week	Four Week	Four Week	Four Week	Four Week
Preliminary Phase						
Design Phase						
Approval Phase						
Construction Phase						
Infrastructure Development						
Equipment Installation & Testing						
Safety Inspection & Trial Runs						
Commissioning & Operations Start						
Commissioning & Operations Start						

4.12 Description of the project

The proposed project involves the establishment of scientific landfill site by M/s SB Engineering JV (Sandhu Brothers Enterprises-Golden Jubilee Enterprises (Pvt) Limited) at Chak No. 134 NP Tehsil Liaqatpur District Rahim Yar Khan with following coordinates: 29.033402 N, 70.898481 E.

4.12.1 Overview of Operational Process

The landfill will serve as a scientifically designed, environmentally controlled waste disposal facility to replace existing open dumping practices. It will cater to the municipal solid waste (MSW) generated from tehsil liaqatpur and its surroundings

supporting safe, long-term waste containment and environmental protection. The operational process is designed to replace irregular and scattered waste handling practices with a structured and monitored municipal service system.

Table 5 Design features of landfill site

Component	Description
Base Liner System	HDPE + clay composite liner to prevent leachate infiltration
Leachate Collection System	Network of perforated pipes to collect and drain leachate to treatment units
Gas Collection System	Passive or active methane gas vents or wells to prevent gas buildup
Waste Cells	Compacted layers of waste, daily covered with soil or geotextile
Perimeter Drainage	Prevents rainwater from entering waste cells
Weighbridge & Entry Gate	For tracking incoming waste and managing site access
Fencing and Security	To restrict unauthorized access and ensure operational control
Plantation Buffer Zone	Green belt to reduce odor and visual impact

Sweeping Schedule

- Main roads and commercial areas: **Daily**
- Secondary streets: **3–6 times per week**
- Peripheral roads: **As per assigned schedule**

Controlled Dumping Practices Include

- Waste tipping in designated cells or zones
- Spreading of waste in thin layers
- Periodic compaction using tractor/dozer (if available)
- Application of soil cover at intervals

- Controlled working face area

Layering Method

Waste is placed in shallow layers (lifts), typically:

- 0.5-1.0 meter per lift
- Periodic soil cover applied
- New layer placed over covered waste

Site Controls Include

- Boundary demarcation
- Controlled vehicle entry
- Restricted dumping area
- Windblown waste collection
- Surface runoff diversion
- Temporary fencing (where feasible)

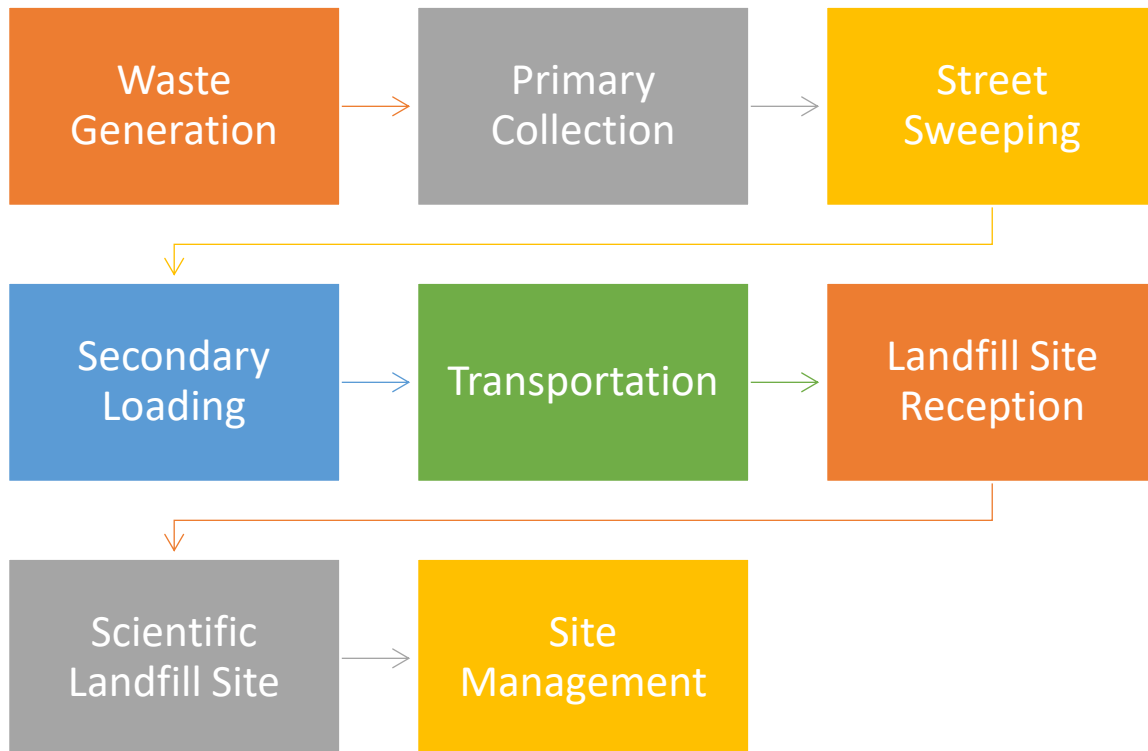
Open burning of waste will be strictly prohibited.

Safety Measures

- PPE for workers (gloves, masks, boots, reflective jackets)
- Safety training for collection crews
- First aid availability
- Safe vehicle operation procedures

4.12.2 Process Flow Diagram of Municipal solid Waste Management:

The process flow chart of waste management is given below:



4.12.3 List of Machinery

The list of complete machinery is provided with in the documents of the report.

4.13 Waste Handling and Deposition Controls

The proposed disposal facility at Liaqatpur is a **scientific landfill site** designated under the Suthra Punjab Program for municipal solid waste generated within Tehsil Liaqatpur.

Waste brought to the site will be deposited only within designated tipping zones. The waste will be spread in thin layers and, where feasible, compacted using available machinery such as a tractor-mounted blade. The active dumping area will be kept limited to reduce odor, litter spread, and vector breeding. Periodic soil cover will be applied over waste layers to control flies, rodents, and windblown material. Open burning of waste will be strictly prohibited.

4.14 Residual Waste and Inert Material Management

Inert waste such as silt, street sweeping debris, and non-recyclable materials will be disposed of within the controlled dumping area. No hazardous industrial waste or infectious hospital waste will be accepted at the site. Visual inspection will be carried out at the time of unloading to discourage unauthorized waste types. Recovered recyclable materials, where identified by informal recyclers or sorting workers, may be separated before final deposition, subject to safety controls.

4.15 Water Supply

Water required for site operations such as dust suppression and occasional soil moistening will be obtained through municipal supply or water tankers, as arranged by the contractor or municipal authority. Water demand is expected to be low and intermittent. No continuous process water consumption is involved in controlled dumping operations.

4.16 Wastewater Generation and Treatment Mechanism

The wastewater generation from the domestic source. Wastewater will be treated by septic tank.

4.17 Operational Hours

The working hours will be 8 hours per day based on daily tonnage and will be 240 hours per year

4.18 Energy Requirements and Sources (e.g., Electricity, LPG)

The project requires minimal energy, primarily for lighting at collection points and the scientific landfill site, which will be met through the local electricity supply. No LPG or high-energy-consuming machinery will be used, as sweeping, collection, and waste transportation activities rely mainly on manual labor and fuel-operated vehicles.

4.19 Personnel Protective Equipment (PPE)

Appropriate Personal Protective Equipment (PPE) will be provided to all workers involved in waste collection, sweeping, transportation, and disposal activities. PPE requirements will be matched to job responsibilities and risk exposure.

Standard PPE Includes:

Safety helmets (for site workers where required)

Protective gloves (cut-resistant and rubber)

Safety boots/gumboots

Dust masks or respirators

Eye protection goggles

High-visibility jackets

Protective overalls

Ear plugs (for high-noise vehicle operators)

General Safety Equipment

First aid kits

Fire extinguishers on vehicles and at site office

Drinking water and washing facilities

Emergency contact and incident reporting system

4.20 Site Restoration and Rehabilitation Measures

Controlled dumping operations will be carried out in planned cells to allow progressive site management. When a dumping cell reaches its capacity, it will be closed through leveling and application of soil cover. Closed portions of the site may be stabilized through plantation of grasses and native plant species to reduce erosion and improve visual conditions.

Upon suspension or closure of dumping activities in any section of the site, the area will be graded and compacted to prevent water ponding. Plantation of suitable vegetation will be undertaken where feasible to support site rehabilitation and environmental improvement.

4.21 Sustainable/Green Features

The project incorporates sustainable waste management practices, including controlled dumping to reduce open dumping and environmental pollution. Efficient route planning for waste collection minimizes fuel consumption and emissions, while periodic soil covering and green belt development around the dumping site help control dust, odor, and visual impacts, contributing to improved environmental quality.

4.22 Government Approvals

Presently, the only approval required is from Punjab Environmental Protection Agency to start construction and installation of this state-of-the-art waste management technology to work for the appropriate disposal of domestic waste, resulting in control over the spread of infectious diseases.

5 DESCRIPTION OF ENVIRONMENT

The Environmental Baseline Study serves as a foundational element of the Environmental Impact Assessment (EIA) for the proposed project. Its primary purpose is to create a comprehensive database that facilitates the prediction and management of potential environmental impacts resulting from the project's construction and operation phases. This study encompasses a detailed examination of the project area, highlighting regional resources likely to be influenced by the project alongside those anticipated to remain unaffected.

5.1 Data Collection

The data collection phase involved several key activities aimed at understanding the existing environmental conditions and gathering community and stakeholder insights:

Site Visits:

A thorough survey of the field area was undertaken to collect pertinent data directly from the project site, ensuring a grounded understanding of the physical, ecological, and socioeconomic settings.

Interviews with the Public and Stakeholders:

Engaging with the public and project stakeholders provided valuable perspectives on the proposed project. These interactions offered insights into public opinion and expectations regarding the project's implementation.

Consultations with Organizations:

Meetings with various Governmental and Non-Governmental Organizations (NGOs) were conducted to gather additional relevant data. The views and feedback obtained from these organizations were documented to enrich the EIA report with diverse perspectives on the project's potential environmental impact.

The environmental baseline study focuses on three primary components:

- Physical Environment

- Ecological/Biological Environment
- Socioeconomic Environment

The comprehensive approach to data collection and analysis within the environmental baseline study ensures that all potential impacts of the proposed project are anticipated and addressed. This process not only aids in the responsible planning and implementation of the project but also aligns with regulatory requirements and community expectations, paving the way for sustainable development.

5.2 Physical Environment

The proposed project lies in District Rahim Yar Khan where proponents intend to develop the proposed project. There are different industrial units within the project area in operational, constructional, and planning phase. The project lies in Rahim Yar Khan, and it has a detailed background history.

5.2.1 Geology

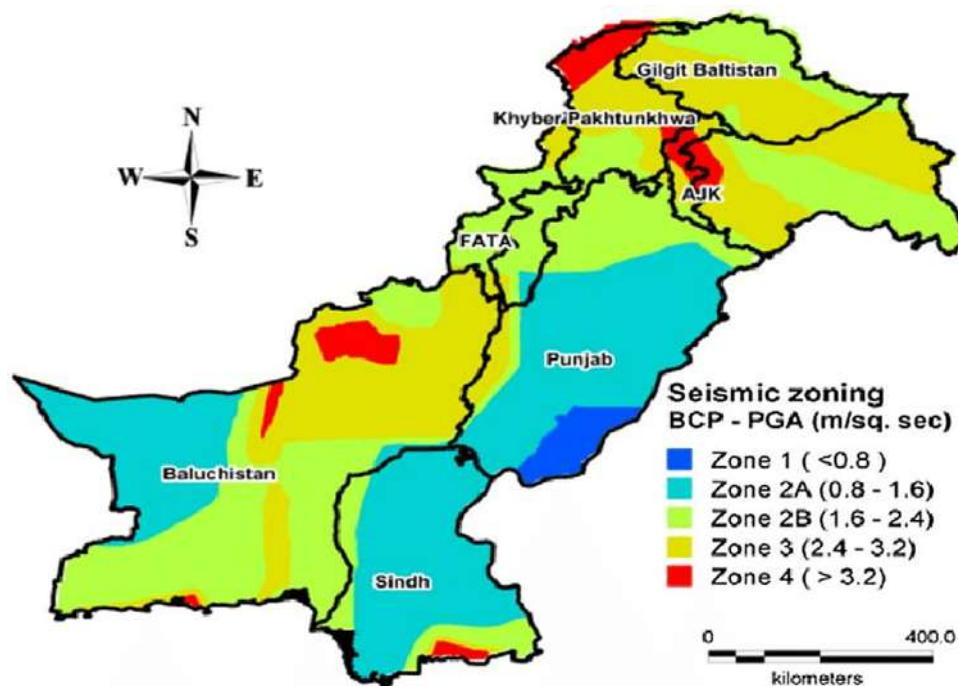
Punjab Province mostly comprises of plain areas lying in the Indus Basin formation. Rahim Yar Khan District lies between Indus basin and Cholistan Desert formation the project area lies on un-deformed Indian plate rock with a recent sedimentary cover. The project area only falls within one geological category of flood plain deposits. Fortunately, no fault line has been noted and the area is not seismically active.

A major portion of the Punjab Province falls in the Indus Plain, which geologically originated in the Late Pleistocene period by deposition of sediments from the Himalayas into abyssal sea. In early days the sediments were carried by two river systems, viz., Indus and Ganges. Later in geological history, the Ganges River changed its course from westward to eastward. Later, the Indus River and its five major tributaries, viz., Jhelum, Chenab, Ravi, Bias and Sutlej, carved the deposits of the early river systems.

5.2.2 Seismicity

Pakistan lies on an active seismic belt of earth. Seismic observations indicate that hundreds of shocks originate every year. Mostly, these seismic waves are of low intensity and do not have significant effect. According to seismic zones of UN- Habitat the project area falls under Zone 2A. The seismic zoning is shown in the figure.

5.2.3 Climate



The climate of the district Rahim Yar Khan is generally hot and dry in summer and cold and dry in the winter. The summer season is comparatively longer. It starts in April and continues till October. The winter season goes from November to March. However, the months of March and November are pleasant. In the Project area, January is the coldest month with a mean daily minimum temperature 4.4oC and the June is the hottest month with mean daily maximum temperature of 42.4oC. However, in the Project area summer is very hot and winter is very cold. Temperature variations are tremendously high in the Project Area. Although the highest time temperature is quite pleasant

because of the proximity of Cholistan desert the relative humidity is highest from July to January, whereas the dry spell starts in April and that till to June.

Table 6 Climate of RYK

Month	Mean Temperature Max	Mean Temperature Min	Precipitation	Relative Humidity
January	19.7	5.0	33.8	66.2
February	21.6	7.7	50.0	60.0
March	26.0	12.5	60.5	53.8
April	33.0	17.7	36.5	41.8
May	38.1	22.0	31.8	32.5
June	40.5	25.8	51.6	37.8
July	35.7	25.8	23.3	67.8
August	34.4	25.3	22.2	70.8
September	35.0	23.0	77.7	65.5
October	33.1	16.6	12.2	55.6
November	27.8	9.9	9.9	62.7
December	21.5	5.7	30.4	72.06
Annual mean	30.6	16.4	36.6	56.4

5.2.4 Surface Water and Ground Water

There are no surface water resources like canals or ponds, near the project area. Ground water is the principal source of municipal water supply Rahim Yar Khan. This is also the case in the immediate vicinity of the site. The city's drinking water is obtained from groundwater aquifer by means of tube wells located throughout the area.

Groundwater is pumped from 60-65 ft feet and is generally good for direct consumption.

5.2.5 Soils

In spite of level differences between the various landforms, the land area falling within one landform is nearly level. The soil generally ranges from loamy sand to sandy. The lands are extensively cultivated under irrigation from canal systems off-taking from Indus River. Hand Pumps Groundwater is also extensively exploited for irrigation purposes by installing deep and shallow tube-wells. The major soils in the project area are mainly loamy clay and loamy sandy soils.

5.2.6 Temperature

In the Project area, January is the coldest month with a mean daily minimum temperature of 4.4oC and the June is the hottest month with mean daily maximum temperature of 42.4oC. However, in the Project area summer is very hot and winter is very cold. Temperature variations are tremendously high in the Project Area. Although the highest time temperature is quite pleasant because of the proximity of Cholistan desert the relative humidity is highest from July to January, whereas the dry spell starts in April and that lasts till June.

5.2.7 Ambient Air Quality

Atmospheric pollution means the imbalance in the normal air chemistry. It can occur due to the addition of a new chemical into the atmosphere or by the change in concentration of the chemicals already existing in the atmosphere.

Atmospheric pollution particularly in urban areas has a strong impact upon daily life. The reasons for such changes can both be natural as well as anthropogenic. Ambient air quality is a key to measuring the concentration of the various chemicals in the atmosphere; especially of the chemicals which pose detrimental effects on health,

safety and environment, to have a comparison with their safe concentrations, as established in WHO Standards and NAAQS.

Table 7 Air Quality

Parameters	CO	SO ₂	NO ₂	PM ₁₀	SPM	O ₃
Unit	mg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
Front side	0.1	35.46	16.98	33.89	195	41.51
Central point	0.1	35.46	16.98	33.89	195	41.51
Back side	0.1	35.46	16.98	33.89	195	41.51
NEQS	5	120	80	150	500	130

5.2.8 Noise Levels

Noise is described as an unwanted sound emitted from unavoidable sources of anthropogenic activities. Daily based natural induced sources of noise are rare to none but human induced noise sources are plentiful and un-avoidable. Physically, there is no distinction between sound and noise. Sound is sensory.

The perception and the complex pattern of sound waves is labeled noise, music, speech, low altitude airplane flying etc. The noise pollution in the project area is a source of pollution and nuisance. Among eight noise measurement locations in the cities, the study says, on average, the noise level ranged from 57-60 dB (A) in and around the project site.

5.3 Ecological/Biological Environment

In this section, the baseline environmental conditions pertaining to biological environment are described. These conditions have subsequently been used to identify the potential impacts on the biological environment that are likely to arise from the project activities.

5.3.1 Wildlife

Because of extensive cultivations, high population and human activities, there is little wildlife in the project area. However, the local population as well as the Wildlife Department has reported some fauna.

5.3.2 Forestry

There are no forests in the Rahim Yar Khan district. According to the forestry department there are no signs of any forest in the past as the area is dry soil. Only shrubs and herbs were present.

5.3.3 Wildlife

Snakes, mammals, lizards, and doves are seen in this area.

5.3.4 Fauna

The main fauna of the project comprises of mammals, birds, and reptiles.

Mammals:

Although most of the study area comprises agricultural lands, due to presence of shrubs of grass, shrubs and several agricultural crops like wheat in the surroundings 10 mammalian species have been recorded. Dense vegetation provides living shelter to the mammals like Asiatic Jackal, Five Stripped Palm Squirrel, Indian Crested Porcupine, Indian Desert Jird, Indian Gerbil, Cape Hare, Small Indian Mongoose, House Mouse, House Rat, and Jungli Cat. All the 10 species are commonly found in the project areas as well as in the country and no significant threat can be expected from any activity.

Reptiles:

During the study several types of burrows and droppings were found which indicate the presence of respected reptiles. None of the reptiles and mammalian species found

here are listed under any category of the IUCN Red List. Ten species of reptiles were also recorded including snakes, lizards and agamas.

5.3.5 Flora

Based upon observations during the field visit many species of plants were directly observed in the project area. List of the floral species in the project area are given in the following:

- Katran
- Phatokar
- Chapri
- Barem Dandi
- Gor Gopan
- Bo Phali
- Rat Sat
- Phali
- Pelu
- Khip

5.4 Socio Economic Environment

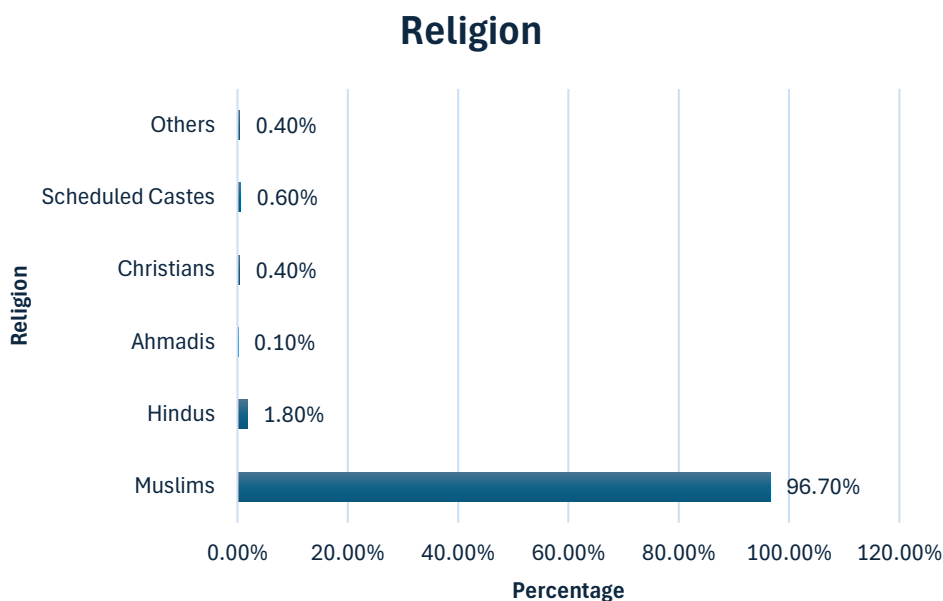
Social change is the consequence of almost any intrusion into the community life of any society. The intrusion can be in the form of any developmental projects or nonspecific, less tangible forms such as increased exposure to other cultures, technological changes and so on. Community, with special reference to environment and conservation of natural resources.

5.4.1 Demographic Profile

Demographic Studies are the major source of any city's Socio-Economic profile. Demographic Studies relate to population. Population studies are extremely important from a Town Planning point of view. Until and unless we know about population in detail, we cannot do successful planning. All aspects of population, such as sex-age composition, trend of migration, social, cultural, political, economic, and administrative have to be related to planning considerations and decisions.

5.4.2 Religion

The population of Okara is over 96 % Muslim with a Sunni majority and Shia minority; there are also small non-Muslims groups of Christians, Hindus and Sikhs.



5.4.3 Languages and major Casts

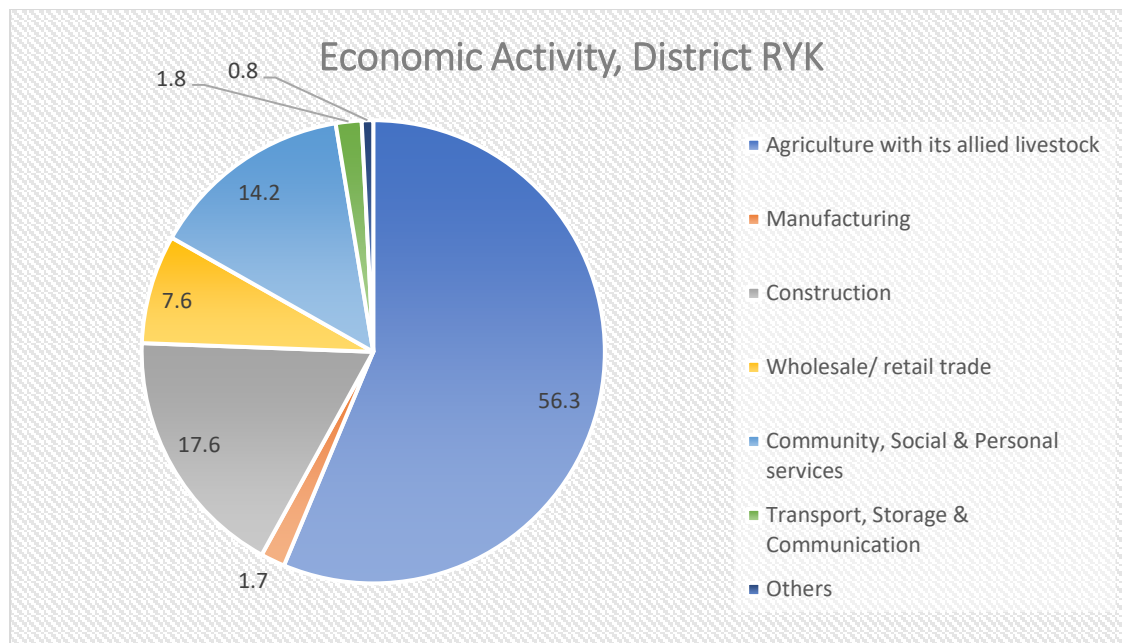
There is no specific tradition on specific occasions and are same as other cities of Punjab. There are no clashes found in the area, people live peacefully however there is a combination of different cast and creeds and religions because district Rahim Yar Khan is industrial city and people from different cities live for the jobs and different business. Major casts dwelling there, are Sheikh, Arain and Rajput.

5.4.4 Dress

Majority of the people wear Kameez and Shalwar. English dress, shirt and Trousers are also common in Rahim Yar Khan as well like other big cities of Pakistan.

5.4.5 Economic Activity

The economy of district RYK is based on agriculture. The major industrial occupations in the district,



5.5 Quality of Life Values

5.5.1 Health Facilities

Hospitals exist in the project area. People also have access to private hospitals in city and sometimes to nearby private dispensaries. Fever, malaria and chest congestion, Hepatitis-C were reported as the common diseases of the project area. In the project area, health conditions are much developed.

5.5.2 Customs

The people are very much concerned about castes and beliefs, visiting shrines is very common among them.

4.6.3. Electric Supply

Power supply line goes all along the project area, and approximately 90% of the community can acquire electricity. Gas supply has been provided to the area, but few of the houses cannot afford to avail the service, so these houses depend upon fuel wood. But the majority of the people belong to business communities, government sectors and have small jobs in district Rahim Yar Khan.

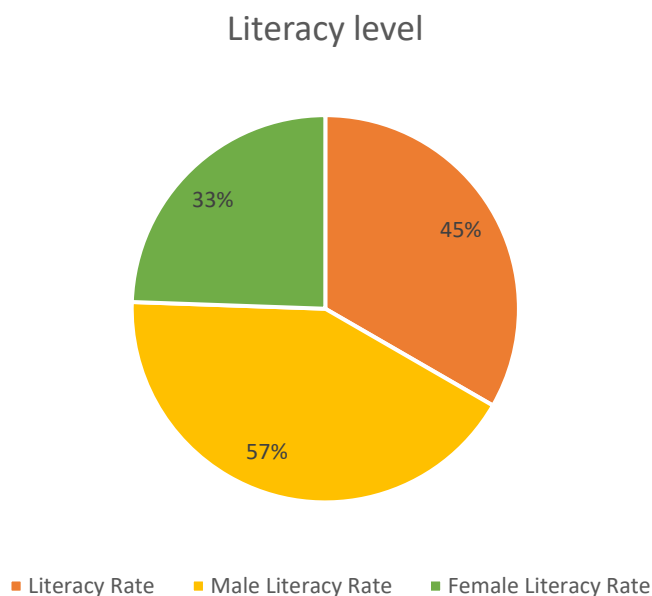
5.5.3 Telephone Facilities

PTCL telephone facility is available in all parts of the project area. Similarly, a mobile service is also available and is being used efficiently as mode of communication in the project area.

5.5.4 Educational Facilities

In the 1998 census Literacy was defined as the "ability of a person to read a newspaper or write a simple letter in any language". Literacy is also measured in terms of literacy ratio and computed as percentage of literate persons among the population aged 10 years and above.

The literacy ratio of the district Rahim Yar Khan is 45 %, with a split of 57 % for males and 33 % for females. There are sharp differences in the literacy ratios by sex and areas.



5.5.5 Agriculture

Major crops of the town are wheat, grain, peas, barley are the important crops of Rabi season, while Kharif crops are cotton, sugarcane, potato, bajra, oil seeds which are shipped by rail and road to other parts of the country.

5.5.6 Site of Physical, Cultural Heritage

There are no documented or protected sites of archaeological, cultural, historical & religious significance in the project area. No visible signs were observed of such sites while conducting the field work.

6 Impact Assessment & Mitigation Measures

This chapter provides a review of the potential impacts of the waste management facility. These impacts could be both positive and negative and have been classified accordingly by a thorough review of the construction and operational phases of the project. This assessment numerates the magnitude of these impacts with the aid of environmental checklist and presents effective mitigation measures to counter their adverse nature.

6.1 Purpose of Environmental Mitigation Measures

Environmental mitigation measures are essential for ensuring the sustainable operation of the project, aligning with environmental compliance, and safeguarding ecological integrity. The rationale behind these measures is dissected through a series of critical inquiries:

1. Identification of the Problem

The core issue arises when environmental resources are exploited unsustainably, leading to significant degradation. Such exploitation diminishes the environment's resilience and carrying capacity, severely impeding its natural recovery processes. In the context of the proposed project, this could manifest as pollution, habitat disruption, or resource depletion, directly impacting the local ecosystem's health and functionality.

2. Timing for Addressing the Problem

The environmental impacts of the project will become apparent from the onset of construction activities and continue throughout the operational phase. These effects are not confined to the project site but may extend to surrounding areas influenced by project activities. Early identification and timely intervention are crucial for preventing long-lasting or irreversible damage. Mitigation efforts should be initiated at the planning stage and integrated into all phases of the project lifecycle.

3. Location for Mitigation Efforts

Mitigation strategies should be applied at the source of the environmental impact. This means implementing measures directly within the project site and, as necessary, in adjacent areas that might be affected by project-related activities. Focusing on the origin of potential problems ensures targeted and effective mitigation, reducing the overall environmental footprint of the project.

4. Approach to Addressing the Problem

Addressing environmental issues necessitates adopting eco-friendly practices and technologies throughout the project's development and operation. Mitigation plans should include:

- **Resource Efficiency:** Minimizing the use of natural resources and promoting recycling and reuse to reduce waste.
- **Pollution Control:** Implementing advanced pollution control technologies and practices to minimize emissions, effluents, and waste generation.
- **Habitat Protection:** Avoiding or minimizing impacts on natural habitats and biodiversity, including the development of green belts and conservation areas.
- **Community Engagement:** Involving local communities and stakeholders in decision-making processes to ensure that mitigation measures address their concerns and benefit the local environment and population.
- **Monitoring and Compliance:** Establishing rigorous monitoring systems to assess the effectiveness of mitigation measures and ensure compliance with environmental regulations.

6.2 Impact Identification Methodology

The methodology for identifying potential environmental impacts associated with the proposed facility involves a comprehensive approach. It includes:

Review of Project Activities: Detailed examination of all phases of the project to understand the range of activities and their potential environmental interactions.

Environmental Study: Assessment of the surrounding environment to identify sensitive areas, ecological value, and any existing vulnerabilities.

Literature Review: Analysis of existing studies, reports, and publications related to similar projects to draw parallels and learn from past experiences.

Expert Judgment: Utilization of insights from environmental experts to predict potential impacts based on their expertise and knowledge of similar projects.

6.3 Approaches for Mitigation Measures

Mitigation of environmental impacts involves several strategies:

- * **Avoid:** Altering project plans such as route or site adjustments to protect ecological or archaeological features.
- * **Replace:** Creating equivalent ecological habitats elsewhere if the original habitat is disturbed.
- * **Reduce:** Implementing measures like filters, cyclones, noise barriers, and visual screening to lessen impacts.
- * **Restore:** Rehabilitating the site post-operations to their original state or better.
- * **Compensate:** Providing support to displaced communities or individuals through relocation, facilities, or financial means.

6.4 Impacts and Mitigation Measures due to Location

Construction activities will generate dust and noise, potentially affecting nearby communities and air quality temporarily. Movement of construction materials and, later, residential traffic could increase congestion on local access roads.

Mitigation Measures

Allocate green areas, parks, and open spaces within the project to maintain environmental balance. Sprinkle water on unpaved areas during construction to control dust emissions. Use noise barriers or schedule high-noise activities during daytime hours to minimize disturbance. Ensure that construction machinery is fitted with appropriate noise suppression equipment. Implement landscaping plans that use native tree and shrub species.

6.5 Impacts and Mitigation Measures in Pre-Operational Phase

i. Soil Disturbance and Land Degradation

Impacts:

Minor soil disturbance may occur due to site clearing, demarcation, leveling, and movement of construction machinery. This may lead to temporary loosening of topsoil, slight alteration of natural surface features, and increased susceptibility to erosion, particularly during dry or windy conditions. However, the impact will remain localized within the project boundary and will be short-term in nature.

Mitigation Measure:

- Site preparation activities shall be restricted strictly within the approved project area.
- Topsoil, where removed, shall be stockpiled separately and reused for site restoration or green belt development.
- Earthworks shall be minimized to the extent possible to avoid unnecessary soil disturbance.
- Disturbed areas shall be compacted and stabilized immediately after completion of leveling activities.

ii. Dust Generation and Air Quality Impacts

Impacts:

Dust emissions may be generated during site leveling, vehicular movement, and preparation of access tracks. This may cause temporary deterioration of local air quality and nuisance conditions for workers present at the site. Given the limited scale and duration of activities, the impact is expected to be minor and short-term.

Mitigation Measure

- Regular water sprinkling shall be carried out on exposed surfaces and access roads to suppress dust.
- Vehicle speeds within the site shall be controlled to reduce dust generation.

- Construction materials shall be properly covered during transportation and storage.
- Site preparation activities shall be suspended during high wind conditions, if necessary.

iii. Noise and Vibration Impacts

Temporary noise may be generated from the operation of construction machinery, vehicles, and equipment used during site demarcation and leveling. This noise may cause short-term disturbance; however, no significant impact is expected due to the limited duration and absence of sensitive receptors in the immediate vicinity.

Mitigation Measures

- Use of well-maintained machinery fitted with proper silencers and mufflers.
- Site activities shall be carried out during daytime hours only.
- Unnecessary idling of vehicles and equipment shall be avoided.
- Workers shall be provided with personal protective equipment (PPE), including ear protection, where required.

iv. Solid Waste Generation

Impacts:

Minor quantities of solid waste such as packaging material, debris, and domestic waste from workers may be generated during the pre-operational phase. Improper disposal of such waste could lead to localized pollution and visual impacts.

Mitigation Measures

- Waste shall be segregated at source into recyclable and non-recyclable categories.
- Temporary waste collection bins shall be provided at the site.
- All generated waste shall be disposed of through approved municipal or authorized disposal facilities.
- Open dumping or burning of waste at the site shall be strictly prohibited.

v. Occupational Health and Safety

Impacts:

Workers involved in site preparation activities may face risks related to dust exposure, noise, and movement of machinery. These risks are temporary and manageable with proper controls.

Mitigation Measure:

- Workers shall be provided with appropriate PPE, including masks, gloves, safety shoes, and helmets.
- Safety briefings and toolbox talks shall be conducted prior to commencement of work.
- Proper signage shall be installed to control movement of vehicles and personnel within the site.
- First-aid facilities shall be made available on-site.

6.6 Impacts and Mitigation Measure During Operational Phase**i. Odor Generation****Impact:**

- The handling and disposal of MSW, particularly organic waste, can result in the generation of unpleasant odors.
- Odors may affect nearby communities, workers, and visitors, leading to temporary discomfort.
- Improper storage or delayed disposal of waste can intensify the odor problem.

Mitigation Measure:

- Waste shall be collected and transported to the disposal site promptly to prevent prolonged decomposition.
- Waste storage areas shall be covered or enclosed to minimize exposure.
- Regular cleaning and maintenance of collection vehicles and equipment to reduce odor sources.

- Incorporate waste compaction techniques at the site to reduce the exposed surface area.
- Plant odor-absorbing vegetation and maintain a green belt buffer around the facility.

ii. Disease Vectors

Impact:

- Accumulated waste can attract vectors such as flies, mosquitoes, rodents, and stray animals.
- These vectors may pose health risks to workers and nearby residents, potentially causing disease outbreaks.

Mitigation Measure:

- Waste shall be covered immediately after disposal using soil or inert material.
- Regular pest and vector control measures, including traps and biological controls, shall be implemented.
- Ensure proper drainage and avoid stagnant water in and around the facility to reduce mosquito breeding.
- Conduct routine monitoring and health inspections for workers.

iii. Dust Emissions and Air Quality Impacts

Impact:

- Dust may be generated during waste handling, sweeping, vehicular movement, and disposal activities.
- Dust can affect the immediate environment and health of workers, causing respiratory irritation if not controlled.

Mitigation Measure:

- Regular sprinkling of water on access roads, waste handling areas, and exposed soil surfaces to suppress dust.
- Limit vehicle speeds within the site to reduce dust generation.

- Ensure proper maintenance of vehicles and equipment to minimize emissions.
- Provide workers with dust masks or respirators as part of PPE.

iv. Noise Impacts

Impact:

- Operational vehicles, compactors, and loaders generate noise that may disturb workers and nearby communities.
- The noise impact is generally localized but may become significant if traffic or operational intensity increases.

Mitigation Measure:

- Restrict operational activities to daytime hours to minimize disturbance.
- Use vehicles and machinery fitted with silencers or mufflers.
- Maintain a minimum safe distance between noise-generating equipment and residential areas.
- Conduct regular maintenance of machinery to avoid excess noise from mechanical faults.

v. Soil and Groundwater Contamination

Impact:

- Leachate generated from decomposing waste may percolate into soil and groundwater if proper containment measures are not in place.
- During rainfall events, the risk of leachate overflow or seepage increases.
- Contamination can affect soil fertility, surface water quality, and potable groundwater resources.

Mitigation Measure:

- Construct the dumping site with a lined base using impermeable material to prevent leachate seepage.
- Install a leachate collection and treatment system to manage liquid runoff.
- Regularly cover disposed waste with soil to reduce infiltration of rainwater.

- Monitor groundwater quality periodically to detect any contamination early.

vi. Traffic Congestion and Safety Issues

Impact:

The increased number of vehicles during peak times and the movement of goods and service vehicles can lead to traffic congestion, road safety risks, and delayed emergency response.

Mitigation Measure:

- Optimize collection routes to reduce travel distance and vehicle emissions.
- Use well-maintained vehicles and engines meeting emission standards.
- Schedule waste collection during off-peak hours to minimize traffic congestion.
- Encourage use of compactors or larger vehicles to reduce the number of trips required.

vii. Visual and Aesthetic Impacts

Impact:

Neglected landscapes, unmanaged waste, and deteriorating public spaces could harm the visual appeal and livability of the waste management facility.

Mitigation Measure:

- A regular maintenance schedule will be followed for parks, green belts, and public areas.
- Landscaping will use native and drought-resistant plant species for easy maintenance and year-round aesthetics.
- Strict enforcement of architectural controls and façade guidelines for commercial units will ensure uniformity and aesthetic appeal across the waste management facility.

6.7 Environmental Enhancement Measures

Here are the environmental and safety measures:

- ✓ Workers will be trained in first aid and provided with medical facilities.

- ✓ Drugs and narcotics are prohibited during working hours.
- ✓ Machinery operators will wear proper protective gear.
- ✓ Water will be sprinkled on dusty roads and tracks.
- ✓ Personal Protective Equipment (PPE) will be provided during construction activities.
- ✓ Construction and domestic waste will be properly disposed of or utilized.
- ✓ Local communities will be informed in advance about construction work.
- ✓ Machinery will never be left unattended.
- ✓ Traffic management will be implemented to avoid disruptions, and overloading will be prohibited.
- ✓ Safety signs and boards will be displayed during construction.
- ✓ Standard Operating Procedures (SOPs) will be followed, along with Health, Safety, and Environmental (HSE) conditions.
- ✓ Native plants will be used to restore the area, and a tree plantation plan will be created.
- ✓ Solid waste will be handed over to contractors with an agreement.
- ✓ Noise levels will be controlled using appropriate measures.
- ✓ PPE will be provided to all workers.
- ✓ First aid facilities will be available at the site.
- ✓ All possible measures will be adopted to ensure the project is safe and environmentally friendly.
- ✓ Detailed planning for occupational health and safety (OHS) mitigation measures will be implemented.
- ✓ Employees will be trained in Environmental, Health, and Safety (EHS) policies and practices.
- ✓ Environmental management and compliance monitoring will be strictly followed

7 ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

The Environmental Management and Monitoring Plan (EMMP) is a crucial component of the project's overarching strategy to ensure environmental sustainability and compliance throughout the construction and operational phases of said project. The primary aim of the EMMP is to effectively manage and mitigate adverse environmental impacts identified in the Environmental Impact Assessment report, promoting environmental stewardship and sustainable development practices.

7.1 Objectives of the Environmental Management Program

The objectives of the EMMP are multi-faceted, focusing on the comprehensive management of environmental aspects associated with the project:

- Defining Roles and Responsibilities
- Mitigation Measures
- Monitoring Mechanism
- Communication and Documentation
- Training and Capacity Building
- Management and Implementation

By addressing these objectives, the EMMP serves as a comprehensive guide for the project team to not only comply with regulatory requirements but also to adopt best practices in environmental management. This initiative-taking approach to environmental protection will help to minimize the project's ecological footprint, promote sustainability, and contribute positively to the local community and environment.

Table 8 Environmental Management Plan

Sr. #	Impacts	Mitigation Measure	Responsibility	
			Implementation	Monitoring
Pre-Operational Phase				
1.	Soil Erosion & Contamination Due to the proposed construction activities, soil erosion and contamination may occur. Soil erosion may occur on roadside and excavation of earth/cutting operations whereas contamination of soil may be caused by oil and chemical spills at asphalt plant sites, equipment washing yards, camp sites and temporary construction site office. This impact is, however,	• Excess spoil should be reused where possible and residual spoil can be disposed of at designated site to prevent erosion • Loss of topsoil can be avoided by stripping and storing topsoil prior to construction, then re-using it to cover the completed cell • Confining excavations to the specified spots as per the approved engineering drawings. Unnecessary excavations need to be avoided;	Construction Contractor	Project manager

	temporary and low adverse in nature			
2.	Air Quality and Dust Air quality will be affected by fugitive dust emissions from construction machinery; dust from the unpaved surface and construction vehicles. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. Besides, multifarious construction activities and increased vehicular traffic (construction vehicles) would also contribute to the	• All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions • Preventive measures against dust should be adopted for on-site mixing and unloading operations; • Construction materials (sand, gravel, and rocks) and spoil materials will be transported through trucks covered with tarpaulins and all vehicles (e.g., trucks, equipment, and other vehicles that support construction works) will comply with	Construction Contractor	Project manager

	localized airborne dust. The Suspended Particulate Matter (SPM) of the size smaller than 10 micrometre (PM₁₀) tends to remain suspended in the environment for much longer and persistent time and is an environmental hazard. The objectionable impacts of settling of the suspended dust would be its dry deposition on vegetation, motor vehicles, structures, and other exposed surfaces. Similarly, exhausts from generators can also have impacts on air quality in the vicinity. The deteriorated ambient air quality may cause health hazards to the residents of nearby	the PEQS for carbon emissions and noise; • Regular water sprinkling of the site should be carried out to suppress excessive dust emission(s); • Emissions from power generators and construction machinery are important point sources at the construction sites. Proper maintenance and repair is needed to minimize the hazardous emissions		
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	residential colonies. The overall impact on the quality of air during the construction phase will be high adverse, however, it will be temporary and limited to the project's implementation phase only.			
3.	Visual Aesthetics & Landscape Changes Visual intrusion from large piles of excavated and construction material is one of the possible adverse impacts during the construction phase of the project. This impact is considered to be temporary and low adverse in nature.	Material stockpiles should be removed as soon as work is completed and the area re-landscaped. During work, these stockpiles should be covered with tarpaulin and watered regularly.	Construction Contractor	Project manager
4.	Noise and Vibration	The most common way to reduce the noise levels of common	Construction Contractors	Project manager

	The noise and vibration will be produced due to the operation of construction machinery equipment. Sources of noise and vibration during construction are heavy machinery. Noise and vibration are perceived as one of the most undesirable consequences of construction activity. The above machinery is expected to generate noise levels that would be severe in the Project Area. The noise and vibration may cause health hazards to the residents of nearby residential areas and sensitive receptors e.g. hospitals, educational institutes and mosques etc.	construction equipment is through worksite modifications. • All workers who need to work within the zone must wear hearing protection		
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5.	Solid Waste Generation Different type of waste is likely to be generated during the construction phase of the proposed Project. The municipal waste will be in the form of food, cans, paper and wastewater from construction camps toilets and washing yards. Construction waste will include excavated soil, sand, gravel, rocks, asphalt, pieces of concrete, bricks, wood, metal pieces and electrical wires. Whereas, hazardous waste can be comprised of paints and construction chemicals. All these, if left unattended, can become a	• Waste disposal plan must be reviewed during the entire construction phase • Solid Waste generated during construction will be safely disposed in demarcated waste disposal sites and the contractor will provide a proper waste management plan; • Construction waste such as waste wood can be recovered and recycled into wood for new building projects, and cement, bricks, and plaster can be crushed and reused in other construction and building projects	Construction Contractor	Project manager
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	source of nuisance and environmental pollution in the Project Area.			
6.	Wastewater Generation Wastewater will be generated at the construction site by the workers. If the generated wastewater is not properly treated or disposed of, this may contaminate the surface water sources	Proper monitoring to check the compliance of PEQS will be carried out	Construction Contractors	Proponent
7.	Flora & Fauna No negative impact on the ecological environment will take place on account of cutting of any trees in the project area and clearing of vegetation from the site.	- Trees and ornamental plants shall be planted along the project boundary which will increase the aesthetic value of the site and will combat pollution. - Landscaping seemed to be a powerful mitigation activity with a positive impact.	Construction Contractors	Proponent

OPERATIONAL PHASE				
8.	Air Quality Air quality of the Project Area may be affected in the operational phase mainly due to increased vehicular movement and open burning of solid waste and garden waste. Deteriorated air quality may result in causing public health risks, nuisance and other potential adverse impacts on bio-physical environment	- Regular vehicle checks to control/ensure compliance with PEQS. Vehicles with excessive smoke emissions should be monitored and penalties should be imposed in case of non-compliance. - Roadside tree plantations as applicable and feasible under local climatic conditions. Plants should be selected in accordance to their ability to absorb emissions;	Regular Monitoring	Proponent
9.	Noise During the operational phase, the noise levels are anticipated to increase mainly due to traffic related noise pollution and due to	- Penalties should be imposed for the use of vehicles having faulty silencers; and - People should be educated to promote using of less horns e.g.	Regular Monitoring	Proponent

	commercial activities in the Project Area.	by placing signboards at road side		
10.	Solid Waste Solid waste management is a critical issue in the operational phase. Improper management of solid waste and accumulation of solid waste due to non-collection give rise to various severe issues to environment and health. Presence of solid waste heaps results in degradation of soil and land, choking of sewers if got way, create obnoxious odour	• An efficient and responsive general municipal solid waste collection, disposal, and management system should be strictly implemented • Waste bins should be provided at various convenient locations in the parks and the marketplaces for solid wastes by the passers-by. They should be regularly emptied and replaced, if found damaged and unserviceable. • Throwing of garbage and solid wastes onto greenbelts or vacant plots should be prohibited and fine should be imposed in the case of noncompliance	Regular Monitoring	Proponent

11.	Fauna There is no protected area, game reserve, game sanctuary, or national park in the project area so, no major impact on wildlife and livestock in the area is expected through noise, vibration, and any type of normal activity in the project area. This impact is Insignificant.	• Maintenance of the green areas and the protection of saplings to ensure better environmental conditions • Use of fertilizers should be strictly monitored in order to avoid any incident. Natural nutrients should rather be preferred	Regular Monitoring	Proponent
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Table 9 Environmental Monitoring Plan

ENVIRONMENTAL MONITORING PLAN			
Receptors	Monitoring Parameters	Monitoring & Reporting Frequency	Responsibility
Water Resources/ Water Quality	Monitoring of Physical, Chemical and Biological parameters and its compliance with PEQS, 2016 for surface water and drinking water.	Once before the start of construction activities; On quarterly basis during the construction phase; Bi-annually for at least one year during O&M phase; and Visual inspection daily.	Proponent/ Management
Soil Contamination	Soil contamination due to effluent / surface runoff and uncontrolled solid waste disposal activities at sites.	- Once before the start of construction activities; - On quarterly basis during the construction phase; - Bi-annually for at least one year during O&M phase	Proponent
Dust Emissions	Monitoring of PM ₁₀ and PM _{2.5} and its compliance with PEQS, 2016 for Ambient Air.	Once before the start of construction activities;	Proponent

		• On quarterly basis during the construction phase; • Bi-annually for at least one year during O&M phase	
Noise Pollution	Monitoring of Noise Level and its compliance with PEQS 2016 for Noise.	• Once before the start of construction activities; • On quarterly basis during the construction phase; • Bi-annually for at least one year during O&M phase	Proponent
Ecological Resources	Disturbance to natural habitat and uncontrolled floral cutting which can be avoidable.	• Start of construction activities; • Visual inspection daily / weekly during construction phase • Annually for at least one year during O&M	Proponent
Safety of workers	Medical record of workers	• On quarterly basis during the construction phase.	• Contractor
Restoration of work sites	Site cleared and no solid and construction waste along the alignment	• After completion of construction work	• Contractor

7.2 Training of Workers

Prior to the commencement of project activities, an environmental and social training and technical support program will be implemented for Project. This program is essential to strengthen institutional capabilities and ensure effective management of environmental and social aspects throughout the project lifecycle.

Building environmental awareness and providing relevant technical knowledge to the Contractor's workforce is crucial for the successful execution of the Environmental Management Plan (EMP). Without adequate training, the workforce may lack the understanding and skills necessary to implement the required environmental protection measures effectively.

Project Management will be responsible for engaging a Technical Assistance (TA) consultant to design and deliver comprehensive environmental and social training sessions.

The key objectives of the TA program will be:

- To assist in the development and establishment of effective environmental and social management systems;
- To deliver targeted training to Project senior management, contractors, subcontractors, and supervision consultants involved in environmental and social planning and management during both construction and operational phases; and
- To conduct specialized training modules covering monitoring techniques for air quality, water quality, and noise pollution.

Table 10 Training Schedule

Participants	Date, Time & Location	Training Topics	Schedule	Responsible Authority
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Staff of project and the contractor	As specified	• Introduction to project EIA and EMMP • EMMP communication, documentation, monitoring, and reporting requirements	Every month	Project Manager
All site personnel	As specified	• Site induction training on HSE system and requirements at Incinerating Site • Environmental sensitivities of the project area • Communication of environmental problems to corresponding officials	After every week	Project Manager
Drivers	As specified	• Road safety • Road restrictions • Vehicle restrictions • Waste disposal. • Defensive driving	After every 3 months	Project Manager
Camp Staff	As specified	• Camp operations. • Waste disposal. • Good housekeeping	Monthly	Project Manager

7.3 Environmental Management Team

The successful implementation of the Environmental Management and Monitoring Plan (EMMP) for the project hinges on the coordinated efforts of a dedicated environmental management team. This team comprises various functionaries, each

with distinct roles and responsibilities throughout the construction and operational phases of the project.

7.3.1 Key Members of the Environmental Management Team:

Proponent:

Serves as the project proponent and owner of the Environmental Management Plan, overseeing its execution during both construction and operational stages.

Project Contractor(s):

Act as executors of the EMMP during the construction phase, responsible for integrating environmental mitigation measures into project activities.

Operational & Maintenance & Health, Safety, and Environment Team:

Execute the EMMP during the operational phase, ensuring ongoing compliance with environmental standards.

Environmental Protection Agency (EPA), Punjab:

Functions as the regulatory body for reviewing and monitoring the project's compliance with environmental remediation and mitigation measures outlined in the EIA.

7.3.2 Responsibilities of Functionaries:

a) Project Management:

Charged with overall environmental supervision, monitoring progress, overseeing mitigation measure implementation, documentation, training program development, and reporting on EMMP status.

b) Project Contractor

Responsible for adhering to all EMMP provisions, and environmental codes of conduct, and ensuring workers are equipped with and trained in the use of Personal Protective Equipment (PPE).

c) Environmental Protection Agency (EPA):

Reviews and monitors the project's adherence to the EIA's remedial and mitigation strategies.

Equipment Maintenance Details

A well-organized maintenance program is critical for ensuring the safety and efficiency of all tools, equipment, and vehicles used in the project. Regular inspections and adherence to safety regulations are mandatory to prevent accidents and injuries.

Proposed Environmental Monitoring

Environmental monitoring is vital for assessing the project's compliance with environmental regulations and its effects on the environment. It is divided into: Compliance Monitoring: Ensures the project's adherence to EIA and EMMP requirements through routine inspections and site monitoring.

Effects Monitoring: Identifies unanticipated impacts or those exceeding anticipated levels, allowing for the timely implementation of additional mitigation measures.

7.3.3 Monitoring Components:

Comprehensive baseline monitoring will be conducted across several key environmental parameters, including:

- Noise Levels
- Ambient Particulate Matter
- Ambient Air Gases
- Ground Water Quality
- Wastewater Quality
- Soil Contamination
- Solid Waste Management
- Vehicular Traffic and Emissions
- Flora & Fauna
- Health & Safety Practices
- Machinery and Equipment Maintenance

By establishing a robust environmental management framework, the project aims to minimize its environmental footprint, ensure the safety of its workers, and contribute positively to the local ecosystem and community.

Environmental Budget

Table 11 Environmental Budget

Environmental Component	Quantity	Amount Pak Rs.	Details/Basis
Landscaping/Plantation	1000-2000 approx.	01 million	Cost includes plantation and maintenance up to three years
Solid waste management	L.S	1.5 million	Lump Sum
Health & Safety Measures	L.S.	0.5 million	Lump sum
Wastewater management	L.S.	1.5 million	Lump sum
Miscellaneous Cost	L.S.	01 million	Lump sum
Air Quality Monitoring	2	12,000	2 samples @ 6000/sample
Water Quality Monitoring	2	12,000	2 samples @ 6000/sample
Noise Level Monitoring	2	10,000	2 samples @ 5000/sample
Soil Tests	2	10,000	2 samples @ 5000/sample
Training		15,000	Lump sum
External Monitoring		100,000	
Total Environmental and Social Management Cost		7.5 million PKR	

8 STAKEHOLDER CONSULTATION

Stakeholder consultation is a critical component in the environmental assessment process for the proposed project. It fosters communication among diverse groups, facilitating information exchange, feedback collection, and collaborative decision-making.

8.1 Benefits and Objectives of Stakeholder Consultation

Engaging with stakeholders offers several advantages, including improved project understanding, identification of environmental concerns, and incorporation of local insights into project planning. Key objectives include:

- **Enhancing Understanding:** Clarifying the project's aims and potential impacts to ensure stakeholders are well-informed.
- **Addressing Concerns:** Identifying and resolving stakeholder issues to prevent opposition and build consensus.
- **Building Trust:** Establishing a foundation of trust and cooperation between the project Proponent and stakeholders.
- **Informed Decision-Making:** Leveraging stakeholder input to make informed decisions regarding project design and implementation.

8.2 Identification and Classification of Stakeholders

A comprehensive stakeholder identification process was undertaken to recognize all parties with a personal stake in the project, classified as:

- **Industries:** Businesses and institutions directly affected or influential to the project outcome.
- **Local Communities:** Residents and groups in proximity to the project site are likely to experience its direct impact.

8.3 Views, Concerns, and Suggestions of Various Stakeholders

Stakeholder feedback highlighted several areas of concern and interest:

- **Environmental Preservation:** Emphasis on minimizing tree removal and establishing green zones.
- **Local Employment:** Dedicated support for prioritizing local residents in hiring processes.
- **Dust and Air Pollution Control:** Recommendations for regular dust suppression measures and continuous air quality monitoring.
- **Noise Management:** Suggestion to limit noise-generating activities to daytime hours.
- **Solid Waste Management:** Advocacy for proper waste disposal techniques to mitigate environmental impacts.

8.4 Methodology for Consultation

The consultation process involved a dynamic exchange of ideas through discussions, meetings, and field visits, aimed at:

- **Scoping Sessions:** Initial meetings to define project scope and identify key stakeholder concerns.
- **Focus Group Discussions:** In-depth conversations with local communities and government representatives to gather detailed feedback.
- **Location-Based Meetings:** Engagements held at various sites to ensure broad stakeholder participation and input.

This stakeholder consultation process underscores the project's commitment to environmental stewardship, community engagement, and sustainable development. By incorporating stakeholder feedback into the EIA process, the project aims to achieve a balance between development objectives and environmental conservation, fostering positive relationships with all affected parties.

8.5 Environmental Management Team and Experts

Sr. #	Managers	Responsibilities
1.	Contract Manager	• Implementation of EMP • Environmental issues identification during pre-construction phase.

		• Communication EMP to all employees.
2.	Contractor	• Ensure that the control measures identified during environmental surveys are implemented as they are relevant to their work/visit. • Ensure that the project management team is notified of any non-conformance of control measures or environmental incidents where the environment has been put at risk.
3.	Site Manager	• Ensure site material and safe handling of hazardous waste. • Controlled access arrangement to avoid hazards. • Emergency egress arrangements to avoid any unfortunate incident. • First aid facilities/services should be readily available on-site.
4.	Site HSE Advisor	• Ensure good standards of workmanship. • Engaged health and safety to devise site waste management plan to be followed and implemented. • Daily checks & weekly checks. • Regular consultation with workers.
5.	Site Environment Advisor	• According to legislation and consent develop EMP. • Ensure application of EMP. • Conduct regular site inspection.
6.	Public Contact Officer	• First point of contact for members of the public. • Arrange and manage public forums. • Maintain relation with stakeholder

8.6 The Responsible Authority for EMP Implementation

The successful implementation of the Environmental Management Plan (EMP) is a pivotal aspect of ensuring the environmental integrity and sustainability of the proposed unit. The ultimate responsibility for overseeing and ensuring the effective execution of the EMP lies with the project Proponent.

8.7 Appointment of an HSE/Project Manager

To facilitate this, the project Proponent will appoint a Health, Safety, and Environment (HSE)/Project Manager possessing the necessary qualifications and expertise. This individual will assume the role of Environmental Manager, tasked with the comprehensive management of all health, safety, and environmental conditions as per the Punjab Environmental Quality Standards (PEQS).

8.8 Responsibilities of the HSE/Project Manager

As Environmental Manager, the HSE/Project Manager's responsibilities will encompass a broad spectrum of duties, designed to ensure that the project not only complies with all relevant environmental regulations but also adopts best practices in environmental stewardship.

8.9 Other Departments and Agencies

Following officers of government departments were consulted by the socio-environmental team of the consultants and concerned details about the project were noted down through personal interviews, group meetings, etc, in their offices, for instance.

Sr. No.	Designation	Concerns
1.	Environment Protection Department (EPD)	
	General Manager	• Solid waste should be managed in Environmentally friendly manner. • Wastewater should be treated effectively & approval should be acquired from concerned agency before disposing off in nearby drain. • HSE* at the site should be managed effectively. • No impact is being foreseen due to the selected location. • Locals should be given job opportunity.
	Environmental Inspector	
2.	Social Welfare Department (SWD)	
	Deputy Director Officer	• Final goods should be affordable for the locals.

		• The proposed product should facilitate locals and they should be economical. • Job opportunities should be given to the locals. • Wages should be given according to the work assigned to them. • Life insurance of the workers should be given as well as all the facilities should be given as per labor laws.
3.	Irrigation Department	
	Subdivision	Following comments were suggested:
	Executive Engineer	• Untreated wastewater should not be disposed of in the nearby drains without proper treatment. • Beneficial as job opportunities will be available to the residents.
4.	Forest Department	
	District Forest Officer	Following recommendation were suggested by the forest department: • Plantation and landscape activities should be conducted on a broader scale. • Proper drainage system must be available at site

8.10 Consultation with Affected and Wider Community

In addition, the use of direct methods to evince the response of the various stakeholders in targeted population residing in study area was ascertained by conducting a sample survey, through specially formatted questionnaires. Questions posed to the public were related to the creation of impacts, adverse impacts, and beneficial impacts, including employment opportunities, income generation activities, change in living standards and provision of the basic amenity.

Personal views of the respondents on the establishment of proposed project disturbance to the residents near the AOI and infringement of their privacy were also recorded. Various rounds of public meetings and consultations were arranged in the project and study area. The stakeholder category involves nearby residents, different industries, shopkeepers. The issues discussed with them are mostly related to the following:

- Activities of project.
- Impacts caused due to certain activities during construction and operational phase.
- The proposed mitigation measures.

9 CONCLUSION

The project aims at the development of scientific landfill site for the disposal of municipal solid waste. The project falls under the category of projects requiring Environmental Impact Assessment (EIA).

At the end of this study, it has been found that:

- There are no sensitive elements/segments of environment around the project site.
- It has also developed ways and means for environmentally sustainable disposal of solid wastes to be generated from the project operations.
- The noise levels will be kept well within the required limiting values of the PEQS Punjab.
- This project will create job opportunities during construction and operation stages leading towards reduction of poverty.
- Sewage will be passed through Septic Tanks before final treatment and disposal.
- It will help in the improvement of the community in the local area. It will also provide such facilities for people from other places.
- Project site means the development criteria like electricity supply, gas supply, water supply and sewage system.
- EMP, as recommended in this EIA Report, is to be put in place during all operational stages of the project.
- Environmental monitoring by the project proponent and a third party also ensures that the project will run in accordance with legal requirements.

Based on these findings of the EIA Report the project merits the issuing of Environmental Approval by the Environmental Protection Agency, Government of Punjab, and Lahore.

10 GLOSSARY

Accommodate	(of a building or other area) provide lodging or sufficient space for. "The cottages accommodate up to six people"
Assessment	The action of assessing someone or something. "The assessment of educational needs"
Aspects	A distinct feature or element in a problem
Adverse	- Preventing success or development; harmful; unfavorable. "Taxes are having an adverse effect on production"
Authorized	- having official permission or approval. "An authorized dealer"
Amendment	a minor change or addition designed to improve a text, piece of legislation, etc. "an amendment to existing bail laws"
Ambient Air	Ambient air quality refers to the quality of outdoor air in our surrounding environment. It is typically measured near ground level, away from direct sources of pollution
Archaeological	the scientific study of material remains (as fossil relics, artifacts, and monuments) of past human life and activities
Annunciation	A formal public statement
Baseline	The existing conditions against which impacts of the proposed action and its alternatives can be compared.
Crushing	Deform, pulverize, or force inwards by compressing forcefully. "You can crush a pill between two spoons"
Containers	An object for holding or transporting something. "The cakes will keep for up to two weeks if kept in an airtight container"
Compliance	Acting according to certain accepted standards
Discrepancies	A difference between conflicting fact, claims or opinions
Disposal	the action or process of getting rid of something
Dumped	Deposit or dispose of (rubbish, waste, or unwanted material), typically in a careless or hurried way

Effluent	Any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapor
Environmental impact statement (EIS)	A document prepared to analyze the impacts on the environment of a proposed action and released to the public for review and comment. An EIS must meet the requirements of NEPA, CEQ, and the directives of the agency responsible for the proposed action.
Emission	The production and discharge of something, especially gas, or radiation." The effects of lead emission on health"
Evaluated	Estimate the nature, value, quality, ability, extent or significance
Graded	Arranged in a sequence of grades or ranks; "stratified areas of the distribution"
Generation	The production or creation of something
Incinerator	A furnace or a container for burning waste materials
Inadequate	Not capable or competent; lacking
Implementation	The process of putting a decision or plan into effect; execution
Intends	To have in mind as something to be done or brought about, plan to design or mean for a particular purpose, use, recipient, etc.
Landfill site	for the disposal of solid waste in which refuse is buried between layers of dirt to fill in or reclaim low-lying ground
Legislation	Law enacted by a legislative body
Mobilization	To release or make available, as cells or chemical substances
Mitigation	The action of lessening in severity or intensity
Noise	Loud, unpleasant, unexpected, or undesired sound that disrupts or interferes with normal human activities
Potential	Having or showing the capacity to develop into something in the future

Pedestrian	A person who goes or travels on foot; walker
Proponent	The person who proposes or intends to undertake a project
Sanitary	Relating to the conditions that affect hygiene and health, especially the supply of sewage facilities and clean drinking water
Segregate	Set apart from the rest or from each other; isolate or divide. "Disabled people should not be segregated from the rest of society"
Settlement	An official agreement intended to resolve a dispute or conflict. "Unions succeeded in reaching a pay settlement"
Ton	A short or net ton is equal to 2,000 pounds; a long or British ton is 2,240 pounds; a metric ton is approximately 2 to 205 pounds
Transportation	The action of transporting someone or something or the process of being transported. "The era of global mass transportation"
Ultimate	Being or happening at the end of a process; final. "Their ultimate aim was to force his resignation"
Violations	the action of violating someone or something
Working place	From the out by side of the last open crosscut to the face
Flora	All the plant life in a particular region or period
Fauna	All the animal life in a particular region or period
Demarcated	Separately clearly, as if by boundaries
Screening	The display of a motion picture
Substitutions	An event in which one thing is substituted
Smelting	extract from its ore by a process involving heating and melting
Regulations	An authorized rule
Recycling	process of converting waste materials into new materials and objects
Stakeholders	A person or organization with an interest or concern in something
Rehabilitation	The conversion of waste land into land suitable for use of habitation or cultivation

11 LIST OF ABBREVIATIONS

AA	Ambient Air
APHA	American Public Health Association
AOI	Area Of Influence
BOD₅	Biological Oxygen Demand
CMS	Convention On Migratory Species
COD	Chemical Oxygen Demand
dB(A)	Decibel
EA	Environmental Assessment
EHS	Environmental Health Safety
EIA	Environmental Impact Assessment
EPD	Environmental Protection Department
PEPA	Pakistan Environmental Protection Act
EPA	Environmental Protection Agency
ESIA	Environmental And Social Impact Assessment
ESA	Environmental And Social Assessment
ESMP	Environmental/Social Management Plan
EMP	Environmental Management Plan
EC	Electrical Conductivity
GIS	Geographical Information System
GOP	Government Of Pakistan
GPS	Global Positioning System

GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HSE	Health Safety & Environment
HWMS	Hazardous Waste Management System
EIA	Environmental Impact Assessment
I & D	Irrigation And Drainage
IAIA	International Association for Impact Assessment
IWM	Industrial Waste Management
IUCN	International Union for Conservation of Nature
KM	Kilometers
LGO	Local Government Ordinance
MW	Mega Watt
MEAS	Multilateral Environmental Agreements
MSDS	Material Safety Data Sheets
NEQS	National Environmental Quality Standards
PMD	Pakistan Meteorological Department
PPE	Personal Protective Equipment
PEQS	Punjab Environmental Quality Standards
NEAP	National Environmental Assessment Plan
NWFP	Northwest Frontier Province
Q&EHS	Quality, Environment, Health & Safety
O & M	Operation And Maintenance
PKR	Pak Rupees

PAP	Project Affected People
PEPC	Pakistan Environmental Protection Council/Punjab
PSC	Project Steering Committee
QA/C	Quality Assurance/Quality Control
RAP	Resettlement Action Plan
ROG	Reactive Organic Gas
SWM	Solid Waste Management
TDS	Total Dissolved Solids
UNFC	United Nation Framework Convention on Climate Change
UNCC	United Nation Convention to Combat Desertification
UNEP	United Nations Environmental Programs
GOP	Government Of Pakistan
WHO	World Health Organization
R&R	Rehabilitation And Resettlement
WWTP	Waste Water Treatment Plant

12 LIST OF INDIVIDUALS AND THEIR FEEDBACK

Sr.#	Name	Concerns
1	Kamran Ali Khan	- Air pollution should be controlled effectively, such as emissions generated from power-generating activities. - Solid waste should be collected timely and avoid the spreading of waste. - Locals should be preferred for the job opportunities. - Wastewater should be treated prior to final disposal in a nearby drain. - Solid waste should be managed effectively by adopting the standard practices of the area. - The cleanliness of the area should be ensured. - An effective EMMP should be designed and enforced with true spirit. - The health of the workers should be ensured. - Planation should be carried out on an extensive scale. - Construction activity should be carried out during day hours. - Noisy activities should be confined.
2	Muhammad Waqas	
3	Qaiser Farooq	
4	Ghulam Mujtaba	
5	Mehboob Alam Shahid	
6	Muhammad Latif	
7	Mazhar Hussain	
8	Shahbaz Khan	
9	Waseem Ahmed	
10	Rab Nawaz	
11	Allah Yar	
12	Ahmed Saeed	
13	Muhammad Jabbar	
14	Muhammad Ramzan	
15	Kamran	

13 SOURCE OF DATA

- Punjab Environmental Protection (Amendment) Act 2026 (PEPA)
- Guidelines for the preparation and review of Environmental Reports, October 1997
- Review of IEE/ EIA Regulation, 2022
- The 2004 Baseline Survey on Millennium Development Goals in AACs, Pakistan
- World Weather Online.com
- Water and Sanitation Agency (WASA), Lahore.
- RED Data Book of IUCN
- <https://pakistanalmanac.com/punjab-bahawalpur/>
- <https://www.worldweatheronline.com/>
- www.wsask.ca/Global/Water%20Programs/Water%20Conservation/SWA
- Water_Efficiency_on_the_Farm_Booklet_WEB.pdf
- [https://pakistanalmanac.com/punjab- /](https://pakistanalmanac.com/punjab-/)
- <http://www.madehow.com/Volume-2/Lead.html>
- http://www.ijirset.com/upload/2013/november/18_Disposal.pdf

List Of Names, Qualifications and Roles of Team Members Carrying Out the IEE/EIA Study

Sr. #	Name	Qualification
Team Leader		
1.	Miss. Sara Fatima	M.Phil. Environmental Sciences
Environmental Scientist		
2	Dr. Hina Ahmed Malik	Ph.D. Environmental Sciences
3	Mr. Zia Ur Rehman Farooqi	Ph.D. Environmental Sciences (Scholar)
4	Hafiz Zeeshan Safdar	M.Sc. Analytical Chemistry
5	Mr. Saffi Ahmed	M.Phil. Environmental Sciences
Environmental Engineers		
6	Engr. Kanza Fatima	B.Sc. Environmental Engineering
7	Engr. Aleeza Kanwal	B.Sc. Environmental Engineering
Sociologist		
8	Ahmed Toqir Hussain	M. Phil Sociology

TERMS OF REFERENCES

Terms of References (TOR) for the Environmental Impact Assessment (EIA) process are designed to ensure compliance with the regulatory framework and facilitate a thorough review of the project's environmental implications. These terms are outlined as follows:

1. Review Fee Payment:

As stipulated in Regulation 7 of the Review of IEE and EIA Regulations, 2022, the proponent is required to submit a nonrefundable review fee to the Environmental Protection Agency (EPA) at the time of submitting the IEE/EIA report. The specific amount of this fee is determined by the rates specified in Schedule III of the regulations.

2. Submission of Required Documents:

The proponent must provide all necessary documents and details essential for the completion of the EIA/IEE report. This includes, but is not limited to, technical studies, environmental impact analyses, mitigation strategies, and any other information pertinent to assessing the project's environmental footprint.

3. Financial Responsibility for Fines and Penalties:

The proponent shall bear full responsibility for any fines or penalties levied by the EPA Punjab or the Environment Tribunal. This includes violations of environmental standards, non-compliance with regulatory requirements, or any other infractions identified during the review or implementation phases of the project.

4. Accuracy and Validity of Information:

The proponent is responsible for ensuring the correctness and validity of all information and documents provided to the consultant for onward submission

to EPA Punjab. The consultant facilitating the EIA process will not bear any responsibility for inaccuracies or omissions in the information supplied by the proponent. It is imperative that the proponent conducts thorough due diligence to guarantee that all submitted materials accurately reflect the project's potential environmental impacts and proposed mitigation measures.

These Terms of References are critical to ensuring that the EIA process is conducted in a transparent, accurate, and regulatory-compliant manner. Adherence to these terms will facilitate a comprehensive environmental review of the project, enabling informed decision-making by the EPA Punjab and contributing to the sustainable development and environmental stewardship goals of the region.

In M/s SB Engineering JV (Sandhu Brothers Enterprises-Golden Jubilee Enterprises (Pvt) Limited)

Proponent

Mr. Toqeer Javed

Consultants

For Enviro Stewards Co. Pvt. Ltd.

