

Environmental Impact Assessment Report of

Incineration Plant

National Institute of Health, Park Road Chak Shahzad, Islamabad



Submitted By:

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Prepared By:



Enviro Stewards Co. (Pvt) Ltd

DISCLAIMER

The data was based on the originality of the project site shown by the project proponent/ stakeholders/ promoters, provided maps, verbal communications and all other related documents. The authenticity of supra-mentioned relies with the proponent/ stakeholders/ promoters, not with the environmental consultant. The EIA / IEE report can't be negotiated in any court of law.

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Representative: EIA & IEE Team

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EXECUTIVE SUMMARY

The executive summary is an outline of the key outcomes in EIA (Environmental Impact Assessment). The proponent intends to install the **incineration plant** located at National Institute of Health, Park Road Chak Shahzad, Islamabad over an area of 1800 Sq. ft. The purpose of this project is to incinerate hazardous waste generated during different health care operations at NIH, the method of managing medical waste using incineration is a popular and recommended technology as per IEE & EIA regulation 2000. The consultant company for this project is Enviro Stewards Company (Pvt.) Limited.

According to projects categorization for environmental assessment studies, the proposed project falls under **Schedule II** (list of projects requiring an EIA), **Category G** (Waste Disposal) and **Sub Sector 1** (*Waste disposal and storage of hazardous or toxic wastes including landfill sites and incineration of hospital toxic waste*) of the IEE / EIA Regulations 2000 made under section 12 of Pakistan Environment Protection Act 1997, under which the Environmental Impact Assessment (EIA) for the proposed project is mandatory for getting Environmental Approval.

This project falls into the category of EIA (Environmental Impact Assessment) which presents a detailed account of the foreseeable environmental and social impacts likely to emanate from the extension of the proposed project. The EIA (Environment 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 impact mitigation measures for the project to undertake to minimize the detrimental impacts on the environment and communities nearby. Details of the process description are given in **Chapter 05** under the heading of process details.

Title and location of the project

The proponent intends to install the **Incineration Plant** located at National Institute of Health (NIH), Park Road Chak Shahzad, Islamabad over an area of 1800 Sq. ft.

Name of the Proponent

The detail of the proponent is given below:

Table 1 Proponent detail

Details of the Proponent	
Proponent name	Syeda Shazia Adeel
Address	DHA Phase 02, House No. 07 Street No 18 Sector F, Islamabad

Name of the Consultant preparing report

The details of the consultant preparing report are given below:

Table 2 Consultants Detail

Details of the Consultant	
Company name	Enviro Stewards Company (Private) Limited
Address	1 st Floor Allied Bank A-Block Commercial Market Canal View Society, Lahore.
Contact	0301-1199600

Brief outline of the proposal

Table 3 Brief outline of the proposal

Title of the Project	Installation of Incineration Plant
Proponent	Syeda Shazia Adeel
Total Area	1800 Sqft
Description of the project	The proposed project is to incinerate hazardous waste generated during different health care operations at NIH.
Location of the project	National Institute of Health (NIH), Park Road Chak Shahzad, Islamabad.
GPS Location	33.68872N, 73.13730E (Google map is attached to A3 size with file)
Cost of the project	19 million
Capacity of the project	100 Kg/hour
Fuel	LPG/ Natural Gas
Waste material	Hospital waste (needles, syringes, swabs, bandages, gloves, glassware, and syringes, broken glass etc.)
Current status of the project	Open Land
Manpower	Construction: 15-20 Persons
	Operation: 5-15 Persons
Power Source	IESCO

Period of Construction	Approx. 01 Year
Assessed Environmental issues	Solid and liquid waste & air pollution will be environmental issues. So, these wastes should be disposed of via EPA approved vendor.
Solid Waste Management	Will manage by EPA approved vendor.
Wastewater Management	Generated wastewater will be disposed of after the treatment in Septic Tank.
Consultants	Enviro Stewards Company (Private) Limited
Compliance	National Environmental Quality Standard (NEQS) and time to time guidelines by PEPA and other enforcement Department / Agencies.

Legal and Administrative Framework

The national guidelines and legislations relating to the environment considered for the project include, National Conservation Strategy (1992), National Environment Policy (2005), Pakistan Labor Policy (2010), Pakistan Environmental Protection Act (PEPA 1997), National Environmental Quality Standards (NEQS), Land Acquisition Act (1894), Cutting of Trees (Prohibition) Act (1975), Punjab Wildlife Act (1974), Punjab Plantation and Maintenance of Trees Act (1974), Antiquities Act (1975) etc.

Environment related documents have been reviewed including submission of environmental assessment study report to obtain environmental approval was made mandatory by the Pakistan Environmental Protection Ordinance (PEPO), 1983 and the Pakistan Environmental Protection Act (1997). Section 12 of the PEPA (1997) stipulates that no project involving construction or any change in the physical environment can be undertaken unless an IEE or an EIA is conducted, and approval (NOC) is received from the relevant provincial environmental agency.

This EIA report has been prepared with due consideration of Pakistan Environmental Protection Act, 1997 and all other legal requirements.

Major Impacts

Incineration plants play a significant role in waste management by reducing the volume of solid waste and generating energy through combustion. This process helps minimize the amount of landfill space required and can contribute to energy production. However, incineration plants also pose environmental challenges, particularly concerning air pollution from emissions. Effective air pollution control technologies are essential to mitigate these impacts and ensure

that incineration remains a viable waste management option without compromising environmental quality. Environmental and social impacts are expected during construction and operational phase, significant ones of which would be:

Table 4 Major impact during construction and operational phase

Pollutant	Constructional Phase	Operational Phase
Air Quality	During construction, activities such as excavation, land clearing, and use of heavy machinery can generate dust and emissions.	During operation, the combustion of waste materials in the incineration process releases emissions
Noise	Construction activities involve heavy machinery, excavation, and transportation of materials, resulting in increased noise levels in the vicinity of the construction site.	During operation, noise is generated from the operation of machinery within the plant, such as fans, pumps, and the combustion process itself.
Water Quality	Construction activities can lead to increased sedimentation and runoff, affecting local water bodies and aquatic ecosystems.	During operation, water quality concerns primarily arise from the management of residues, particularly ash generated from the incineration process.
Visual Impact	The construction phase can alter the visual landscape temporarily.	Once operational, incineration plants have a permanent visual presence due to their infrastructure.
Residue Management	Construction activities generate various waste, including construction debris, excavated materials, and packaging waste.	During operation, the management of residues, particularly ash from the incineration process, is a significant concern.
Odor	During construction, activities such as excavation and waste handling can generate odors from disturbed soils and materials.	During operation, incineration plants may emit odors from the handling and processing of waste materials, particularly organic waste.
Health and Safety Risks	Construction activities involve various health and safety risks for workers, including hazards related to heavy machinery operation, construction materials handling, and working at heights.	During operation, potential health risks arise from exposure to airborne pollutants emitted from the incineration process.

Mitigation Measures

The possible mitigation measures of potential environmental impacts resulting during construction and operational phase of the project are given below:

During Construction Phase:

- Mitigation measures recommended to be incorporated into the project include running the machines and vehicles of good quality (low-sulfur fuels) in good working order ensuring regular maintenance, tuning, servicing, and providing them with emission control devices, such as mufflers and silencers, solid waste handling facilities such as waste bins and skips in all sections of the factory.
- Waste will be managed as per municipal practices.
- Management needs to regularly carry out checks of all machinery and carry out regular servicing and maintenance of it to keep the environmental impact on account of their emissions to their minimum level.
- For reducing fugitive dust, regular water sprinkling on roads has been carried out.
- All trucks used for transportation will be covered with tarpaulin, maintained, and optimally loaded.
- Moreover, the green zone has been developed and tree plantation activities during operational phase would ensure minimal impact of fugitive dust emissions.
- Generators will be installed with proper enclosure, tuning and maintenance to control emissions.
- Assignment of traffic aides
- Usage of low-noise construction machine

During Operational Phase:

- Proper domestic solid waste handling and management practices will be adopted.
- Continuous monitoring is essential to ensure emissions remain within permissible limits. Installation of appropriate signage to avoid any accident during traffic on the road.
- Process solid waste will be disposed of through EPA Certified Contractor.
- Improving morale within the workforce.
- Scrubbers will be used to capture and reduce the emissions to comply with stringent air

quality regulations.

- Training regarding HSE should be given on a regular basis.
- It should be strictly enforced to wear PPEs (mainly gloves, and face masks) while working.
- Regular monitoring and maintenance of odor control systems ensure effective odor management throughout plant operation.
- Moreover, the green zone will be developed and tree plantation activities of proponent during operational phase would ensure minimal impact of fugitive dust emissions.
- A proper ventilation plan, and regular monitoring for preventive maintenance of the generators and machinery, are the control measures which will check air pollution.

Proposed Monitoring

As it is the project requiring EIA the impacts will be long term, significant or adverse. These impacts can be reduced by regular monitoring and implementing all the mitigation measures. An Environmental Monitoring Program should be formulated which ensures effective inspection of the environmental parameters at various stages of the project development and compliances with NEQS and legal obligations.

An environmental management and monitoring plan provides a delivery mechanism to address the potential environmental impacts of a project during its construction and operational phase, to enhance project benefits, and to introduce health and safety standards of good practice to be adopted for proposed project.

The proponent will ensure the proper implementation of mitigation measures for the concerned installation and operation and maintenance phase through adequate monitoring. Monitoring plan has been included in **Chapter 09**.

Conclusions and Recommendations

The major positive impacts of the project include improved air quality and waste management. Incineration plants offer significant benefits by efficiently reducing the volume of hospital waste and generating energy through combustion. This process not only extends the lifespan of landfills but also produces electricity and heat, contributing to local energy supply. Incineration helps in managing non-recyclable and hazardous waste streams effectively, while recovering metals from ash residue for recycling. It also mitigates greenhouse gas emissions compared to landfilling and fossil fuel-based energy production, supporting sustainable waste

management practices and resource conservation efforts. Careful mitigation and monitoring, specific selection criteria and assessment procedures for subprojects have been specified to ensure that minimal impacts take place.

It is recommended that the proponent should obtain an environmental approval (No Objection Certificate) from the Pakistan-EPA before proceeding further into the construction activities as per regulatory requirements.

1 INTRODUCTION

1.1 General

Incineration plants in Pakistan play a critical role in addressing the country's mounting waste management challenges. By reducing the volume of solid waste and minimizing its environmental impact, these plants help manage urban waste more efficiently. They also contribute to energy generation, particularly beneficial in a nation plagued by energy shortages. Moreover, incineration reduces methane emissions from landfills and mitigates health risks associated with open dumping. With proper technology and regulation, these plants not only manage waste but also support resource recovery through the recycling of metals from residual ash, thus promoting sustainability in waste management practices across Pakistan.

1.2 Purpose of the Report

This report has been prepared to conform to the requirements of the Pakistan Environmental Protection Act, 1997 (PEPA), 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 EPA, Government of Pakistan. 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 Pakistan Environmental Protection Act -1997 Section 12.

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

The EIA (Environmental Impact Assessment) 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 (PEPA in the Present case) before issuing the desired environmental approval.

1.3 Identification of the project and proponent

The details of the project and proponent are given below:

Table 5 Proponent and project detail

Details of the Project and Proponent	
Proponent name	Syeda Shazia Adeel
Proponent designation	Manager Quality Insurance / Principle Scientific Officer NIH
Address of the proponent	DHA Phase 02, House No. 07 Street No 18 Sector F, Islamabad
Project title	Incineration Plant
Location of the project	National Institute of Health (NIH), Park Road Chak Shahzad, Islamabad.
Purpose of the project	The purpose of the proposed project is to incinerate hazardous waste generated during different health care operations at NIH.

1.4 Consultant Details

The proponent has engaged M/s Enviro stewards Company (Pv.t) Limited to conduct the EIA study of a foresaid project in accordance with guidelines issued by PEPA. For this purpose, M/s Enviro stewards Company (Pvt.) Limited has engaged a group of professionals which comprises of environmental specialists, environmental engineers, and chemical engineers. The details of the consultants are given below:

Table 6 Detail of consultants

Details of the Consultant	
Company name	Enviro Stewards Company (Private) Limited
Address	1 st Floor Allied Bank A-Block Commercial Market Canal View Society, Lahore.
Contact No.	0301-1199600

Details of the Team Leader	
Name	Miss Sara Fatima
Designation	Senior Environmentalist
Contact No.	0301-1198600

1.5 Nature and size of the project

The proponent intends to install the “incinerator plant” located at National Institute of Health, Park Road Chak Shahzad Islamabad over an area of 1800 Sq. ft. The purpose of this project is to manage the hazardous waste. As a result of the project, around 15-20 people will get jobs during the construction phase and another around 5-15 people will be engaged during the operation phase of the project.

1.6 Location of the project

The project site is located at National Institute of Health (NIH), Park Road Chak Shahzad, Islamabad. The coordinates of the project area are **33.68872N, 73.13730E**.



Map 1 Location of the proposed project

1.7 Extent of the EIA study, scope of the study, magnitude of the efforts

This EIA (Environmental Impact Assessment) study has been accomplished following the Guidelines for the preparation and review of Environmental Reports, 2000". In compliance of Pakistan Environmental Protection Act, 1997 requirements, an EIA report has been prepared by the team of environmental experts. This document covers all environmental impacts, due to the proposed project, in and around the project area comprising the physical, ecological, and socio-economic aspects together with identification of the potential positive and negative impacts. Any developmental activities outside the project area like rehabilitation of the road and establishment of the other factories outside the project vicinity have not been covered under this EIA (Environmental Impact Assessment) study.

The EIA (Environmental Impact Assessment) report covers the examination of the physical, biological, and environmental socioeconomic impact of the following:

- Construction activities including the leveling and marking of land.
- Relevant off-site construction activities like the construction of access road if required.
- The environmental impacts are due to constructional and operational activities.
- Positive impact for increase in the economy level.

2 POLICY, LEGISLATION, LEGAL & ADMINISTRATIVE FRAMEWORK

2.1 General

This section deals with the current policy as well as legal and administrative framework related to carrying out EIA (Environmental Impact Assessment) of various projects. A number of laws exist in Pakistan, containing a number of 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 Pakistan Environmental Protection Act – 1997.

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

The Institutional Legislative and Policy Framework related to Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) is vital for ensuring sustainable development and effective environmental management. This framework comprises a set of laws, regulations, policies, and guidelines that govern the assessment and management of environmental impacts associated with development projects. In this chapter, we will explore the institutional framework, key legislation, and policies that guide the IEE and EIA processes, emphasizing their importance in promoting environmental sustainability.

2.2 Screening

According to projects categorization for environmental assessment studies, the proposed project falls under **Schedule II** (list of projects requiring an EIA), **Category G** (Waste Disposal) and **Sub Sector 1** (*Waste disposal and storage of hazardous or toxic wastes including landfill sites and incineration of hospital toxic waste*) of the IEE / EIA Regulations 2000 made under section 12 of Pakistan Environment Protection Act 1997, 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 05** under the heading process description.

2.3 Institutional Framework

The institutional framework for IEE/EIA comprises various government bodies, agencies, and organizations responsible for implementing and enforcing environmental legislation. Key institutions typically involved in the IEE/EIA process include:

2.3.1 Environmental Protection Agencies (EPAs):

National and provincial EPAs are primarily responsible for the regulation and enforcement of environmental laws. They oversee the EIA process, review submitted assessments and provide guidance to project developers. EPAs play a crucial role in ensuring compliance with environmental standards and regulations.

2.3.2 Sectoral Ministries and Departments:

Various ministries, such as those responsible for natural resources, agriculture, forestry, and urban development, collaborate with EPAs to ensure that IEE/EIA requirements are integrated into sector-specific policies and planning. These ministries provide essential data and expertise related to their respective sectors.

2.3.3 Local Government Authorities:

Local government bodies are often involved in the IEE/EIA process, especially in the context of local development projects. They ensure that community concerns are addressed and that projects comply with local environmental regulations.

Non-Governmental Organizations (NGOs) and Community-Based Organizations (CBOs): NGOs and CBOs play a critical role in advocating environmental protection and community rights. They often participate in the IEE/EIA process by providing feedback, conducting independent assessments, and raising public awareness about environmental issues.

2.4 Legislative Framework

The legislative framework for IEE/EIA consists of national and local laws that mandate the assessment of environmental impacts for specific projects. Key components of this framework include:

2.4.1 National Environmental Policy:

The National Environmental Policy serves as the foundation for environmental governance and sets the vision and goals for sustainable development. It outlines the importance of conducting environmental assessments to evaluate potential impacts of development.

2.4.2 Environmental Protection Acts:

Countries typically have comprehensive environmental protection acts that outline the procedures and requirements for conducting EIA. These acts define the scope of projects requiring EIA, establish review processes, and identify penalties for non-compliance.

2.4.3 Specific Environmental Legislation:

Various sector-specific laws, such as those related to water, air quality, and biodiversity, also influence the IEE/EIA process. For example, legislation governing water resources may require specific assessments related to water quality impacts from industrial projects.

2.4.4 International Agreements and Conventions:

Countries may be signatories to international agreements that emphasize the need for environmental assessments. Agreements such as the Convention on Biological Diversity and the Paris Agreement reinforce the importance of considering environmental impacts in development planning.

2.5 Policy Framework

In addition to legislative requirements, various policies guide the implementation of IEE/EIA processes. Key components of the policy framework include:

2.5.1 National and Provincial EIA Guidelines:

Governments often issue specific guidelines for conducting EIA, outlining methodologies, required content, and procedures for submitting assessments. These guidelines provide a standardized approach to EIA and ensure consistency in the assessment process.

2.5.2 Strategic Environmental Assessment (SEA):

SEA is a policy-level assessment process that complements project-level EIAs. It evaluates the potential environmental impacts of proposed policies, plans, and programs. Incorporating SEA into decision-making processes helps identify and mitigate environmental issues at an early stage.

2.5.3 Public Participation Policies:

Effective public participation is essential for successful IEE/EIA processes. Policies promoting stakeholder engagement ensure that local communities, NGOs, and other stakeholders can provide input during the assessment process. This participatory approach enhances transparency and accountability in decision-making.

2.6 National Environmental Policy, 2005

The National Environment Policy (NEP) aims to protect, conserve and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development. In NEP, the further sectorial guidelines, Energy Efficiency and Renewable directly related to building energy code for newly constructed buildings were introduced.

The NEP provides an overarching a framework for addressing the Environmental issues facing Pakistan, particular pollution of freshwater bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural disasters and climate change. It also provides directions for addressing the cross-sectored issues as well the underline causes of Environmental degradation and meeting international obligations.

The NEP, while recognizing the goals and objectives of National Conservation Strategy, National Environmental Plan and other existing environment-related national policies, strategies and action plans provide broad guidelines to the Federal Government., Provincial Government, Federally Administered Territories and local Government for addressing environmental concerns and ensuring effective management of their environmental resources.

Laws and Regulations

Pakistan has several laws and regulations regarding the conservation and protection of the environment. However, the enactment of comprehensive legislation on the environment, in the form of an act of parliament, is a relatively new phenomenon. Most of the existing laws on environmental issues were enforced over an extended period of time and are context specific. The laws relevant to the developmental projects are briefly reviewed below.

Pakistan Environmental Protection Act, 1997

The Pakistan Environmental Protection Act, 1997 is a supreme document meant for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development.

An Act to provide for protection, conservation, rehabilitation and improvement of the environmental prevention and control of pollution, and promotion of sustainable development.

Pakistan Environmental Protection Agency (Review of IEE and EIA Regulations), 2000

The Pakistan Environmental Protection Agency (Review of IEE and EIA Regulations), 2000 (the Regulations) prepared by the Federal Environmental Protection Agency Islamabad under the powers conferred upon it by the Act, provide the necessary details on preparation, submission and review of the IEE and the EIA. Categorization of projects for IEE and EIA is one of the main components of the regulations.

Hazardous Substance Rules, 2003

Section 4: A license will be required to import or transport a hazardous substance.

Section 5: EIA of the industrial activity involving generation, collection, transport, treatment, disposal, storage, handling or import of hazardous substance will be required along with safety and waste management plan.

The rules provide information on validity, renewal and cancellation of license; packing; and labeling; safety precautions; entry, inspection and monitoring; safety plan; waste management plan; import; and transport of hazardous substances.

Hospital waste management rules, 2005

Ministry of Environment, Government of Pakistan, has prepared the hospital waste management rules on August 03, 2005.

According to these rules, every hospital shall be responsible for the proper management of the waste generated by it till its final disposal in accordance with the provision of the act and the rules 16 to 22.

The rules provide information on the roles and responsibilities of waste management team, waste management plan, waste segregation, waste collection, waste transportation, waste storage, waste disposal, accident and spillages, waste minimization and reuse, inspection and hospital waste management advisory committee.

National Environmental Quality Standards (NEQS)

The NEQS, promulgated under the PEPA 1997 specifies the following standards: The maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources.

The National Environmental Quality Standards (NEQS) specify the following standards:

- The maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged into inland waters, sewage treatment facilities, and the sea (three separate sets of numbers).
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources.
- Maximum allowable concentration of pollutants (02 parameters) in gaseous emissions from vehicle exhaust and noise emission from vehicles.
- Maximum allowable noise levels from vehicles.

Ambient Noise and Air Quality Standards:

These standards also apply to the gaseous emissions and liquid effluents generated by the generator, process waste etc. The standards for vehicles will apply during the construction as well as the operation phase of the project. Standards for air quality have not been prescribed yet.

Environmental Quality Standards for Treatment of Liquid and Disposal of Bio-Medical Waste by Incineration, Autoclaving, Microwaving and Deep Burial

The Environmental Protection Council has approved the national Environmental Quality Standards for Treatment of Liquid and Disposal of Bio-medical Waste by Incineration, Autoclaving, Microwaving and Deep Burial.

National Drinking Water Supply 2009

During September 2009 the government approved the National Drinking Water Policy that provides a framework for addressing the key issues and challenges facing Pakistan in the provision of safe drinking water to the people by 2025.

Drinking water is the constitutional responsibility of the provincial governments, and the specific provision function has been devolved to specially created agencies in cities and Towns and Tehsil Municipal Administrations under the Local Government Ordinance 2001.

Therefore, this policy framework is intending to guide and support the provincial and district governments in discharging their responsibility in this regard. The overall goal of the national drinking water policy is the following:

- To ensure safe drinking water to the entire population at an affordable cost in an equitable, efficient and sustainable manner
- To ensure a reduction in the incidence of mortality and morbidity caused by water-borne diseases.

The policy is expected to be reviewed and updated every five years to examine its implementation and efficacy and to adapt it to the changing situation in the country

National Sanitation Policy

The National Sanitation Policy aims at providing adequate sanitation coverage for improving the quality of life of the people of Pakistan and to provide physical environment necessary for a healthy life.

Wildlife (Protection, Preservation, Conservation and Management) (Amendment) Act, 2007

The national Wildlife (Protection, Preservation, Conservation and Management) is an act that provides protection, preservation, conservation and management of wildlife in Pakistan. The main aim of this act is the preservation and conservation of wildlife, for sustainable development to comply with the concept of national parks internationally.

Forest Act, 1927

The Act authorizes Provincial Forest Departments to establish forest reserves and protected forests. The Act prohibits any person from setting a fire in the forest, quarry stone, remove any forest-produce or cause any damage to the forest by cutting trees or clearing up area for cultivation or any other purpose. Much like the Punjab Wildlife Act described above, the Forest

Act is also not likely to be applicable to the proposed project. No project activities will, however, be carried out in any protected forests, and no unauthorized tree cutting will be carried out for any facility expansion or waste disposal.

Land Acquisition Act, 1894

The Land Acquisition Act (LAA) of 1894 was amended from time to time has been the de-facto policy governing land acquisition and compensation in the country. The

LAA is the most used law for acquisition of land and other properties for development projects. It comprises 55 sections pertaining to area notifications and surveys, acquisition, compensation and apportionment awards and disputes resolution, penalties and exemptions.

Antiquity Act, 1975

The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The act is designed to protect antiquities from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc.

The law prohibits new construction in the proximity of protected antiquity and empowers the Government of Pakistan to prohibit excavation in an area that may contain articles of archaeological significance. Under the Act, the project proponents are obligated to:

- Ensure that no activity is undertaken in the proximity of protected antiquity, and
- If during the course of the project an archaeological discovery is made, it should be reported to the Department of Archaeology, Government of Pakistan.

Cutting of Trees (Prohibition Act), 1975

Section 3 of this Act states “No person shall, without the prior written approval of the local formation commander or an officer authorized by him in this behalf, cut fell or damage or cause to cut, fell or damage any tree.”

Protection of Trees and Bush wood Act, 1949

This Act prohibits cutting or chopping of trees and bush wood without permission of the Forest Department.

Pakistan Explosive Act, 1884

This Act provides regulations for the handling, transportation and use of explosives during quarrying, blasting and other purposes. The transmission line tower installation may need blasting at rocky/mountainous areas. Thus, these regulations will be applicable to the proposed project.

Employment of Child Act, 1991

Section 3, Prohibition of Employment, of this Act starts “No child shall be employed or permitted to work in any of the occupations set forth in Part I of the Schedule or in any workshop wherein any of the processes set forth in Part II of that Schedule is carried on: Provided that nothing in this section shall apply to any establishment wherein such process is carried on by the occupier with the help of his family or to any school established, assisted or recognized by Government.”

Factories Act, 1934

The clauses relevant to the proposed project are those that address the health, safety and welfare of the workers, disposal of solid waste and effluents, and damage to private and public property. The Act also provides regulations for handling and disposing of toxic and hazardous substances. The Pakistan Environmental Protection Act, 1997 (discussed above), supersedes parts of this Act pertaining to the environment and environmental degradation.

Pakistan Penal Code, 1860

This outlines the penalties for violations concerning pollution of air, water bodies and land. Sections 272 and 273 of this Act deal with the adulteration of food or drink. Noise pollution has been covered in Section 268, which defines and recognizes noise as a public nuisance. “A person is guilty of a public nuisance who does any act or is guilty of an illegal omission which causes any common injury, danger or annoyance to the public or to the people in general who dwell or occupy property in the vicinity, or which must necessarily cause injury, obstruction, danger or annoyance to persons who may have occasion to use any public right.”

The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents. Most of the environmental aspects of the Code have been superseded by the Pakistan Environmental Protection Act, 1997.

Acts Governing Healthcare Services

The following laws govern various aspects of the healthcare services in the Province:

- Public Health (Emergency Provisions) Ordinance, 1944
- West Pakistan Epidemic Diseases Act, 1958
- Punjab Vaccination Ordinance, 1958
- Punjab Juvenile Smoking Ordinance, 1959
- Punjab Prohibition of Smoking in Cinema Houses Ordinance, 1960
- Punjab Pure Food Ordinance, 1960
- Eye Surgery (Restriction) Ordinance, 1960
- Pakistan College of Physician and Surgeons Ordinance, 1962
- Medical and Dental Council Ordinance, 1962
- Allopathic System (Prevention of Misuse) Ordinance, 1962
- Unani, Ayurvedic and Homoeopathic Practitioners Act, 1965
- Pharmacy Act, 1967
- Medical Colleges (Governing Bodies) (Punjab Repeal) Ordinance, 1970
- Pakistan Nursing Council Act, 1973
- Drugs Act, 1976
- Medical and Dental Degrees Ordinance, 1982
- Punjab Health Foundation Act, 1992
- Punjab Transfusion of Safe Blood Ordinance, 1999
- Mental Health Ordinance for Pakistan, 2001
- University of Health Sciences Lahore Ordinance, 2002

3 SCOPING

The scoping in Environmental Impact Assessment involves a comprehensive assessment of the potential impacts of a project or activity, including direct and indirect impacts, cumulative impacts, and potential long-term effects. This assessment is carried out by a team of environmental and social experts, who analyze the proposed project or activity in detail and identify potential risks and impacts on various aspects of the environment, such as air quality, water quality, biodiversity, and cultural heritage. In this Environmental Impact Assessment, a public consultation has been conducted, where members of the public and other stakeholders can provide feedback and raise concerns about the proposed project or activity.

3.1 Spatial and Temporal Boundaries of Environmental Assessment

Due to the construction of the current project, land use will change from open land. Within a radius of 2-km, no residential area is present as represents in figure given below but current project will be installed by adopting proper mitigation measures to avoid disturbance in nearby area and local community. In the current project no significant emission will be observed because the proposed project itself is to reduce air emission and also incineration plant equipped with scrubbers for the exhaust gases purification. Wastewater quality will be measured to ensure NEQS. No environmentally sensitive area is present within safe distance that could be impacted due to the proposed project.

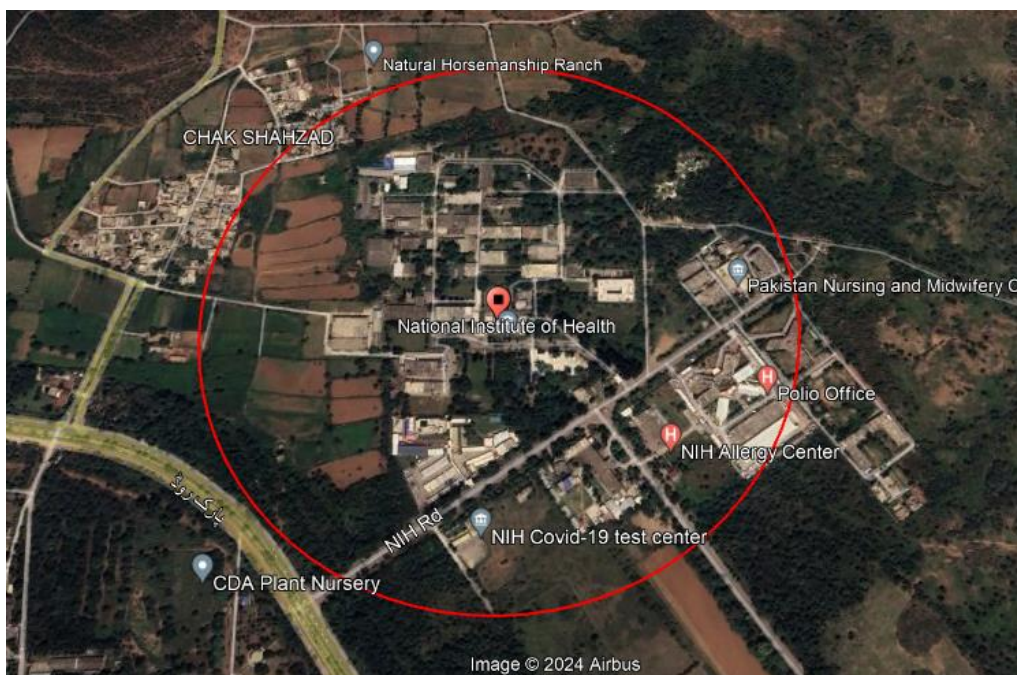


Figure 1 Location of the proposed project

3.2 Important Issues and Concerns Raised during Consultation

During the installation phase, a broad spectrum of stakeholders including local community members, government departments, environmental practitioners, experts, and nearby industries, expressed their views on the project. While there was a consensus in favor of the project, several important concerns were highlighted:

3.2.1 Employment Opportunities:

Preference for local hiring to ensure community benefit from job opportunities.

3.2.2 Worker Training:

Emphasis on providing adequate training to enhance worker skills and safety.

3.2.3 Noise Pollution:

Recommendations to limit noisy activities to mitigate disturbance.

3.2.4 Air Pollution Control:

The need for effective measures to manage and reduce air pollution.

3.2.5 Wastewater Management:

Importance of treating wastewater before disposal and installing adequate treatment facilities.

3.2.6 Solid Waste Management:

Timely collection and proper disposal of solid waste were underscored.

3.2.7 Environmental Mitigation and Management:

Suggestion for a robust Environmental Management and Monitoring Plan (EMMP), tree plantation initiatives, and ensuring workers' health and safety.

3.2.8 Resource Conservation:

Calls for responsible use of groundwater and overall cleanliness of the area.

3.2.9 Transportation and Community Impact:

on covering transport vehicles during construction to reduce air pollution and efforts towards community betterment.

3.3 SIGNIFICANT ENVIRONMENTAL IMPACTS AND MANAGEMENT FACTORS:

The consultation process also helped in identifying critical environmental impacts and management factors necessary for sustainable project execution. These include:

3.3.1 Dust and Air Quality Management:

Strategies to minimize dust and particulate emissions.

3.3.2 Wastewater Treatment:

Ensuring all wastewater is treated according to standards before disposal.

3.3.3 Solid Waste Management:

Establishing a solid waste collection and disposal mechanism.

3.3.4 Occupational Health and Safety:

Implementing measures to protect workers' health and safety.

3.3.5 Site Security and Traffic Management:

Ensuring secure and efficient site operations and traffic flow.

3.3.6 Hygiene and Community Impact:

Maintaining hygiene standards and assessing the project's impact on the community.

3.3.7 Resource Conservation:

Focusing on water conservation, energy efficiency, and other sustainable practices.

3.3.8 Environmental Restoration and Green Initiatives:

Commitment to site restoration post-construction and promoting green spaces through tree plantation.

These insights from the consultation phase are crucial for refining project strategies, ensuring environmental compliance, and fostering positive community relations. Implementing these considerations will not only address stakeholder concerns but also contribute to the project's sustainability and acceptance within the local context.

4 ALTERNATIVES CONSIDERATION

Alternatives are recommended and examined to determine the best method of achieving project objectives, while minimizing environmental impacts. The discussion and analysis of alternatives in an EIA (Environmental Impact Assessment) study should consider other practicable strategies that will promote the elimination of negative environmental impacts identified.

This section covers the project alternatives which were examined for the proposed project in the said location. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options will be adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of the most feasible alternative in terms of economics, environment, and health & safety. It outlines the following options that were considered for this project:

- Site Alternative their selection and rejection criteria
- Design/technology alternatives, their selection and rejection criteria
- Environmental Alternatives, their selection and rejection criteria
- Economic Alternatives, their selection and rejection criteria

4.1 Site Alternative

The chosen location for the establishment of proposed project, named as Incineration plant, matches perfectly with the requirement. Other alternatives have also been considered during the site selection and the selected site seems perfect as the site is spacious enough to accommodate the proposed facility and its infrastructure and also way form the residential area. Based on the existing infrastructure and its strategic location, we believe that the chosen location is ideal and suitable for the proposed plant. There are no historical sites or other recreational opportunities in the vicinity of the area. In addition, the building belongs to the proponent.

The site is suitable for implementation of said project owing to the following characteristics:

- Transportation infrastructure (road network) is available.
- The selected site is under the ownership of the proponent.

4.2 Design/Technology Alternative

For development of current plant, state of art technology will be selected to avoid long term environmental impact. Proponent will use updated technology and new machinery to run the plant. This system emits less emissions and can work properly. Proponent is making heavy investment for this project so latest/state of art technology will be preferred to ensure good quality plant. Water mitigation techniques also considered at their best including wastewater treatment.

4.3 Environmental Alternative

The unit site is located in an area which is away from any biodiversity including forestry, wildlife, migratory birds, flora and fauna, fishery. There is no cultural or any other heritage in the project area. There is no environmental sensitivity in the project area. These factors are also strongly supportive of the proposed project site. After completion of construction, proper landscaping will be done. The proponent is going to install fire frightening facility. Moreover, the proponent is very concerned and conscious about the quality and equally about the environmental protection and resource conservation.

4.4 Economic Alternative

Currently the design of the plant is economically efficient. Tree plantation will be done that will reduce the temperature of the area and act as noise barrier. Building design will be such that maximum use of day light and LED lights will be installed to minimize electricity consumption. Job opportunities for the local person as well as for the skilled person. The economy rate of the project site will also increase. The cumulative effect of this type of project would result in improved waste management and improved environmental conditions.

5 PROJECT DESCRIPTION

The proponent intends to establish the “incineration plant” located at National Institute of Health (NIH), Park Road Chak Shahzad, Islamabad over an area of 1800 Sqft. The purpose of this project is to reduce the hazardous waste and properly manage the hospital waste to improve environmental health. The estimated cost for the subject proposed project will be about 19 million PKR.

The project will pose positive impacts in terms of managing waste, will create jobs during construction and operation and will contribute to reduce the community disease level by addition of safe disposal of biomedical waste in NIH

5.1 Type and category of the project

The capital cost of the project is 19 million PKR. The project will spread over an area of over an area of 1800 Sqft. As a result of the project, around 15-20 people will get jobs during the construction phase and around 5-15 people will be engaged during the operational phase 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 Disposal) and **Sub Sector 1** (*Waste disposal and storage of hazardous or toxic wastes including landfill sites and incineration of hospital toxic waste*) of the IEE / EIA Regulations 2000 made under section 12 of Pakistan Environment Protection Act 1997, under which the Environmental Impact Assessment (EIA) for the proposed project is mandatory for getting Environmental Approval.

5.2 Objective of the project

The objective of the aforesaid project is, i.e., the establishment of an incineration plant to reduce the hazardous waste and properly manage the hospital waste to improve the environmental health. The project will have the following advantages:

- To eliminate pathogens and sterilize infectious materials, reducing public health risks.
- To reduce the volume of medical waste, minimizing storage.
- Efficiently reduce the volume of waste, particularly non-recyclable and hazardous materials, by incineration.

Temperature ranges: after getting NOC for EPA incinerator will be designed as per WHO guideline for incineration of hospital waste incineration.

Following are the recommendations from the team of environmental stewards

According to the latest **WHO (World Health Organization)** guidelines for the treatment and disposal of **biomedical waste**, the recommended temperature for the **incineration** of biomedical waste is typically between **800°C to 1000°C (1472°F to 1832°F)**.

Specifically:

- **Primary chamber:** The temperature should be between **800°C to 1000°C** to ensure proper combustion of the waste and destruction of pathogens.
- **Secondary chamber:** It should be maintained at **850°C to 1100°C** to allow for the complete destruction of gases and remaining pollutants, ensuring minimal environmental contamination.

These temperatures ensure the efficient and safe destruction of harmful pathogens and toxic substances, preventing the release of harmful by-products into the atmosphere.

Additionally, the **WHO guidelines** emphasize the need for properly designed incinerators that meet these temperature standards and that the combustion process is monitored to ensure proper disposal of hazardous waste.

5.3 Location and Site Layout

The site under consideration for the establishment of “Incineration Plant” is located at National Institute of Health (NIH), Park Road Chak Shahzad, Islamabad. The location of the project is given below, and layout of project is attached within the file. The coordinates of the project site are 33.68872N, 73.13730E.

5.4 Land use of the site

The land selected for the project is open land. The open land is situated in the four walls of NIH.

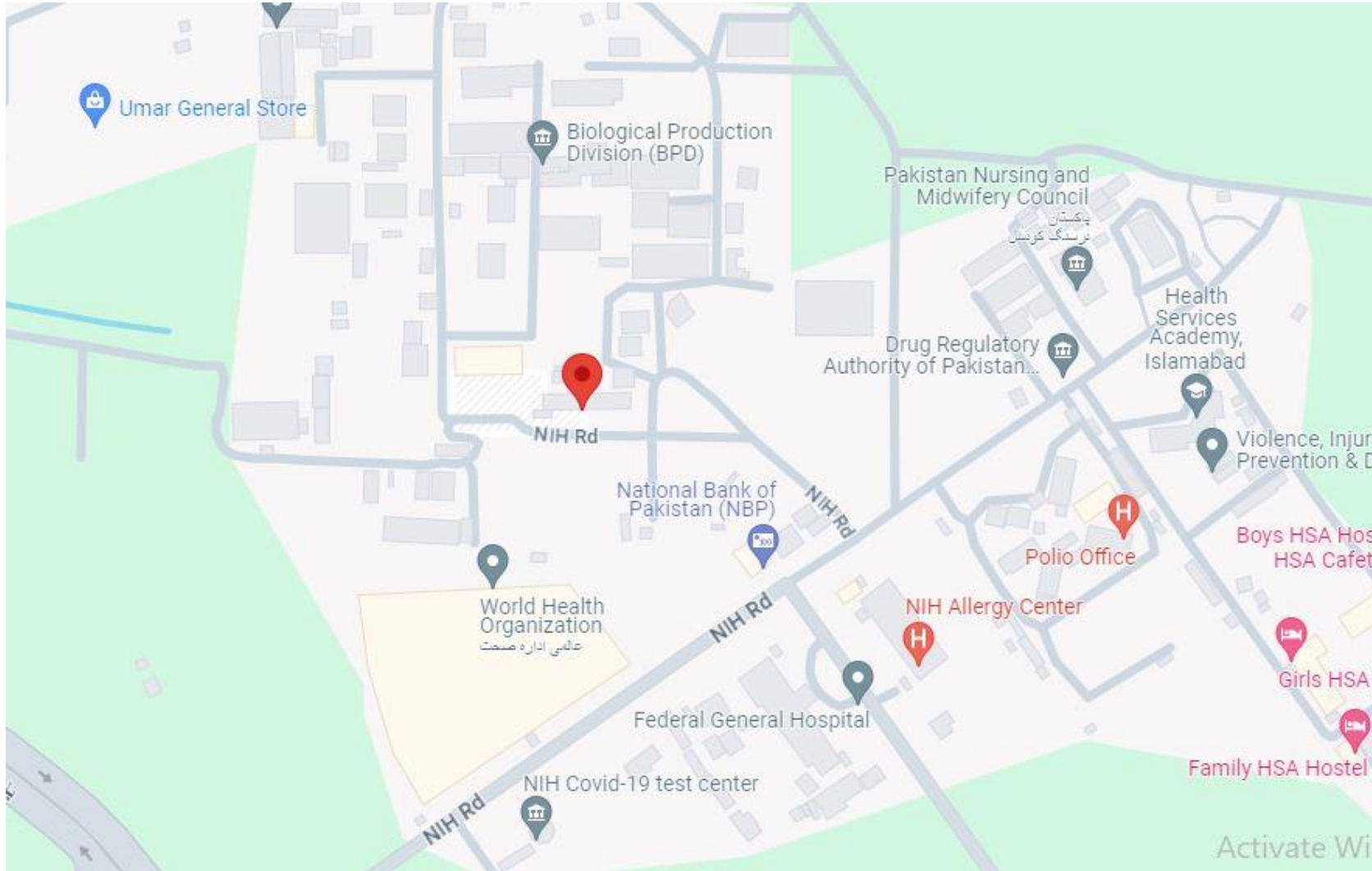
5.5 Road Access

There is paved road access to the project site. The main road access is by NIH road near the proposed project site. Due to this main road availability, access to project site is easy. All the

constructional & operational activities and basic needs provision will be made easy by the road access. Following is the Road access map of the proposed project site:



Map 2 Location of the project



Map 3 Road access map

5.6 Vegetative Features of Site

During the operation phase, green belts will be developed near the project site, and it will serve as a useful buffer to control pollution from different sources, mainly public and private vehicles. As a control measure of atmospheric pollution, as a barriers noise generated within the premises it is recommended to develop a green belt.

5.7 Plantation Plan

Approximately 500-1000 plants will be planted in and around the project vicinity to enhance the landscape's beauty and to make the ambient air quality better. These plants will include ornamental, coreopsis and daylily plants as well. But most trees will be shaded.

5.8 Magnitude & Cost of the project

The estimated initial capital cost of the aforesaid project is approximately 19 million PKR. The machines' safety will be ensured if these operations are carefully managed. No separate fund allocation is required.

Table 7 Cost of the project

Amenities	Cost in PKR
Plant cost	15 million
Plantation	01 million
Civil & Environmental cost	03 million
Total Cost	19 million

Detailed site surveys, planning and demarcation of the various regions during development of the proposed project will be done. However, the budget will be allocated for purchase and maintenance of standardized PPEs for workers, for waste management and environmental enhancement.

5.9 Proposed schedule for implementation (Tentative)

Stage I: The clearing of land, preparation of land for construction activity.

Stage II: During this phase machinery will be brought to the site and installed.

Stage III: In this phase all the outstanding activities will be completed, construction activities will be initiated.

Stage IV: After completing construction, employees will be hired, and staff will be assigned their respective work. The operation activities will be initiated.

Table 8 Schedule of implementation

Activities	Times Frame											
	Four Week		Four Week		Four Week		Four Week		Four Week			
Preliminary Phase (Land Acquiring etc.)	■											
Design Phase		■	■									
Pre-Construction Activities Finalization			■	■								
Construction Phase				■	■	■	■	■				
Purchasing Phase								■	■			
Machinery Installation										■		
Commissioning Phase											■	
Recruiting Of Staff												■
Operation Phase												■

5.10 Description of the project

The proponent intends to establish the incineration plant located at National Institute of Health (NIH), Park Road Chak Shahzad, Islamabad over an area of 1800 Sqft. The estimated cost for the subject proposed project will be about 19 million PKR.

The project will pose positive impacts in terms of waste reduction, will create jobs during construction and operation and will contribute to the country economy as well as the environmental improvement.

5.10.1 Process Description

The process description of an incineration plant for hospital waste is given below:

1. Collection and Transportation:

Hospital waste, which includes various types such as infectious materials, sharps (needles, scalpels), bandages, and pharmaceutical waste, is collected in designated containers at the hospital. These containers are labeled and segregated according to the type of waste.

2. Receiving Area:

Upon arrival at the incineration plant, the waste is weighed and logged into the facility's system. This ensures proper tracking and management of incoming waste volumes.

3. Sorting and Pre-treatment:

Before incineration, the waste undergoes a sorting process to remove Non-combustible materials such as metals are separated out to prevent interference with the incineration process.

4. Loading into the Incinerator:

The sorted waste is then fed into the incinerator. Modern incinerators are designed to handle different types of waste and maintain high temperatures necessary for complete combustion.

5. Gas Cleaning and Emission Control:

The gases produced during combustion (flue gases) pass through a series of pollution control devices such as wet scrubbers. Before the gas is diluted in the air dilution chamber. These devices remove particulates, heavy metals, and acidic gases (like sulfur dioxide) from the emissions to meet environmental regulations.

8. Ash Handling:

After hospital waste is incinerated, the resulting ash is collected and treated to stabilize it and reduce environmental impact. This treatment may include leaching to remove soluble contaminants, solidification with binders, or encapsulation for safe storage. Metals recovered from the ash are separated for recycling. Residual ash is then disposed of in designated facilities in accordance with environmental regulations, ensuring safe and compliant management of hazardous waste residues.

9. Monitoring and Compliance:

Throughout the entire process, emissions and ash quality are monitored regularly to ensure compliance with environmental standards and regulations. This includes testing for pollutants and ensuring that emission levels are within permissible limits.

10. Final Disposal of Residues:

Any residues from the treatment of emissions (like scrubber sludge) and the final ash are disposed of in accordance with regulations and environmental best practices to minimize environmental impact.

This process ensures that hospital waste, which can be hazardous due to its infectious nature, is safely and effectively managed through controlled incineration, minimizing risks to public health and the environment.

5.10.2 Process Flow Diagram:

The process flow diagram of incineration plant is given below:

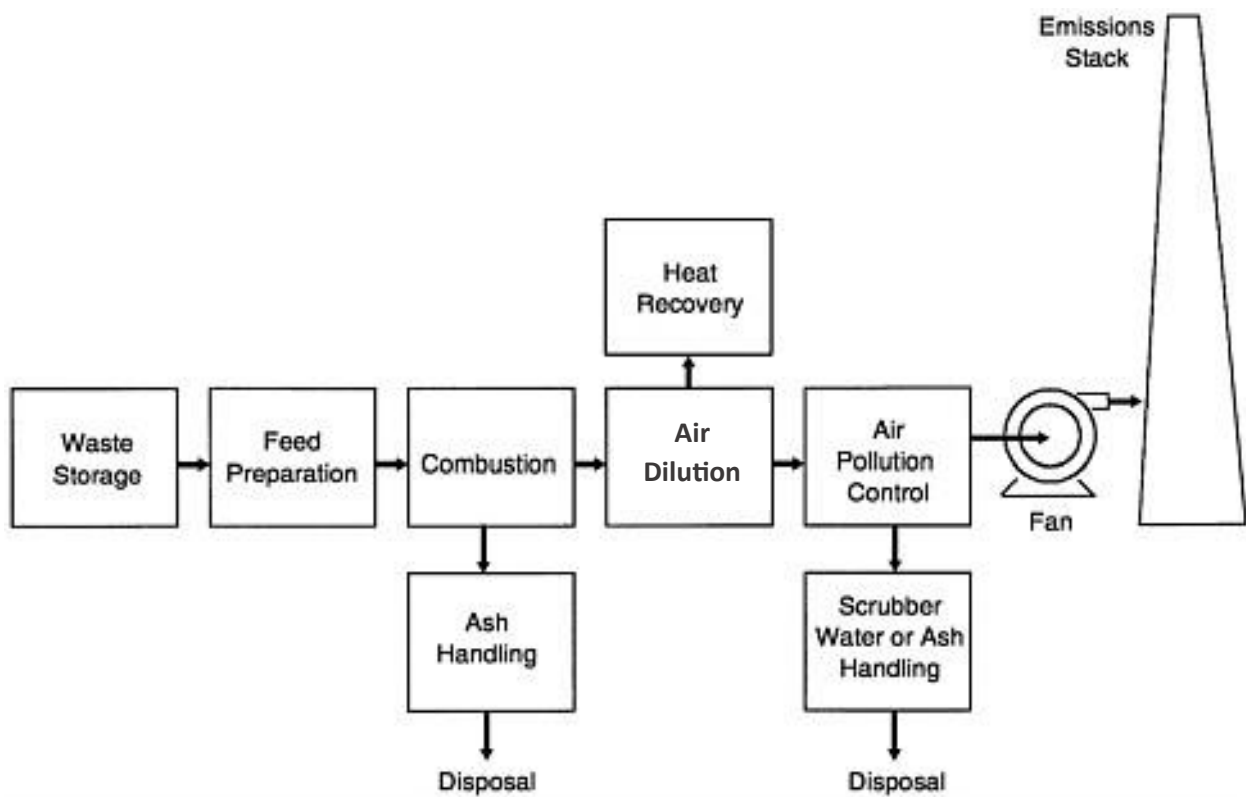


Figure 2 process flow diagram

5.10.3 Technical Specification of Incinerator:

Some technical specification of incinerator is given below and detailed one is attached as annexure:

Specification	Description
Capacity	Total capacity of the incinerator is 100 kg/hour

Operating Temperature	800°C to 1000°C
Chambers	Mainly two chambers: Primary chamber: 800-1000°C Secondary Chamber: 850-1200°C
Temperature Maintaining Time	50-60 minutes
Burners	Total 4 Burners (2 in P.C and 2 in S.C)
Fuel	LPG / Natural Gas
Construction	Made of refractory materials to withstand high temperatures and corrosive gases
Air Dilution Chamber	To dilute the concentrated gases
Air Pollution Control	Include wet scrubbers
Monitoring Systems	Integrated systems for continuous emissions monitoring
Safety Features	Ensure operator safety with robust safety mechanisms and alarms
Maintenance	Requires regular maintenance to ensure efficient and compliant operation

Available facilities:

Water Resource: The groundwater will be used for water consumption.

Fire Fighting System: The firefighting system will also be available in case of any emergency.

Wastewater Treatment System: For wastewater treatment, septic tanks will be installed and operated.

Water Supply

The source of water for the proposed site is ground water at the depth of 100-150 ft. In the development phase, 3-6 m³/day water will be used for domestic & constructional activities and water source will be ground water.

Use of Drugs and Narcotics

Drugs and narcotics are strictly prohibited during working hours in working area. Smoking will be only allowed at rest timings at properly isolated places.

Manpower

There will be approximately 15-20 workers during the construction phase and 5-15 workers on the unit during operational phase.

Personnel Protective Equipment

Following Personnel Protective equipment will be provided to the workers for their safety during construction and operational phase as per the requirement of specific activity:

- Heat-Resistant Clothing
- Safety Helmets
- Safety Gloves
- Eye Protection
- Respiratory Protection.
- Safety Footwear
- Ear Protection
- High-Visibility Clothing
- Chemical Resistant Clothing
- Fall Protection
- General Safety Equipment: This may include first aid kits, fire extinguishers, and emergency showers or eyewash stations for quick response to accidents or exposure incidents.

5.11 Details of restoration and rehabilitation

As the selected project location is away from residential area so there is no local community there. There is no structure of significance that needs to be relocated or dismantled due to the operation of the proposed project. No fresh land is to be occupied. Hence no relocation or restoration and rehabilitation are required. Project site notified by govt. as an industrial estate. The estimated life of the project is about 25 years approximately. All civil structures and related infrastructures will be extensively renovated. Rehabilitation would not be required as such at the current project site.

5.12 Government approvals and leases

As the approval from Environmental Protection Agency (EPA), Government of Pakistan, is mandatory before the start of construction of the project in compliance with Section-12 of the

Pakistan Environmental Protection Act, 1997, therefore, this EIA report has been prepared to submit in Pakistan Environmental Protection Agency.

5.13 Health, Safety & Hygiene

Health, Safety & Hygiene includes the following:

First Aid facility

At workplace, workers and employers should have enough information, knowledge and training regarding first aid treatment in case of any emergency.

Safety Trainings

Workers and all the staff will be provided with proper training about the work and safety practices.

Use of Drugs and Narcotics

Drugs and narcotics are strictly prohibited during working hours in working area. Smoking will be only allowed at rest timings at properly isolated places.

5.14 Safety signs/Safety boards

At any workplace safety signs and symbols are very important to avoid many accidents. They must be easy and understandable languages for all the workers. Workers should have the knowledge of sign wordings, and they must be trained and aware of them. Safety signs, symbols and boards must be provided by every department to protect the workers and employees from the risks of hazards that have not been controlled by other means. Regarding the subject project, safety signs and boards are placed to avoid the workers and staff from any risk.



Figure 3 safety signs

6 DESCRIPTION OF ENVIRONMENT

An environmental baseline study is intended to establish a database against which potential impacts can be predicted and managed subsequently. The EIA of the proposed project covers a comprehensive description of the project area, including regional resources which are expected to be affected by the project, as well as those which are not expected to be directly affected by the construction and operation of the project.

6.1 Data Collection

A site visit was conducted to survey the field area for collection of relevant data. Interviews were conducted with the general public and stakeholders of the project area in order to seek public opinion on the implementation of the proposed project. Various Governmental and Non-Governmental Organizations (NGOs) were also visited for the collection of relevant data and their views on the proposed project were recorded for incorporation into the EIA report. The environmental impacts of any activity or process will be assessed based on deviation from the baseline or normal situation. The following components form part of the baseline:

- i. Physical Environment
- ii. Ecological/Biological Environment
- iii. Socioeconomic Environment

6.2 Physical Environment

The proposed project lies in National Institute of Health (NIH), Park Road Chak Shahzad, Islamabad over an area of 1800 Sqft where proponent intends to develop the proposed project. The project lies in Islamabad territory, and it has detailed background history.

6.2.1 Geology

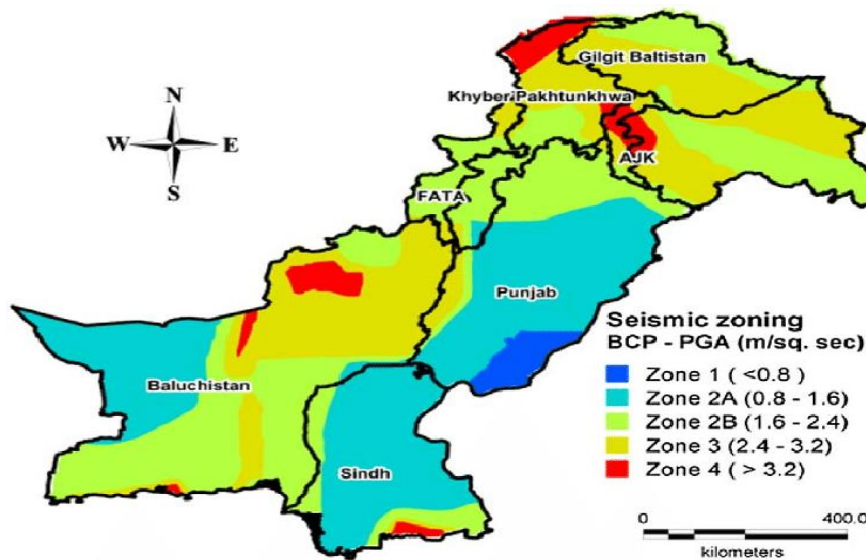
Islamabad is located at 33.43°N 73.04°E at the northern edge of the Pothohar Plateau and at the foot of the Margalla Hills in Islamabad Capital Territory. Its elevation is 540 metres (1,770 ft). The modern capital and the ancient Gakhar city of Rawalpindi form a conurbation and are commonly referred to as the Twin Cities. To the northeast of the city lies the colonial era hill station of Murree, and to the north lies the Haripur District of Khyber Pakhtunkhwa. Kahuta lies on the southeast, Taxila, Wah Cantt, and Attock District to the northwest, Gujar Khan, Rawat, and Mandrah on the southeast, and the metropolis of Rawalpindi to the south and

southwest. Islamabad is located 120 kilometres (75 mi) SSW of Muzaffarabad, 185 kilometres (115 mi) east of Peshawar and 295 kilometres (183 mi) NNW of Lahore.

Islamabad covers an area of 906 square kilometers (350 sq mi). A further 2,717 square kilometres (1,049 sq mi) area is known as the Specified Area, with the Margalla Hills in the north and northeast. The southern portion of the city is an undulating plain. It is drained by the Kurang River, on which the Rawal Dam is located.

6.2.2 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 2B. The seismic zoning is shown in the figure.



Map 3 Seismicity map of Pakistan

6.2.3 Climate

Islamabad has a humid subtropical climate with five seasons: Winter (November–February), Spring (March and April), Summer (May and June), Rainy Monsoon (July and August) and Autumn (September and October). The hottest month is June, where average highs routinely exceed 38 °C (100.4 °F). The wettest month is July, with heavy rainfalls and evening thunderstorms with the possibility of cloudburst and flooding. The coolest month is January.

Islamabad's micro-climate is regulated by three artificial reservoirs: Rawal, Simli, and Khanpur Dam. The latter is located on the Haro River near the town of Khanpur, about 40 kilometres (25 mi) from Islamabad. Simli Dam is 30 kilometres (19 mi) north of Islamabad. 220 acres (89

ha) of the city consists of Margalla Hills National Park. Loi Bher Forest is situated along the Islamabad Highway, covering an area of 1,087 acres (440 ha).

6.2.4 Water sources

The water supply in Islamabad Capital Territory is managed through Simly and Khanpur Dam, with 30% coming from groundwater. The peak supply of 141 million m³ is insufficient to meet the 407 million m³ demand, causing a shortage of 110 million m³.

6.2.5 Ambient Air Quality

Atmospheric pollution means the imbalance in 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 measure 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.

6.2.6 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 plenty and unavoidable. Physically, there is no distinction between sound and noise. Sound is sensory.

The perception and the complex pattern of sound waves are 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.

6.3 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.

6.3.1 Fauna

The Margalla Hills National Park is home to monkeys, jackals, wild boars, porcupine, mongoose, pangolin, Asiatic leopard, leopard cat, grey goral sheep, barking deer, chinkara gazelle, red fox, yellow-throated martin, and fruit bats, among others.

Avifauna includes Himalayan griffon vulture, laggar falcon, peregrine falcon, kestrel, Indian sparrow hawk, Egyptian vulture, white-cheeked bulbul, yellow-vented bulbul, paradise flycatcher, black partridge, cheer and khaliq pheasants, golden oriole, spotted and collared doves, larks, shrikes, wheat eaters, and buntings. Rawal Lake attracts a large number of birds which include mallards, grebes, cormorants, herons, egrets, common teal, kites, shikra, long legged kestrel, grey francolins, water hens, Eurasian coots, lapwings, hoopoes, wood peckers, sand martins, king fishers, thrush, warblers, great tit, and babblers.

There are around 174 mammal species, 668 bird species, around 177 species of reptiles and 198 native and introduced freshwater fish species in Pakistan. There has been little research on invertebrates of Pakistan, but about 5,000 species of invertebrates have been recorded including insects (1,000 species of true bugs, 400 species of butterflies and moths, 110 species of flies, and 49 species of termites). Other species include 109 species of marine worms, over 800 species of mollusks and 355 species of nematodes. Reptilian fauna includes Russell's viper, Indian cobra, Himalayan pit viper, and saw-scaled viper.

6.3.2 Flora

Pakistan's native flora reflects its varied climatic zones, which range from arid and semi-arid, to temperate and tropical, as discussed already. This volume provides an overview of the country's Flora and Fauna. For further details, and an extensive list, please visit The Pakistan Plant database, available online, and for details of flora in different districts, please consult the relevant chapters in this volume. The database provides access to flora of Pakistan, which is a comprehensive inventory of the plants of Pakistan, the first modern cataloguing of more than 6,000 species from Pakistan, a large, relatively poorly known region of South Asia. This Pakistan Plant Database (PPD) includes all information published in the Flora volumes already in print, and available in a searchable web-based format. To date, this project has produced 217 volumes of the Flora, the last 16 of which have been co-published by the Missouri Botanical Garden and the University of Karachi. Many volumes have been authored by world authorities on the taxa involved, who have often partnered with Pakistani botanists.

6.4 Socio Economic Environment

The physical extent of the study area extends up to 5km surrounding the proposed site (referred as project area) considering the physical, ecological, and socioeconomic boundaries beyond which the project is not likely to significantly influence local communities, and also with a view of covering a substantial sample size for collection of reliable and authentic socio-economic data.

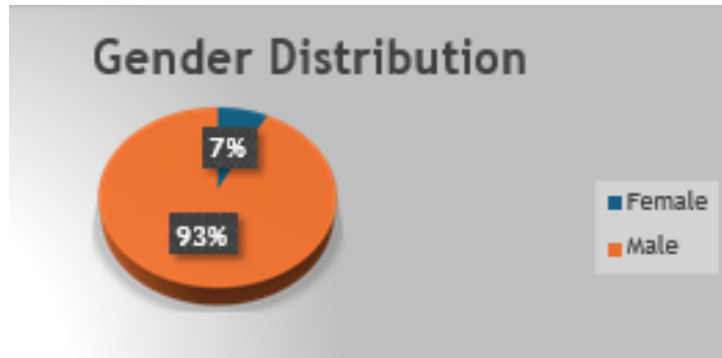
6.4.1 Population

People inhabiting the project area are of different castes and races. Most of the families have been living here in these villages from 20 to 25 years which has led to homogeneity of culture and the development of a closed economy. There is no danger or damage or elimination of indigenous community as the locals are steeped in their customs and have no intention of relocating. The following table presents the population of Pakistan as per the 2017 Census with Projected Population for 2019.

Administrative Unit	Area km ²	Total km ²	Male %	Female %	Urban %	Growth Rate %	Projected Population
Pakistan	796,096	207,774,520	51.2	48.8	34.4	2.40	220,890,000
Khyber Pakhtunkhwa	74,521	30,523,371	50.6	49.4	18.8	2.89	37,662,000
FATA	27,220	3,176,331	52.0	48.0	2.7	2.19	Added in KP Population
Punjab	205,345	73,621,290	51.7	48.3	31.3	2.64	117,072,000
Sindh	140,914	30,439,893	52.9	47.1	48.8	2.8	50,805,000
Balochistan	347,190	6,565,885	53.4	46.6	23.9	2.47	13,253,000
Islamabad	906	805,235	53.9	46.1	65.7	5.19	220,890

This table shows the distribution of respondents based on their gender. Out of a total of 40 respondents, 3 were female, and 37 were male. The percentage distribution is calculated as follows: 7.5% female and 92.5% male.

Gender	Frequency	Percent
Female	3	7.5
Male	37	92.5
Total	40	100



6.4.2 Religion

The majority of Pakistan’s population is Muslim but there are significant numbers of the population following other faiths, as shown in the following table:

Muslim	96.28%
Christians	1.59
Hindus	1.6%
Ahmadis	0.22%
Scheduled Castes	0.25%
Others	0.07%

6.5 Quality of Life Value

Overall, the social and physical infrastructure is not up to the mark in the project area. However, the project area is better compared to the other rural areas of the province. A brief account of the education, health, infrastructure, and markets of the area is as follows:

6.5.1 Economic Activities

Islamabad is the Federal Capital of Pakistan and contributes nearly 1% to Pakistan’s GDP. The Islamabad Stock Exchange, founded in 1989,[1] is Pakistan’s third largest stock exchange after Karachi Stock Exchange and Lahore Stock Exchange. Islamabad has seen an expansion in information and communications technology with the addition of 2 Software Technology Parks

which house numerous national and foreign technological and IT companies. Most of Pakistan's state-owned companies like PIA, PTV, PTCL, OGDCL, and Zarai Taraqiati Bank Ltd. are based in Islamabad. The city is home to many branches of Karachi-based companies, banks, and TV channels. The headquarters of all major telecommunications operators such as PTCL, Mobilink, Telenor, Ufone, and China Mobile are also located in Islamabad.

According to the 1998 Census; (2017 Census data has not been made Public yet), the major employers in the territory include:

- Community, Social & Personal Services (55%)
- Wholesale/ Retail Trade, Restaurant/ Hotel (12%)
- Construction (11%)
- Agriculture with its Allied Livestock Breeding, Fishing (4%)
- Manufacturing (7.0%)
- Others (11%)

6.5.2 Agriculture

The district falls under the barani (rain-fed) Agro-Ecological Zone of Pakistan and relies mostly on rainwater for its agriculture. Wheat, bajra, jowar, maize, mash, masoor, moong, rapeseed, mustard & canola, sesamum, and fodder are some of the crops of the territory. The main fruits grown in the area are citrus, guavas, apricots, pear, peach, Ber, phalsa, and pomegranate.

Main vegetables include potatoes, garlic, turnip, bottle gourd, okra, brinjal, bitter gourd, cauliflower, peas, chilies, coriander, carrots, and watercress.

6.5.3 Education

The literacy rate of Islamabad is the highest in Pakistan at 72% with 80.6% males and 62.4% women being literate. The total number of higher education institutions (Universities) is also the highest. Some of the best educational institutes are located in Islamabad. The following table shows the number of government educational institutes in the district as per Pakistan Education Statistics 2016-17:

Facility	Boy/Girl	Facility	Boys/Girl
Primary Schools	112/79	Middle Schools	23/37
Secondary Schools	45/52	Higher Secondary	30/35

Degree Colleges	02/08	Technical Training	07/08/05
Vocational Institutes	21/69/08	Commercial Training	NA
University	30	Medical College	08
Agriculture College	–	Engineering Schools	20

6.5.4 Healthcare Facilities

The Ministry of Health has its head office in Islamabad. The major roles of this Ministry are national planning and policy formulation, plus regulation and standardization; medical education; research; preventive and infectious disease control; and curative healthcare. In Pakistan, the health care system is a four-tier system as follows:

- Outreach and community-based services that focus on immunization, sanitation, malaria control, maternal child health, and family planning
- Primary Health Care facilities that include Basic Health Units (BHUs) and Rural Health Centers (RHCs)
- Secondary Health Facilities that include Tehsil and District Hospitals.
- Tertiary care hospitals located in major cities.

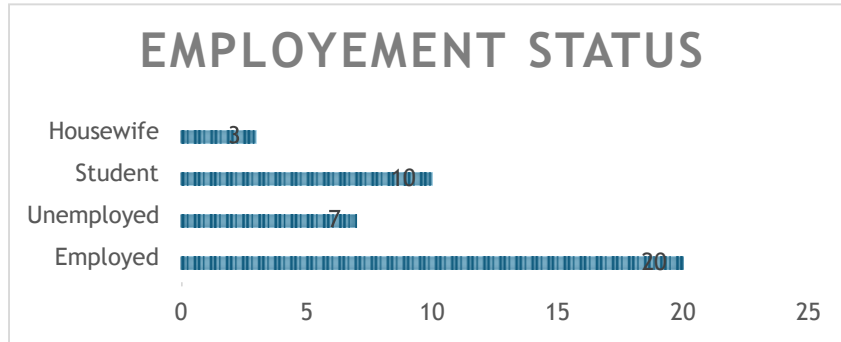
In Islamabad, the H-Sectors are mostly dedicated to educational and health institutions. Islamabad has the lowest rate of infant mortality in the country at 38 deaths per 1,000 compared to the national average of 78 deaths per 1,000. Islamabad has both public and private medical centers. The largest hospital in Islamabad is the Pakistan Institute of Medical Sciences (PIMS) hospital. It was established in 1985 as a teaching and doctor training institute. PIMS now functions as a National Reference Center and provides specialized diagnostic and curative services. Some of the important hospitals are in Islamabad as follows:

- Islamabad General Hospital: A major component of PIMS and has 592 beds
- Children Hospital: 230 beds
- Maternal & Child Health Care (MCHC) System: 125 beds
- Pakistan Atomic Energy Commission (PAEC) General Hospital: 100 beds
- Shifa International Hospital: A teaching Hospital with 150 beds.

6.5.5 Healthcare Facilities

This table shows the employment status of respondents. The majority are employed, followed by students, while a small percentage are housewives.

Employment Status	Frequency	Percent
Employed	20	50.0
Unemployed	7	17.5
Student	10	25.0
Housewife	3	7.5
Total	40	100



7 IMPACT ASSESSMENT

This section discusses the potential environmental impact for the establishment of incineration Plant. The impacts may include; soil contamination, water problem, biological resources disturbance and socio- economic impacts and, where applicable, identifies mitigation measures that will reduce significantly, if not eliminate, its adverse impact. The assessment carried out in this section is based on potential impacts on overall environmental receptors within the project area.

- To find different alternatives and ways of carrying out the project activities, which may cause adverse environmental and social impacts on the surroundings.
- To enhance the Environmental and Social benefits of projects.
- To avoid, minimize and remediate adverse impacts.
- To ensure that residual adverse impacts are kept within acceptable limits.

7.1 Impact Assessment Method

This section discusses the project's potential environmental impact due to the proposed project. The adverse impact may occur on the area's geomorphology, soil, water resources, air resource, biological resources and socio-economic condition and where applicable, identifies mitigation measures that will reduce significantly, if not eliminate, its adverse impact. The assessment carried out in the sub-sections below is based on potential impacts on overall environmental receptors within the project area. Impacts are evaluated on the basis of magnitude, immediacy and sustainability.

There are various methods for Impact assessment such as listed below:

1. Checklists
2. Matrices
3. Networks
4. Overlays
5. GIS and computer expert systems

The method used to evaluate the impacts of proposed project is **Checklist Method**. This method has been used to identify the significance and magnitude of the impacts as well as the nature, reversibility and extent. The impact assessment is done on the basis of project phases from construction to operation.

7.2 Evaluation of the Residual Impacts

Incorporation of suggested mitigation measures may reduce the magnitude of the environmental impacts of the above stated project but sometimes, it may fail in bringing them within the acceptable limits. This step refers to the identification of the anticipated remaining impacts after mitigation measures have been applied.

It can be concluded in view of these reasons that the selected site is best suited for the project and the technology adopted for the proposed project. The said project will not pose any adverse impact or threat on any component of the environment, if properly managed.

7.3 Characteristics of Impact

Based on the nature of impacts further subdivisions can be as follows:

- Positive and Negative Impacts
- Long- and Short-Term Impacts
- Direct and Indirect Impacts
- Continuous and Intermediate Impacts
- Wide and Local Impacts
- Large, moderate and minor Impacts

DURING CONSTRUCTION PHASE

Basic Components	Impact Characteristics												
	Duration		Location		Frequency		Extent		Significant			Nature	
	Long	Short	Direct	Indirect	Continuous	Intermediate	Wide	Local	Large	Moderate	Minor	Positive	Negative
Soil Erosion		*		*		*		*			*		*
Air Quality		*	*			*		*			*		*
Ground Water Quality		*	*			*	*		*				*
Noise Level		*	*			*		*			*		*
Wastewater Generation	*		*		*		*		*				*
Solid Waste	*		*		*			*		*			*
Aesthetic		*		*		*		*			*		*
Flora		*		*		*		*			*		*
Fauna		*		*		*		*			*		*
Employment Rate		*	*			*	*			*		*	
Economics Uplift		*	*			*	*			*		*	
Health & Safety		*	*			*		*			*		*

DURING OPERATIONAL PHASE

Basic Components	Impact Characteristics												
	Duration		Location		Frequency		Extent		Significant			Nature	
	Long	Short	Direct	Indirect	Continuous	Intermediate	Wide	Local	Large	Moderate	Minor	Positive	Negative
Soil Erosion		*		*		*		*			*		*
Air Quality		*	*			*		*			*	*	
Ground Water Quality	*		*			*	*		*				*
Noise Level		*	*			*		*			*		
Wastewater Generation	*		*		*		*		*				*
Solid Waste	*		*		*			*		*		*	
Machine Installation	*		*		*			*		*			
Cleanliness		*		*		*		*			*	*	
Aesthetic		*		*		*		*			*		*
Flora		*		*		*		*			*		
Fauna		*	*		*			*		*			
Economic Uplift	*		*		*		*		*			*	

The impact analysis of the incineration plant facility encompasses a multifaceted evaluation of the facility's influence on various stakeholders and sectors. Firstly, the unit significantly contributes to waste management and good air quality practices. This positively impacts the environment and solid waste management of the hospital waste. Moreover, incineration plants play a crucial role in disease prevention, reducing the risk of transmission. Economically, the unit contributes to the industry, fostering waste reduction, innovation, research, and employment opportunities. The advanced technology used in the design of incineration plants makes this plant a very good environment friendly and sustainable resource. On the regulatory front, the unit's adherence to stringent quality standards ensures safety, bolstering public trust. Conversely, challenges may arise, including the environmental impact of management of stored waste and the ash handling. A comprehensive impact analysis has been considered to guide sustainable practices, regulatory compliance, and continuous improvement within the plant. By adopting proper PPEs and by following mitigation measures and EMP, the impact associating with this proposed project can be neglected.

8 ANTICIPATED IMPACTS AND MITIGATION MEASURES

This chapter provides a review of the potential impacts by the installation of the Incineration plant located at National Institute of Health (NIH), Park Road Chak Shahzad, Islamabad over an area of 1800 Sqft. The purpose of this project is to reduce the hazardous waste and proper handling of it. The estimated cost for the subject proposed project will be about 19 million PKR. These impacts could be both positive and negative in nature 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 matrices and presents effective mitigation measures to counter their adverse nature.

8.1 Purpose of Environmental mitigation measures

For the project to be running successfully and compliance with environmental regulations mitigation of impacts caused by the project is required. The purpose of the need for mitigation can be answered by various questions as follows:

1. What is the problem?

When the resources of the environment are being used ruthlessly, it results in degradation of the environment to the extent that the environment loses its resilience and the carrying capacity reduces the resources found and the recovery process is too slow or nearly no recovery is possible.

2. When will the problem occur and when should it be addressed?

The problems that would occur fall within the project premises, and near the boundaries of the project location. The impacts would range up to the distance where project related activities are performed or up to the geographical zone where the effects spread. Impacts would show their presence soon after the project development starts.

3. Where should the problem be addressed?

The problems should be addressed where they originated. That is at the project location.

4. How should the problem be addressed?

Problems can be addressed by using environmentally friendly practices. Such practices can be followed by the following mitigation plans.

8.2 Impact Identifications Methodology

Potential impacts from the project activities were identified by a thorough review of the project activities, study of surrounding environment, review of literature, from previous similar studies and expert judgment.

8.2.1 Approaches for Mitigation Measures

The following approaches may be used to mitigate the impact of the project:

Avoid: Change of route or site details, to avoid damaging important ecological or archaeological features.

Replace: Regenerate similar habitat of equivalent ecological value in different Location.

Reduce: Filters, cyclones, noise barriers, dust, enclosures, visual screening, wildlife corridors and changed time of activities to reduce the impact.

Restore: Site restoration at the end of the operational activities.

Compensate: Relocation of displaced communities, facilities for the affected communities, financial compensation for the affected individuals, etc.

8.3 Potential Environmental Impacts and Mitigation Measures due to project location

The location is well linked to the other parts of the city through the main Road of NIH. There will be no enduring, high and adverse impact predicted due to the establishment of the proposed project at this location. The project site is mostly suitable. The selected site is owned by the client and there is no clash associated with the ownership of the land. Moreover, the area is not inhabited by any ecologically important or protected flora and fauna specie as well as within 2.0 km vicinity of the project area no archaeology and historically important site is located.

8.4 Potential Environmental Impacts and Mitigation Measures due to design

All technical standards will be kept in mind during construction and operational activities. The waste will be generated during different project activities. The proper handling of waste will be ensured. The technology will be updated and advanced. Advance and comprehensive methods will be followed. The fuel used in machinery is more eco-friendly and will emit less

emissions. The design proposed is latest and can be used easily. The transportation activities will be done through the main. Efficient infrastructure has been developed.

8.5 Potential Environmental Impacts and Mitigation measure during Construction Phase

Project construction phase whose activities will surely show effects on land environment, water, air, noise level, soil quality, socio-economic trend of area, etc. These impacts had been controlled effectively by adopting best management practices.

8.5.1 Air Quality

Potential Issues:

Impact on air quality will be arise due to moving of vehicles different gases like Sox, NOx, PM and other gaseous emission, transporting construction material cause spreading of dust particles in air. The machinery used in construction phase also emits gaseous particles.

Mitigation Measures:

These impacts will be reduced by:

- For reducing fugitive dust, regular water sprinkling on roads has been carried out
- Usage of low-noise construction machine
- Covering the transport vehicle by tarpaulin
- The construction machinery and equipment must be kept maintained on a regular basis
- Use the updated fuel in vehicle

8.5.2 Noise Quality

Potential Issues

During construction process compaction, blistering and mixing of raw material machinery granulation process, use of heavy machinery for clearing of the site and trolleys and trucks used for the transportation of construction materials will create some noise and vibration as well.

Mitigation Measures

These impacts will be reduced by:

- Avoiding the unnecessary use of horns.
- Proper maintenance of machinery engines.
- Noise control measures will take such as provision of silencers on the heavy

construction vehicles.

- The green zone of plants will also help decrease sound levels.

8.5.3 Water availability

Ground water will be used for the water requirement. But due to increasing demand of water nearby water resources may be affected, however the impact shall be lesser in magnitude.

Mitigation Measures

- Water will be handled with great care.
- Pipes and containers will be used for further usage of water.
- Water will be saved at maximum possibility during construction.

8.5.4 Wastewater drainage

Potential Impact

There will be no impact on the natural drainage ways. During Construction, the generated wastewater may impact on the environment if not properly managed.

Mitigation Measures

- Municipal wastewater drainage will be properly handled.
- National Environmental Quality Standards (NEQS) will be compliance for waste management and disposal.
- Wastewater will be disposed of in the drainage system after the treatment through septic tank.

8.5.5 Solid Waste Management

Potential Impacts

The solid waste will be generated due to construction material like gravels, sand particles, and packaging bags of construction material. If not properly handled it can also damage the drainage system. Disposal of construction debris produce shall be properly disposing of otherwise it would have negative impacts on the site and surrounding area.

Mitigation Measure

The impacts will be minimized if:

- Solid waste will be collected timely.

- Waste bins will be provided on the site for disposal.
- Spreading of solid material will be avoided.

8.5.6 Ecological Impacts

Potential Issues

Impacts on wildlife may arise from the following project activities:

- Noise generated from project activities.
- Air pollution due to emissions
- Movement of personnel and vehicles
- Clearing of vegetation

Mitigation measures:

The following mitigation measures will reduce the adverse impact on the wildlife of the project area:

- Vegetation loss will be kept to an absolute minimum. Cutting of large trees will be avoided.
- Fires in the open will not be allowed.
- A 'no-hunting, no-trapping, no-harassing' policy will be strictly enforced, unless threatening to human life.
- Uncontrolled discharge of waste of any kind will not take place in the area.
- Discharging firearms will be explicitly prohibited.
- General awareness of the crew will be enhanced regarding the wildlife, through environmental training, notice board postings, tool box talks etc.
- The project staff will be educated and instructed to avoid killing. Feeding or harassment of wildlife will not be allowed.
- Physical disturbance to areas outside the work corridors will be avoided.
- The total duration of activities will be minimized by good management.

8.5.7 Impacts Related to Health and safety

Possibility of health and safety hazard of workers is always present during construction phases like laying of pipes, installation of scaffolding and machines installations.

Mitigations

- To handle emergency medical situations, first aid facilities have already been made available for the workers at the site.
- Avoid all possible injuries during construction of the project.
- The contractor will ensure the availability of transport and driver to handle any emergency condition during construction activities at the project site.
- Safety equipment like belts, gloves and helmets should be strictly used by the labor at the work site.
- Implement training programs that support the achievement of the staff and personnel's competency in relation to health, safety and environment.
- Introduce methodology of motivating good safety and environmental performance.

8.5.8 Increase in Employment Opportunities

Due to installation of aforesaid project, the employment opportunity will be slightly enhanced. During construction phase, 15-20 workers will be hired from local community include; skilled and un-skilled workers. Locals will also have the opportunity to diversify their income by being employed. Hence, there will be an increased employment opportunity for the local people which will have a positive impact on the socio-economic status of the area.

8.6 Anticipated Impacts and Mitigation Measure during Operational Phase

The summary of the impacts and possible mitigation measures during the operational phase are as follows:

8.6.1 Impact on air quality

Dust will be generated due to the movement of vehicles carrying the raw-material (hospital waste) and emission from the chimney. During operational phase, suspended particulate matter and gaseous emissions will be the main pollutant, not in a significant amount.

Mitigation Measures

Following mitigation measures will be adopted:

- For dust suppression regular sprinkling of water will be carried out.
- Vehicles used for transportation will be regularly serviced and maintained in order to keep the environmental impact on account of their exhaust emissions to its minimum level.

- “Wet Scrubbers” will be equipped within the plant to reduce the emission of harmful gases
- Native tree would be planted along the boundary of project area to keep environment healthy.

8.6.2 Impact of Noise

Noise, an unwanted sound, affects human being. Excessive exposure to noise produces varying degree of damage to hearing system. It leads to headache, fatigue, etc. Continuous exposure of increased level of noise will have an adverse impact on the health of workers as well as the people residing in surrounding area.

Mitigation Measures

In general, the following methods will be adopted to control the noise pollution from the proposed project: A thick greenbelt will be developed all around the plant which will be acting as noise barrier.

- The use of concrete and masonry walls & barriers keeping in view the benefits of stiffness weight & cavity construction & the need to provide well sealed sound attenuating doors & windows.
- Attenuation by use of sound absorbents on walls and fixed or suspended ceilings.
- All the transporters will be vised to carry out regular maintenance of their vehicles.

8.6.3 Solid Waste Management

Proper solid waste management system is necessary for the prompt, timely and efficient disposal of solid waste & sludge for the reduction of its impacts. Impacts due to solid waste are expected to be temporary and minor in nature.

Mitigation Measure

- Use separate waste bins for disposal of solid waste
- Timely collection of solid waste from site.

8.6.4 Impacts of Wastewater

Wastewater will be produced from the domestic sources and during the operation of plant to some extent. Direct dispose of can affect the drainage system. Improper or mismanagement of sewerage supply system can cause polluted water to spread out and can affect the land.

Mitigation Measure

- Provide proper drainage system.
- Wastewater will be disposed of in the drainage system after the treatment through septic tank.
- Wastewater should meet the NEQS before discharging it to the drain.

8.6.5 Health & Safety of Workers

Improper handling of chemicals and raw material may cause various health issues such as; inhaling, injection, work place incident, physical hazards, chemical hazards, etc. It can cause allergy reaction and many other issues. To ensure the safety of workers these impacts need to be managed effectively.

Mitigation Measures

- Workers will be trained on the regular basis regarding personal safety, disaster management physical and chemical hazards.
- Training regarding HSE should be given on the regular basis.
- Workers will be given PPEs such as; helmets, mask, ear-plugs/muffs, safety boots, etc.
- It should be strictly enforced to wear PPEs while working.
- Incidents should be reported directly to the concerned authority.
- Unloading of the input-material and loads of the final products should be controlled, supervised, slow and smooth.

8.6.6 Impact on Flora and Fauna

No significant species present there. Some of common trees and animals found there. No adverse impact imposes on it.

Mitigation Measure

- After construction trees will be planted.
- Avoid unnecessary cutting and damage to habitats.

8.7 Environmental Enhancement Measure

The proposed project will be installed with all precautionary measures to enhance and safe the environment. Following necessary measures will be adopted during construction and operation:

- At workplace workers and employers have enough information, knowledge, and training regarding first aid treatment in case of any emergency. The project provides proper medical facilities to workers and staff to cope with any incidental accidents and tackle them
- Drugs and narcotics are strictly prohibited during working hours in working areas.
- The staff / attendants of the machinery will use proper protective gears.
- Sprinkling of water will be done on dusty road and tracks
- PPEs will be provided during construction activity
- Constructional waste and domestic solid waste will be disposed-off or utilized properly
- Local people will be informed in advance when work is about to start in an area
- Machinery will never be left unattended
- Efforts should also be made to discuss traffic conditions so that regular traffic is not disturbed. Transporters engaged for the project would be forced to adhere to the load specifications of the access road. No overloading would be allowed in any case.
- Safety signs and boards will be placed during construction
- Proper SOPs will be followed with proper schedule along with the HSE conditions
- Area will be restored with native plants. A proper tree plantation plan will be formulated to save the environment
- Solid waste will be handed over to contractors and agreement will be made.
- Noise will be controlled by adopting proper measures
- PPEs will be provided to workers during working
- Safety signs will be placed at all locations where required
- First aid facilities will be made available
- Any possible measure will be adopted to make the project safe and environmentally friendly.

9 ENVIRONMENTAL MANAGEMENT & MONITORING PLAN (EMMP)

A comprehensive management plan is necessary to implement the recommendations and suggestions for environmental protection included in chapter. The objective of the Environmental Management and Monitoring Plan (EMMP) is to address all the major environmental issues and provide a framework for the implementation of the proposed mitigation measures during the construction and operational phases of the project. The proper implementation of the EMP will ensure that all the adverse environmental impacts identified in the EIA report are adequately mitigated, either totally prevented or minimized to an acceptable level and required actions to achieve those objectives are successfully adopted by the concerned institutions or regulatory agencies.

For effective environmental management, the management of the project should assign the necessary responsibilities to its Health, Safety and Environment team, which should be responsible for environmental monitoring of the project.

9.1 Objectives of Environment Management Program

The EMMP provides a delivery mechanism to address potential impacts of the project activities, to enhance project benefits and to introduce standards of good practice to be adopted for all project works. The EMMP has been prepared with the objectives of:

- Defining roles and responsibilities of the project proponent for the implementation of EMMP and identifying areas where these roles and responsibilities can be shared with other parties involved in the execution and monitoring of the project.
- Outlining mitigation measures required for avoiding or minimizing potential impacts assessed in the EIA report.
- Developing a monitoring mechanism and identifying requisite monitoring parameters to confirm effectiveness of the mitigation measures recommended in the EIA report.
- Defining the requirements for communication, documentation, training and monitoring, management, and implementation of the mitigation measures.

9.2 Environmental Budget

Table 9 Environmental Budget

Environmental Component	Quantity	Amount Pak Rs.	Details/Basis
Landscaping/Plantation	500-1000 approx.	1 million	Cost includes plantation and maintenance up to three years
Solid waste management	L.S	03 lacs	Lump Sum
Health & Safety Measures	L.S.	05 lacs	Lump sum
Miscellaneous Cost	L.S.	01 lacs	Lump sum
Air Quality Monitoring	2	10,000	2 samples @ 5000/sample
Water Quality Monitoring	2	10,000	2 samples @ 5000/sample
Noise Level Monitoring	2	10,000	2 samples @ 5000/sample
Soil Tests	2	10,000	2 samples @ 5000/sample
Training		10,000	Lump sum
External Monitoring		50,000	
Total Environmental and Social Management Cost		2 million	

9.3 Environmental Monitoring Plan

The Environmental Monitoring Plan outlines specific parameters that need to be regularly monitored to assess the project's impact on the environment. This plan is divided into various components, each aligned with the potential impacts identified in the EIA:

9.3.1 Air Quality Monitoring

Parameters: PM10, PM2.5, SO_x, NO_x, CO levels.

Frequency: Monthly monitoring during construction and semi-annually during operation.

Responsibility: Environmental Manager/Third-party monitoring agency.

Mitigation Actions: Dust suppression (e.g., sprinkling water), low-emission machinery, and vehicle maintenance.

9.3.2 Water Quality Monitoring

Parameters: pH, dissolved oxygen, turbidity, heavy metals, and coliform levels.

Frequency: Quarterly monitoring of surface and groundwater resources.

Responsibility: Environmental Manager and certified laboratory.

Mitigation Actions: Wastewater treatment, runoff control, and proper disposal of hazardous substances.

9.3.3 Noise Level Monitoring

Parameters: Noise levels (in decibels) during peak construction and operational activities.

Frequency: Monthly during construction and annually during operation.

Responsibility: Contractors, with oversight from the Environmental Manager.

Mitigation Actions: Use of noise barriers, restricted working hours, and maintenance of machinery.

9.3.4 Soil and Land Monitoring

Parameters: Soil quality (contamination, compaction) and erosion risk.

Frequency: Biannual soil testing in and around the project site.

Responsibility: Environmental Manager/Contractor.

Mitigation Actions: Implement soil erosion controls, limit excavation, and stabilize exposed soil.

9.3.5 Biodiversity and Habitat Monitoring

Parameters: Changes in local flora and fauna populations, habitat degradation.

Frequency: Annual monitoring during both construction and operation.

Responsibility: Environmental team with the assistance of ecological experts.

Mitigation Actions: Reforestation, creation of wildlife corridors, and habitat restoration.

9.3.6 Waste Management Monitoring

Parameters: Volume of solid, liquid, and hazardous waste generated.

Frequency: Ongoing monitoring, with monthly reporting.

Responsibility: Contractors and waste management team.

Mitigation Actions: Waste segregation, recycling programs, and proper disposal in designated areas.

9.3.7 Social Impact Monitoring

Parameters: Displacement, livelihood impacts, access to resources, public health.

Frequency: Biannual assessments, with community consultations.

Responsibility: Social experts and community liaison officers.

Mitigation Actions: Implementation of resettlement plans, provision of alternative livelihoods, and health services.

9.4 Environment Management Plan (EMMP)

Table 10 Environment management and monitoring plan (MMP)

ENVIRONMENT MANAGEMENT PLAN				
S. #.	Impact	Mitigation Measure	Responsibility	
			IMPLEMENTATION	MONITORING
A.	CONSTRUCTION STAGE			
1.	AIR QUALITY			
	Dust, SO ₂ , NO _x & CO emissions from trucks, cause health issues to workers.	Spray by water trucks to minimize the dust. Maintenance of construction machinery should be made mandatory to reduce emissions. Haul-trucks carrying earth, sand, aggregate and other materials will be kept covered with tarpaulin to reduce dust pollution.	Contractor	Proponent through Consultant
2.	NOISE			

	The impact of noise generated during construction.	Engines of vehicles visiting project site should be properly tuned-up. The green zone of plants will also help to decrease sound levels.	Contractor	Proponent through Consultant
3.	OCCUPATION, HEALTH AND SAFETY			
	There will always be the possibility regarding hazard to health and safety of workers to occur during construction stage, lying of piles, and machines installation.	First aid facilities should be readily available for the workers at the site. The contractor will ensure the availability of transport and driver to handle any misshape which may occur. Relevant safety devices like belts, gloves and testers should be strictly used by the labor force at the work site. Implement training programs that support the achievement of the staff and personnel's competency in relation to HSE.	Contractor	Proponent through Consultant
4.	DISPOSAL OF CONSTRUCTION DEBRIS			
	Each phase of the development shall produce solid waste, disposal of which, if not managed properly could have negative impacts on the site and surrounding area.	A site waste management plan should be made the responsibility of the contractor. The wastes should be properly segregated and separated to encourage recycling of some useful waste materials.	Contractor	Proponent through Consultant

		Train or educate the involved stakeholders on the importance and means of waste management and handling.		
5.	GROUND WATER QUALITY			
	No appreciable impacts on the ground water quality are anticipated.	Avoid accidental spills through good work practice.	Contractor	Proponent through Consultant
6.	SOIL CONTAMINATION			
	Any improper storage or handling of materials including paints, fuels, solvents, oil, cement, etc. would result in soil contamination.	The contractor should be required to impart proper training to their workforce in the storage and handling of materials.	Contractor	Proponent through Consultant
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 increase the aesthetic value of the site and will combat pollution. Landscaping is deemed to be a powerful mitigation activity with a positive impact.	Contractor	Proponent through Consultant
8.	SOCIO-ECONOMIC ENVIRONMENT			

	Several categories of employees will be required during the construction phase. This would have a positive impact on the local economy and on regional unemployment.	<p>Socially responsible attitude of the project management towards local people and resources can make project people friendly.</p> <p>Awareness and educational programs introduced by the project management or e area can reduce the fear among the people regarding non-local people.</p>	Contractor & Proponent	SIE
B.	OPERATIONAL STAGE			
9.	AIR QUALITY			
	<p>The slightly increased traffic as a result of project operation will not result in the significant increase in concentrations of emissions.</p> <p>The emissions from the chimney</p>	<p>Proper maintenance and tuning of the vehicles done by the proponent.</p> <p>Wet Scrubbers will be used to clean the gases before emission into the air.</p>	Proponent	EPA
10.	NOISE QUALITY			
	Noise due to movement of vehicles, during traffic of materials.	<p>No Mitigations required except for keeping maintenance of vehicles.</p> <p>Plantation along with boundary will make buffer zone to avoid noise.</p>	Proponent	EPA
11.	OCCUPATION, HEALTH AND SAFETY			

	<p>There will always be the possibility regarding hazards to health and safety of workers to occur during the operational phase of the project.</p> <p>Working in the high temperature can cause some issues if PPEs will not wear</p>	<p>All the workers will be suggested to wear heat resistance gears to avoid injury</p> <p>Plantation of trees along the boundary walls will help in reducing the noise levels to enough extent.</p> <p>All the vehicles should be properly tuned up and regular maintenance and periodic monitoring must be done. Strict rules should be made and implement.</p>	Proponent	EPA
12.	SOLID WASTE			
	<p>The solid waste may negatively impact the site, the workers, the visitors and the factory surrounding in different ways including aesthetically, occupationally as well as from health, safety and environment point of view.</p>	<p>Solid waste will be collected by system, which will be managed by the management of proposed project.</p> <p>Recyclable material will be recycled.</p>	Proponent	EPA
13.	WASTEWATER QUALITY			
	<p>The sewage effluents shall be discharged after primary treatment into the main sewerage tank.</p>	<p>The system for the treatment (septic tank) of the sewage effluent should be appropriately installed and maintained.</p>	Proponent	EPA

14.	FLORA & FAUNA			
	Excessive plantation shall be done on the walls. This will act as a buffer zone and bring healthy change in the environment during the operational phase of the project.	The process of plantation should be kept sustainable throughout project life.	Proponent	EPA
15.	SOCIO-ECONOMIC ENVIRONMENT			
	A few employees will be required in the operational phase and this would have a positive impact on the local economy and on regional unemployment.	<p>The management of the project can capitalize the positive attitude of people of the study area towards this project by offering them maximum employment opportunities.</p> <p>Measurements and steps should be taken to keep undisturbed the privacy of adjoining workplaces.</p>	Proponent	EPA

9.5 Proposed Monitoring/EMP reporting and Reviewing Mechanism

Table 11 Proposed monitoring and reviewing mechanism

Category	Impact	Project Activity	Monitoring Mechanism	Frequency	Monitoring Agency
Construction and Operational Phase					
Land Resource	Solid Waste	Implementation of Solid waste Management system	Record keeping and timely transfer of Solid waste from bags to the disposal site for disposal	Daily	Manager HSE/Project Proponent
	Soil Contamination	Implementation of Management Plan	Visual monitoring and complete soil analysis	Daily and annually	
Ecological	Flora	Uprooting of trees	Inventory of uprooted	During Baseline	
Air Resource	Air Emission	Dust emissions during Construction and Operation	Monitoring of the emissions as per applicable standards Water sprinkling will be done regularly to avoid dust emissions	Once before start of operation and after that as when required during operation	
	Dust				
Noise	Noise Pollution	Development/operational material transportation	As per applicable standards	Fortnightly	
Water Quality	Wastewater generation	Domestic wastewater, due to construction activities	Water quality testing	Monthly	
Health and Safety	Health risk	During construction and operational phase mainly due to more chemical usage	Keep record of workers as they use PPE's and follow safety signs and instructions	Daily	
Resource		During construction phase	Trees and vegetation during operation phase	Survey, once in a year and after the completion of the Project	

9.6 Training of Workers

One of the most important mechanisms for the enhancement of the project's overall environmental performance will be the implementation of a program of environmental training for the project personnel and the Contractor's team.

Environmental training will form part of the ongoing environmental management of the project. It will help to ensure that Proponent's environmental policies and principles are followed. The Contractor will be expected to implement a formalized training program.

Suggested components of an environmental training program may be as follows:

- Promotion of environmental protection measures in company literature, broadsheets, posters, project updates, etc.
- Provision of guidance notes on environmental protection to contractor/s.
- Clear signs at worksites highlighting prohibited activities (discarding of wastes, smoking).
- Clear signs indicating sanitary disposal areas, safe drinking water sources, etc.

9.6.1 Training schedule

A training log will be maintained by the management of the project and contractors. The training log will include:

- Topic
- Date, time and location
- Trainer
- Participants

Important training under the spectrum needs to include:

- Training on firefighting and safety management
- Training on environmental safeguards and compliance
- Staff training on environmental monitoring and reporting
- Training on occupational health and safety measures.

Table 12 Training Schedule

Participants	Date, Time & Location	Training Topics	Schedule	Responsible Authority
Staff of Incineration Plant and the contractor	As specified	<ul style="list-style-type: none"> ✓ Introduction to project EIA and EMMP ✓ EMMP communication, documentation, monitoring and reporting requirements 	Every month	Project Manager
All site personnel	As specified	<ul style="list-style-type: none"> ✓ Site induction training on HSE system and requirements at Incinerating Site ✓ Environmental sensitivities of the project area ✓ Communication of environmental problems to corresponding officials ✓ Waste disposal 	After every week	Project Manager
Drivers	As specified	<ul style="list-style-type: none"> ✓ Road safety ✓ Road restrictions ✓ Vehicle restrictions ✓ Waste disposal ✓ Defensive driving 	After every 3 months	Project Manager
Camp Staff	As specified	<ul style="list-style-type: none"> ✓ Camp operations ✓ Waste disposal ✓ Good housekeeping 	Monthly	Project Manager

9.7 Environmental Management Team

Following functionaries will be involved in the implementation of EMMP:

- Syeda Shazia Adeel, as the proponent of the project, Environmental Management Plan during construction as well as operation stage.
- Project contractor(s) as executors of the EMMP during the construction phase of the project.
- Operational & Maintenance (O&M) and the Health, Safety and Environment team of the project as an executor of the EMMP during the operational phase of the project.
- Environmental Protection Agency (EPA), PEPA as Government Agency to review and monitor the implementation of remedial and mitigation measures as given in EIA.

9.7.1 Responsibilities of functionaries

Specific responsibilities of key role players are illustrated hereunder:

9.7.2 Responsibilities of management of project

Management of the project **Incineration Plant** will be responsible for the environmental management and supervisory affairs during the project activities. Environmental personnel designated by the management of the project will look after the environmental related issues during the project activities. The responsibilities of environmental personnel are as follows:

- Monitoring progress of the project as per planned schedule of activities.
- Exercising oversight over the implementation of environmental mitigation measures by the contractor.
- Documenting the experience in the implementation of the environmental process.
- Preparing training materials and implementing programs.
- Maintaining interfaces with the other lined departments / stakeholders.
- Reporting to the management of the project on the status of EMMP implementation.

9.7.3 Responsibilities of project contractor

Contractor appointed for the commissioning of the project including the auxiliary facilities is responsible for:

- Implementation of all provisions of the EMMP and with any environmental and other codes of conduct required by the project.

- Provision of proper Personal Protective Equipment (PPE) to the workers and train them for their proper use.

9.7.4 Responsibilities of EPA

To review and monitor the implementation of remedial and mitigation measures as given in the EIA.

9.8 Equipment Maintenance Details

The proposed project is to incineration plant by the title “**Incineration Plant**” located at National Institute of Health (NIH), Park Road Chak Shahzad, Islamabad over an area of 1800 Sqft. All chambers, machines, equipment and vehicles must be properly maintained so that workers are not in danger. Construction regulations require inspections of vehicles, tools, machines and equipment before use. We must always be aware that maintenance tasks themselves are potentially hazardous and can result in injury.

The successful maintenance program is:

- Well organized and scheduled
- Controls hazards
- Defines operational procedures
- Trains key personnel

9.9 Proposed Environmental Monitoring

Environmental monitoring can be categorized into two types:

- Compliance Monitoring
- Effects Monitoring

The environmental monitoring will be conducted according to EPA regulation.

9.9.1 Compliance Monitoring

Compliance monitoring will be carried out to ensure compliance with the requirements of the EIA and EMMP. The project staff and contractors will carry out the inspections on a routine basis. This will also include the routine monitoring at the project site as specified in EMMP.

9.9.2 Effects Monitoring

To monitor actual impacts of the project on selected sensitive receptors so that impacts not anticipated in the EIA report or impacts which exceed the levels anticipated in the EIA report can be identified and appropriate mitigation measures can be adopted in time. This objective will be achieved through effects monitoring.

9.9.3 Monitoring components

Baseline environmental monitoring will be carried out for the following essential parameters.

- Noise Levels
- Ambient Particulate Matter
- Ambient Air Gases
- Ground Water
- Wastewater
- Soil Contamination
- Solid Waste
- Vehicular Monitoring
- Flora & Fauna
- Health & Safety
- Machinery Maintenance.

10 STAKEHOLDER CONSULTATION

Stakeholder consultation is a communication tool used to engage with a diverse range of communities, each with different objectives. Its purposes include sharing information, exchanging views, gathering feedback, and seeking suggestions on matters related to the healthcare facility project. This practice initiates a need assessment and identify areas of concern for all the parties that maybe affected by the management of biomedical waste in NIH.

During stakeholders' consultation our team interacted with all those people and institutions near to the NIH specially in the area of Chak Shahzad, Park Road Islamabad. This includes those positively and negatively affected by the said project.

The stakeholders, including regulators, government representatives and NGOs were met to appraise and discuss the environmental and social perspective of biomedical management project using incineration technology during installation and operation of incineration unit. Their valuable concerns and suggestions were noted and incorporated in the EIA process and study.

During the field survey for this EIA study, meetings were held with the communities residing within the Chak Shahzad, Park Road Islamabad project area. The objective of these meetings was to solicit and record their views and concerns for inclusion in waste management project design at the planning phase. In the same vein, meetings were held with the members of the nearby locality.

All the stakeholders were briefed about the biomedical waste management project verbally that the said project is to install incineration plant at National Institute of Health (NIH) Park Road Chak Shahzad, Islamabad, to manage the hazardous waste and to reduce emissions from this technology. The capacity of the project is 100kg/hour and the project cover the area of 1800 Sq.Ft. The fuel will be LPG/Natural Gas to avoid air pollution and keep the environment clean. Their feedback was noted, and all the concerns voiced in the discussion were conveyed to the management team of the project.

10.1 Objectives of Stakeholders Consultation

The objectives of public consultation in an Environmental Impact Assessment (EIA) report are to ensure transparency, inclusivity, and informed decision-making in the project planning process. Public consultation seeks to gather local knowledge, opinions, and concerns from

affected communities and stakeholders, ensuring that their perspectives are considered in assessing potential environmental and social impacts. It aims to identify issues that may not be evident through technical assessments, promote community involvement, and build trust between project proponents and the public. Ultimately, the consultation helps to shape more effective mitigation measures, address stakeholder concerns, and enhance the social acceptance of the project.

The important general objectives of the consultation process in an Environmental Impact Assessment (EIA) are as follows:

- **Inform and Educate Stakeholders:** Provide stakeholders, including local communities and other relevant parties, with clear and accurate information about the proposed project, its objectives, and potential environmental and social impacts.
- **Gather Local Knowledge:** Gain insights from stakeholders about local environmental, social, and economic conditions, which may help identify potential impacts that might not be apparent through technical analysis alone.
- **Identify and Address Concerns:** Understand the concerns, issues, and expectations of the affected communities and stakeholders to integrate them into the EIA process and ensure their inclusion in the decision-making process.
- **Promote Transparency and Accountability:** Foster an open and transparent dialogue between project proponents, regulatory bodies, and stakeholders, ensuring that the consultation process is inclusive and accessible to all relevant parties.
- **Enhance Project Design:** Use stakeholder feedback to improve project design, particularly with respect to environmental and social safeguards, ensuring the project minimizes harm and maximizes benefits.
- **Build Trust and Acceptance:** Create a sense of ownership and trust among stakeholders by actively involving them in the planning process, which can lead to greater acceptance of the project and smoother implementation.
- **Identify Mitigation Measures:** Use stakeholder input to help identify more effective mitigation strategies and enhance the project's overall sustainability and social responsibility.

10.2 Methodology for consultation

Stakeholder consultation is a two-way flow of information and dialogue between the project proponent and stakeholders, specifically aimed at developing ideas that can help shape project design, resolve conflicts at an early stage assist in implementing solutions and monitor ongoing activities.

Various techniques are used worldwide to carry out the stakeholder consultation that includes discussions, meetings and field visits. A series of scoping sessions and informal focus group discussions were carried out with local communities and local government representatives. The meetings were held at various locations.

10.3 Identification and Classification of Stakeholders

During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. Identification of stakeholders is important for the sustainability of a developmental waste management project and helps to evaluate and predict the role of stakeholders. The influence or impact of the waste management project on stakeholders can be elaborated in the form of a matrix and the mitigation measures are proposed accordingly.

All the stakeholders had different types of stakes according to their professions. The stakeholders that are likely to be influenced by the waste management project activities or would like to participate in the waste management project include:

- Surroundings of the said project at NIH.

The National Institutes of Health (NIH) in Islamabad is located in the area of Chak Shahzad, specifically near Park Road, which is a key location in the city's southeastern part. This area has experienced rapid development and urbanization in recent years, making it a notable hub for research institutions, educational centers, and residential settlements.

1. Geographical Context

- Park Road: This is one of the major thoroughfares in Chak Shahzad, connecting it to various parts of the city, including the main urban centers like Rawal Chowk and Faizabad. Park Road stretches from Rawal Lake in the north, passing through several key areas such as the National Agricultural Research Centre (NARC), leading towards Bani Gala, a residential area that has grown in prominence.

- Chak Shahzad: Once a semi-rural locality, Chak Shahzad has seen major development and is now home to various research facilities, educational institutions, and upscale housing societies. It's also known for its proximity to the scenic Rawal Lake and the Margalla Hills, which add to the appeal of this area for both residents and professionals.

2. Key Institutions around NIH

- The vicinity of the NIH is a hub for several other important institutions and facilities, especially those related to education, research, and healthcare:
- National Agricultural Research Centre (NARC): Located close to NIH, NARC is one of Pakistan's leading institutions focused on agricultural research and innovation. It's a sprawling campus known for its various divisions, working on everything from crop sciences to livestock.
- COMSATS University (Islamabad Campus): This well-reputed higher education institution is also situated nearby, contributing to the academic and research environment in the region.
- Capital University of Science and Technology (CUST): Another academic institute in proximity to the NIH, providing higher education in engineering, technology, and business.

3. Residential and Commercial Developments

- Chak Shahzad, while traditionally known as an area with farmhouses and agricultural land, has undergone significant urban development. The region now boasts:
- Farmhouses: Some of the large farmhouses in Chak Shahzad are still present, offering a more secluded and quieter living option compared to the city's central areas.
- Residential Housing Societies: Several housing societies have been developed in this area, catering to both mid-range and upscale segments. The presence of nearby educational and research institutions makes it a favorable choice for professionals working in those fields.
- Shopping and Commercial Centers: The area has also seen the growth of local markets and small shopping centers that cater to the everyday needs of residents. For larger commercial activities, residents often head towards areas like Rawal Chowk or central Islamabad.

4. Healthcare Facilities

- Beyond NIH itself, which serves as one of the country's premier health research institutions, there are a few other health-related facilities around the area:
- Shifa International Hospital: Located on the nearby Faisal Avenue, Shifa is one of Islamabad's leading private hospitals, offering specialized care in a wide range of medical fields.
- Pakistan Institute of Medical Sciences (PIMS): Though not immediately adjacent to NIH, PIMS is one of the largest public hospitals in Islamabad and can be reached within a short drive.

5. Environmental Features

- Rawal Lake: This is a prominent feature of the area, located relatively close to Chak Shahzad. It serves as both a water reservoir for the city and a recreational spot. The lake is surrounded by gardens and picnic areas, making it a popular destination for residents of nearby areas.
- Margalla Hills: Although the Margalla Hills are located farther towards the north of the city, they form a picturesque backdrop for the entire region, including Chak Shahzad. The greenery and natural beauty contribute to the relatively peaceful and less congested atmosphere of this part of Islamabad.

6. Development Trends

- With the expanding population of Islamabad and increasing demand for residential space, Chak Shahzad, including the area around NIH, is experiencing a shift from agricultural land and farmhouses to planned housing societies. The area's tranquil environment combined with proximity to key institutions makes it attractive for professionals and families.

In conclusion, the surroundings of NIH at Park Road, Chak Shahzad, offer a mix of educational, research, and residential opportunities, making it a dynamic part of Islamabad. The balance between natural beauty, institutional presence, and urban development has transformed this area into a vibrant locale for living and professional work, particularly in the fields of health and scientific research.

10.4 Views, Concerns and Suggestions of Various Stakeholders

The major socio-economic concerns and problems of the affected persons of various communities have been given in tabulated form along with their main concerns and remarks. Community showed a lot of concerns; a few are being mentioned here:

- Removal of shrubs and trees should be avoided, if any, to the extent possible in the case of clearance green zones should be established within the facility.
- Indigenous trees around the facility should be planted to control air pollution and as the compensation of construction activity.
- Proper solid waste management and waste disposal practices should be adopted in order to avoid any kind of disease or health issues.
- Water spraying/sprinkling should be done on the regular basis during construction phase to avoid dust emissions.
- Employment opportunities will be generated during construction and installation phase of project, not a lot but one or two persons will be hired during operational phase.
- The air pollution is one of the major impacts in our country and being affected at the large scale. So, ambient air quality should be monitored regularly and air pollution expected to generate from the operation should be mitigated beforehand by installation of wet scrubber.
- Good relations with the local communities will be promoted by encouraging contractor to provide opportunities for skilled and unskilled employment to the locals as well as on-job training.
- Noise generated activities should be carried out during day hours.

10.5 Proponent’s Environmental Management Team and Experts

Table 13 Responsible Authority

Sr. #	Managers	Responsibilities
1.	Contract Manager	<ul style="list-style-type: none"> • Implementation of EMP • Environmental issues identification during pre-construction phase. • Communication EMP to all employees.
2.	Contractor	<ul style="list-style-type: none"> • 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 incident where the environment has been put at risk.
3.	Site Manager	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • According to legislation and consent develop EMP. • Ensure application of EMP. • Carry out regular site inspection.
6.	Public Contact Officer	<ul style="list-style-type: none"> • First point of contact for members of the public. • Arrange and manage public forums. • Maintain relation with stakeholders. • Coordination with work.

10.6 The responsible Authority

Overall responsibility for implementation of EMP will be that of project proponent. He will appoint an HSE/Project Manager of relevant qualification. HSE/Project Manager will act as Environmental Manager and will manage all HSE condition at the NEQS.

10.7 Environmental Practitioners and Experts

Consultation with Environmental Practitioners and experts was done and following comments and suggestions were noticed.

Table 14 List of Experts

Following comments are summarized to control the air pollution generation during operational phase:

Sr. No.	Name	Designation	Comments/Suggestions
1.	Engr. M Bilal	Environmental Engr.	<ul style="list-style-type: none"> The pollution abatement technique should be followed. Value addition of area.
2.	Sara Fatima	Environmentalist	<ul style="list-style-type: none"> She said that installation of incineration plant will have positive impact on economy, but its construction should be done in Environment Friendly way During construction and operation emissions must be controlled properly
3.	Zia Ur Rehman Farooqi	Ph.D. Scholar Environmental Sciences	Following mitigation measures should be adopted: <ul style="list-style-type: none"> Tree plantation in designated green zones should be carried out. Proper disposal of the solid waste. HSE management measures should be adopted and implemented effectively.
4.	Mr. Saffi Ahmed	Environmentalist	<ul style="list-style-type: none"> He said that locals should be preferred for employment. Proper mitigation measures must be adopted while construction and operation of this project.
5.	Aleeza Kanwal	Environmental Engineer	<ul style="list-style-type: none"> Proper Monitoring of Air Quality should be done. Proper PPEs should be given to the workers for their safety.
6.	Kanza Fatima	Environmental Engineer	<ul style="list-style-type: none"> Solid waste must be collected and dispose of properly. In both construction and operational phase PPEs should be followed.

10.8 Other department 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.

Table 15 Department and agencies

Sr. #	CNIC/Designation	Concerns
Environmental Protection Department		
1	GM (General Manager) Col. ® Rizwan Rasool	Following comments area summarized to control the pollution: <ul style="list-style-type: none"> • 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.
2	Environmental Inspector Inam Ur Rehman	
Social Welfare Department		
3	Deputy Director Public Health Mr. Gulzar Ahmed	Following comments are suggested by the Deputy Director Public Health on the behalf of Ministry of Health: <ul style="list-style-type: none"> • Waste should be incinerated at prescribed temperature. • Job opportunities should be given to the locals. • Wages should be given according to the work assign to them. • Life insurance of the workers should be given as well as all the facilities should be given as per labor laws.
Shifa Hospital		
4	Executive Engineer Sabir Hussain Ansari	Following comments were suggested: <ul style="list-style-type: none"> • Untreated wastewater should not be disposed of in the nearby drains without proper treatment. • Beneficial as job opportunities will be available to the local residents.
Forest Department		

<p style="text-align: center;">5</p>	<p style="text-align: center;">Forest Department Representative</p> <p style="text-align: center;">Kaleem Ullah</p>	<p>Following recommendation were suggested by the forest department:</p> <ul style="list-style-type: none"> • Planation and landscape activities should be carried out on broader scale. Barna, Neem, Suharjna, Amaltas and Jaman should be planted. • Proper drainage system must be available at site.
COMSATS University		
<p style="text-align: center;">6</p>	<p style="text-align: center;">Group of Students</p>	<p>Students of COMSATS University were interviews and the comment are as follow:</p> <ul style="list-style-type: none"> • Solid waste should be managed in Environmentally friendly manner. • Wastewater should be treated effectively. • Health and Safety at the site should be managed effectively.

10.9 Key Findings of Study:

The study findings depict that people perceive overall positive social impacts by development of proposed waste incineration facility. Their attitude towards management of biomedical waste incineration facility development is highly positive with the expectation that locals are provided with jobs especially where unskilled labor is required. Majority of the people is convinced for positive sign for development in area and they correlate this change with the pace of their upward social mobility and progress. However, they want wastewater treatment plants to be installed.

























Pictorial View of Consultation









11 CONCLUSION

The project is aiming at the development of incineration plant as proposed project. The project falls under the category of the projects requiring Environmental Impact Assessment (EIA).

At the end of this study, it was 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 waste to be generated from the project operations.
- The noise levels will be kept within the required limiting values of the NEQS Pakistan.
- Wet Scrubber will be installed to clean the gases before the discharge into the outdoor air.
- This project will create job opportunities during construction and operation stages leading towards a reduction in poverty.
- Sewage will be passed through wastewater treatment before final treatment and disposal.
- It will help in the improvement of community/social service status in the local area. It will also provide such facilities for people from other places.
- Project sites mean 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.
- Availability of water for the project is ensured from the underground water sources without any effect on the needs of the people around the project area.

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

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 or determine 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 so as 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 (metal) 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

LIST OF ABBREVIATIONS

AA	Ambient Air
APHA	American Public Health Association
AOI	Area Of Influence
BOD ₅	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	North West Frontier Province
Q&EHS	Quality, Environment, Health & Safety
O & M	Operation And Maintenance
PKR	Pak Rupees
PPM	Parts Per Millions
PAP	Project Affected People
PEPC	Pakistan Environmental Protection Council/
PSC	Project Steering Committee
QA/QC	Quality Assurance/Quality Control
RAP	Resettlement Action Plan
ROG	Reactive Organic Gas
SWM	Solid Waste Management
TDS	Total Dissolved Solids
TT	Technology Transfer
UNFCC	United Nation Frame Work 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

LIST OF INDIVIDUALS AND THEIR FEEDBACKS

Sr.#	Name	Concerns
1	Kamran Ali Khan	<p>During the survey in the study area the following concerns of the local community were noted:</p> <ul style="list-style-type: none"> • Air pollution should be controlled effectively, such as emissions generated from power generating activities. • Chemicals should be stored and handled properly only authorized people should be allowed near the chemical storage area. • Locals should be preferred for the job opportunities. • Wastewater should be treated prior to final disposal in the nearby drain. • Solid waste should be managed effectively by adopting the standard practices of the area. • Cleanliness of the area should be ensured. • An effective EMMP should be designed and enforced with true spirit. • Health of the workers should be ensured. • Planation should be carried out at extensive scale. • Construction activity should be carried out during the daytime. • 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 Ali Khan	

SOURCE OF DATA

- Pakistan Environmental Protection Act, 1997 (PEPA)
- Guidelines for the preparation and review of Environmental Reports, October 1997
- Review of EIA/ EIA Regulation, 2000.
- WHO. (2014). *Safe management of wastes from health-care activities*. Geneva: World Health Organization. Available at: <https://www.who.int/publications/i/item/safe-management-of-wastes-from-health-care-activities>
- 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
- Material Safety Data Sheet (MSDS) of chemicals
- /www.wsask.ca/Global/Water%20Programs/Water%20Conservation/SWA-
- Water_Efficiency_on_the_Farm_Booklet_WEB.pdf
- <http://www.madehow.com/Volume-2/Lead.html>
- http://www.ijirset.com/upload/2013/november/18_Disposal.pdf
- [Economic survey of Pakistan 2024.](#)

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 EIA 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 EIA/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 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 Pakistan 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 Pakistan. 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 federal EPA Pakistan and contributing to the sustainable development and environmental stewardship goals of the region.

Syeda Shazia Adeel

(Manager Quality Insurance / Principle Scientific Officer NIH)

Incineration Plant

National Institute of Health (NIH), Park Road Chak Shahzad, Islamabad

For Enviro Stewards Co. Pvt. Ltd.

Ms. Sara Fatima

Mr. Zia Ur Rehman

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

Table 16 List of experts and practitioners

Sr. #	Name	Qualification
Team Leader		
1	Miss. Sara Fatima	M.Phil. Environmental Sciences
Environmental Scientist		
3	Mr. Zia ur Rehman Farooqi	Ph.D. Environmental Sciences (Scholar)
4	Hafiz Zeeshan Safder	M.Sc. Analytical Chemistry
5	Mr. Saffi Ahmed	M.Phil. Environmental Sciences
Environmental Engineers		
7	Miss Misbah Ali	B.Sc. Environmental Engineering
8	Engr. Muhammad Bilal	B.Sc. Environmental Engineering
Sociologist		
9	Qazi Muhammad Ahmed Raza	M. Phil Sociology

