

# **ENVIRONMENTAL IMPACT ASSESSMENT**

## **CAPACITY ENHANCEMENT OF VANDCOR-SPECTRUMS (VS) ENVIRONMENTAL SOLUTIONS FOR HAZARDOUS AND NON- HAZARDOUS WASTE MANAGEMENT FACILITY**

**SANGHORI, RAWALPINDI**  
**MARCH 2026**

**Proponent: VANDCOR-SPECTRUMS (VS) ENVIRONMENTAL SOLUTIONS**



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# Executive Summary

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## 1. Title of the Project

This report presents the findings of Environmental Impact Assessment (EIA) of **Capacity/Capability Enhancement of Vandcor-Spectrum (VS) Environmental Solutions Hospital Waste Treatment Facility**".

The EIA study aims at the identification of the possible environmental and social impacts of the proposed project on its immediate surroundings on both short and long-term basis, suggesting mitigation measures and identifying the responsible agencies to implement those measures.

## 2. Location of the Project

The project site is located near Sanghori, Tehsil Gujar Khan, District Rawalpindi. The project site can be accessed through GT Road. The GPS Coordinates of the project site are 33°24'14.18"N, 73°15'39.01"E.

## 3. Name of Proponent

Vandcor-Spectrum (VS) Environmental Solutions is the proponent of the proposed project.

## 4. Organization Preparing the EIA Report

Sustainable Environmental Solutions (SES) is working in the field of environment since 2014. It has been providing technology and guidance to its customers related to the environment sector. The project team is headed by the EPA Punjab veteran officer Muhammad Farooq Alam who has been working in EPA Punjab as Director Multi-Lateral Agreements (MEAs) and Deputy Director Lab Head Quarter. It has experienced team for this assignment. SES has undertaken many assignments of cement sector, waste management and incineration, Textile, power generation Highways and motorways, sugar mills, commercial buildings and ambient air quality monitoring.

## 5. Outline of the Project

Improper treatment and disposal of hazardous and infectious waste are serious environmental issues that must be addressed urgently. Untreated infectious and hazardous waste has the potential to contaminate ecosystems and the biosphere, thereby creating risks for human health and other living organisms. Such waste may also enter the food chain, causing both short-term and long-term adverse effects on ecosystems and destabilizing environmental balance.

Hospital waste and other hazardous wastes have frequently been reported to be poorly handled and managed in hospitals due to inadequate systems and limited awareness among staff and administration. This situation leads to environmental contamination and health risks not only within healthcare facilities but also for surrounding communities. Therefore, hazardous and infectious waste requires proper segregation, handling, treatment, and disposal before its final discharge into the environment.

In developing countries such as Pakistan, awareness and implementation of proper hospital waste management practices—including segregation, collection, storage, transportation, treatment, and disposal—remain inadequate. In Pakistan, all healthcare facilities are required to comply with the Hospital Waste Management Rules, 2005, framed under the Pakistan Environmental Protection Act, 1997. Healthcare institutions are also expected to maintain waste management systems that meet acceptable national and international standards.

Studies conducted in Pakistan indicate that hospitals generate approximately **1.35 kg of waste per bed per day**. At the national level, Pakistan generates over **49.6 million tons of solid waste annually**, with an estimated **annual growth rate of 2.4%**. Although precise nationwide figures for hazardous waste generation are not consistently documented, estimates suggest that **up to 14% of municipal waste may be hazardous**, including approximately **1,790 kilotons of electronic waste annually**. Major sources of hazardous waste include industrial activities, commercial establishments, healthcare facilities, and electronic waste streams.

Despite the increasing volume of hazardous waste, the treatment and safe disposal of such waste remain expensive, and many waste-generating facilities lack the resources to establish and operate appropriate treatment systems.

To address this challenge, **Vandcor-Spectrum Environmental Solutions (Pvt.) Limited (VS)** has established a hospital waste treatment facility. Currently, the facility has an incineration capacity of **150 kg per hour**, along with a **steam autoclave with a capacity of 400 litres**. The proponent now plans to expand the facility by installing **two additional incinerators, each with a capacity of 500 kg per hour**, to be implemented in two phases. After expansion, the total incineration capacity will increase to **1,150 kg per hour**, while autoclaving capacity will remain **400 litres per cycle**. Hazardous and non-hazardous waste collected from hospitals and industrial units will be transported to this facility for treatment and safe disposal.

The estimated cost of the proposed project is estimated to be **PKR 200 million**, and the total area allocated for the project is **9 kanal and 17 marla**.

## **6. Physical Environment**

## 6.1 Topography and Geography

Gujjar Khan is located within the **Potohar Plateau**, a region characterized by **undulating terrain, dissected plateaus, and gentle to moderate slopes** formed due to long-term erosion processes. The landscape consists of rolling uplands, seasonal streams, and small valleys.

The **Kanshi Stream** originates from the **Kahuta Hills**, flows through **Gujjar Khan Tehsil**, and ultimately joins the **Jhelum River**. The area is also geologically significant due to the presence of hydrocarbon reserves. According to geological surveys, substantial **oil and gas reserves were discovered in February 2002 at Tobra**, located approximately **10 km from Gujjar Khan**.

The terrain surrounding the project area is moderately sloping with no significant natural hazards such as landslides or steep escarpments.

## 6.2 Geology

The geology of the Gujjar Khan area is typical of the **Potohar Plateau**, which primarily consists of **sedimentary formations belonging to the Siwalik Group**. These formations include **sandstone, siltstone, clay, and conglomerates** deposited during the late Tertiary period.

The region also contains **loess deposits**, which are wind-blown silt materials that form steep vertical faces and pinnacles due to erosion. In several areas, the surface layer consists of **recent alluvial deposits**, indicating past fluvial activity.

These geological formations are generally stable and suitable for industrial development.

## 6.3 Soil Characteristics

Soils in the project area are mainly composed of **yellowish-brown fine sandy loam and loess-derived soils**. These soils are moderately fertile but are susceptible to **erosion due to rainfall and surface runoff**, especially on sloping terrain.

Alluvial soils are also present in low-lying areas and along seasonal drainage channels. The soil structure generally allows moderate infiltration but may experience surface erosion during heavy rainfall events.

## 6.4 Hydrology and Surface Water

The project area is largely **rain-fed**, and surface drainage occurs through **seasonal streams and natural drains** formed during rainfall events. Rainwater is occasionally stored in **small ponds or local depressions**, which serve as temporary water bodies.

- The **Soan River** and **Kurang River** are the main surface watercourses draining the wider region. Their major tributaries include:
- **Ling River**, draining northwest into the Soan River
- **Gumreh Kas**, draining westward into the Kurang River from the area between the Soan and Kurang Rivers
- **Lei Nala**, which drains southward into the Soan River from the Margalla Hills and adjoining urban areas

Most natural water bodies in the region remain relatively clean. However, **Lei Nala is known to be polluted due to the discharge of untreated municipal wastewater from urban areas.**

The proposed project will not directly discharge wastewater into any natural surface water body.

## 6.5 Groundwater

The project area lies within the **Potohar Plateau groundwater zone**, where groundwater resources are relatively limited and often occur at considerable depths.

In the vicinity of the project site, groundwater is generally found at depths of approximately **60–65 feet**. In the broader **Islamabad–Rawalpindi region**, groundwater occurs mainly in **Quaternary alluvial gravel aquifers**.

The altitude of the water table decreases from approximately **600 m near the Margalla Hills** to less than **450 m near the Soan River**, resulting in a saturated groundwater zone typically lying **2–20 m below the ground surface**.

Groundwater in the region is commonly used for **domestic and agricultural purposes**.

## 6.6 Land Use

The land use of the project site is **industrial**. The site is already operational as a **hospital waste treatment facility equipped with an incinerator**.

The proposed project involves the installation of **two additional incinerators within the existing premises**, and therefore there will be no change in land use due to the proposed enhancement of the project.

The surrounding areas consist mainly of **agricultural land, scattered rural settlements, and small commercial activities.**

## 6.7 Climate

The region falls within the **sub-humid climatic zone** characterized by **hot summers and cool winters.**

January is the coldest month, with an average maximum temperature of approximately **16°C** and a minimum temperature of about **2.7°C**. During summer, temperatures may rise up to **46–47°C**.

The **monsoon season generally begins in July**, bringing moderate to heavy rainfall that helps lower the high summer temperatures. The annual temperature range typically varies between **2.7°C and 47°C**, reflecting significant seasonal variations.

## 6.8 Air Quality

There are **no major industrial sources of air pollution** in the immediate vicinity of the project site. Minor anthropogenic emissions originate mainly from **motorcycles and light vehicles plying on the nearby road.**

Approximately **10–14 vehicles per hour** pass near the project site, contributing minimally to local air pollution.

Ambient air quality monitoring conducted in the area indicates that **PM<sub>10</sub> and PM<sub>2.5</sub> concentrations remain within the permissible limits specified under the Pakistan Environmental Quality Standards (PEQS).**

According to the **Punjab Urban Unit (Planning and Development Department)**, the **Air Quality Index (AQI) in Rawalpindi on 12 February 2026 was recorded at 118**, while **AQMS data from the Environmental Protection and Climate Change Department (EP&CCD) reported an AQI value of 145 for Rawalpindi on the same day.**

## 6.9 Noise and Vibration

Traffic volume on the nearby local road is relatively low. As a result, ambient noise levels in the project area remain low.

Noise monitoring indicates that **ambient noise levels are within the permissible limits specified in the Pakistan Environmental Quality Standards (PEQS).** No

significant vibration sources exist either due to the proposed project or near the project site.

## 7. Ecological Environment

### 7.1 Flora

The project site is surrounded predominantly by **agricultural land**. Natural vegetation in the area has largely been modified due to **agricultural expansion, livestock grazing, and human settlements**. Consequently, natural vegetation survives mainly along **field boundaries, village surroundings, and scattered patches of farmland**.

The area is **rain-fed**, and crop production largely depends on seasonal rainfall. The principal crops cultivated by the local community include **maize, barley, oats, and groundnut**. The groundwater table in the region lies at a depth of approximately **65–70 feet**, and local residents typically obtain drinking water through **dug wells or tube wells**.

Livestock rearing is also an important component of the local economy. Farmers commonly keep **cattle, buffaloes, goats, and sheep** for milk and meat production. These animals graze in open fields and surrounding areas, feeding on **grasses, shrubs, crop residues, and scattered tree species**.

The dominant vegetation species of the area include:

- **Phulai (*Acacia modesta*)**
- **Shisham (*Dalbergia sissoo*)**
- **Dhab grass (*Desmostachya bipinnata*)**
- **Aak (*Calotropis procera*)**

Other grasses and shrubs typical of the **Potohar Plateau ecosystem** are also present in the surrounding agricultural landscape.

### 7.2 Fauna

The wildlife of the project area consists mainly of species adapted to **agricultural and semi-arid environments**.

Common fauna observed in the area include:

- **Jackal (*Canis aureus*)**
- **Fox (*Vulpes bengalensis*)**
- **Hare (*Lepus nigricollis*)**

- **Wild boar (*Sus scrofa*)**
- **Grey partridge (*Francolinus pondicerianus*)**
- **Black partridge (*Francolinus francolinus*)**

The ecological conditions of the area are under **significant human pressure** due to agricultural expansion, livestock grazing, and hunting activities. Livestock grazing occurs extensively in nearby farmland where animals feed on **grasses, shrubs, crop residues, and scattered tree species**.

Hunting pressure also exists in the area. Local residents occasionally hunt **grey partridges and hares**, while **black partridges are sometimes captured due to their high value and cultural significance**.

According to the **IUCN Red List**, the **black partridge (*Francolinus francolinus*) is classified as “Least Concern” globally**, although local populations may decline due to **overhunting and habitat disturbance**.

### **7.3 Protected Areas and Wildlife Sanctuaries**

Pakistan has designated several areas for biodiversity conservation in the form of **national parks, wildlife sanctuaries, and game reserves**.

There are **no protected areas, wildlife sanctuaries, or national parks located within the immediate vicinity of the project site**. Therefore, the project is not expected to directly impact any legally protected habitats or ecologically sensitive zones.

### **7.4 Biodiversity Significance**

The ecological significance of the project area is considered **low to moderate**, primarily because the landscape has already been **heavily modified by agricultural activities and human settlements**.

The vegetation mainly consists of **common species typical of the Potohar Plateau**, and no **endangered or rare plant species** have been reported in the project vicinity.

Similarly, the fauna recorded in the area includes **common wildlife species adapted to disturbed habitats**. No **endangered or protected wildlife species** have been identified within the immediate project area.

### **7.5 Socio-Economic Conditions**

The project site is already operational as a **hospital waste treatment facility**. The proposed project involves **expansion of the facility by increasing its waste incineration capacity**.

For environmental assessment purposes, the **project influence area is defined as a 500-meter radius around the project site**, where direct environmental and socio-economic impacts may occur.

The surrounding communities rely primarily on:

- **Agriculture**
- **Livestock farming**
- **Small-scale businesses**
- **Local labor employment**

Basic infrastructure such as **roads, electricity, and communication facilities** are available in the surrounding villages.

## **7.6 Cultural and Community Aspects**

No **archaeological sites, historical monuments, or culturally significant locations** have been identified within the immediate vicinity of the project site.

The local population consists mainly of **rural communities engaged in agriculture and livestock activities**, and no cultural conflicts with the project are anticipated.

## **8. Stakeholder Consultation**

During the public consultation process, meetings were conducted with the **local community residing in the vicinity of the project site**. In addition, consultations were held with the **project proponent, the responsible regulatory authority (Environmental Protection Agency – EPA Rawalpindi)**, and other relevant stakeholders including **government departments, private hospitals generating healthcare waste, environmental practitioners, and subject experts**.

During these consultations, the **potential impacts of the proposed project activities on the physical, biological, and socio-economic environment of the project area** were discussed. Stakeholders were informed about the **nature of the project, the proposed expansion of the incineration facility, and the environmental management measures planned to minimize potential impacts**.

The concerns raised by stakeholders regarding the **existing environmental conditions and potential impacts of the project** were carefully recorded. These concerns have been addressed through appropriate **mitigation measures incorporated into the Environmental Impact Assessment (EIA) report**.

A major portion of the public concerns related to **air emissions from the waste incineration process**. These concerns have been addressed through the proposed installation of **air pollution control systems and emission control measures** in the incineration facility.

The local community initially expressed **apprehension regarding the increase in the incineration capacity**. The **SES assessment team** explained the proposed **environmental safeguards and emission control technologies** that the project proponent will implement to ensure compliance with environmental standards and to minimize air pollution.

Information obtained during consultations with the community and other stakeholders was used to **identify key environmental concerns and issues**, which have subsequently been analyzed and addressed in the present EIA report.

## **9. Major Impacts and Recommended Mitigation Measures**

### **A. Operation Phase**

#### **Ecological Environment**

##### **Potential Impacts**

The proposed project involves the **incineration of hazardous and non-hazardous waste**. Temporary storage of hazardous and infectious waste at the project site may pose **potential health and environmental risks if not properly managed**.

Workers who handle infectious hospital waste may face occupational health risks if **adequate safety measures and personal protective equipment (PPE)** are not used. However, workers at the facility are provided with **appropriate safety equipment and PPE**, and waste handling procedures are designed to **minimize direct exposure to hazardous materials**.

Air emissions from the incinerator may affect **local and regional air quality if not properly controlled**. These emissions may potentially impact **human health, vegetation, agricultural productivity, and surrounding environmental resources**.

Combustion of waste generates various pollutants, including:

- **Particulate matter (PM)**
- **Sulfur oxides (SO<sub>x</sub>)**

- **Nitrogen oxides (NO<sub>x</sub>)**
- **Volatile organic compounds (VOCs)**
- **Dioxins and furans**
- **Acidic gases**

Particulate matter generated during the combustion of infectious waste may also contain **heavy metals**, which can have significant environmental and health impacts.

Particular attention must be given to controlling emissions of **fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), dioxins, furans, sulfur oxides, and nitrogen oxides**, as these pollutants are associated with serious environmental and health concerns.

The installation of a **wet scrubbing system in the stack emission control** system significantly reduces air pollution and helps maintain emissions within acceptable environmental limits.

### **Mitigation Measures**

The following mitigation measures will be implemented during the operational phase:

- **Fly ash and other incineration residues** will not be disposed of indiscriminately on land. These materials will be disposed of in **designated ash pits or approved landfill sites managed by TMA Rawalpindi**.
- **Wastewater generated from the wet scrubber system** will be properly treated and reused within the facility, such as in the **scrubber circulation or cleaning systems**, to minimize wastewater discharge.
- **Recyclable materials** generated at the project site (e.g., cardboard, metal drums, and scrap materials) will be sold to **authorized recycling contractors** or reused where possible.
- **Infectious waste will be segregated and handled separately**, according to established waste management procedures. All infectious waste containers will be **clearly labeled and handled with appropriate precautions**.
- **Used metal drums will be disinfected before being sold to recycling facilities**, such as iron and steel furnaces.
- The facility will utilize **modern air pollution control equipment** designed to meet environmental standards. Properly operated pollution control systems can achieve the following approximate removal efficiencies:
  - + Up to **99% removal of dioxins and furans**
  - + More than **99% removal of heavy metals**

- + Approximately **99% removal of particulate matter**
- + More than **99% removal of hydrogen chloride (HCl)**
- + More than **90% removal of sulfur dioxide (SO<sub>2</sub>)**
- + Up to **65% reduction of nitrogen oxides (NOx)**

## **B. Construction Phase**

### **Ecological Environment**

#### **Potential Impacts**

The project site is **already operational and has a valid No Objection Certificate (NOC)**. Therefore, construction activities associated with the expansion will be **limited and localized**, resulting in minimal environmental impacts.

Since the site is already being used for **hospital waste incineration**, no significant **change in land use** is expected.

Potential impacts on vegetation and fauna are expected to be **negligible**, as the expansion will occur **within the existing facility premises**.

#### **Mitigation Measures**

After completion of the construction activities, the proponent will **rehabilitate disturbed areas through plantation of trees and ornamental plants within the facility premises**, which will improve the aesthetic value and environmental conditions of the site.

## **C. Socio-Economic Environment**

### **Potential Impacts**

The project will involve the installation of **state-of-the-art incinerators and autoclave systems** to enhance the capacity of the existing hospital waste management facility.

The project is not expected to cause **any significant changes in demographic patterns or disruption of social and cultural values** in the surrounding communities.

The socio-economic impacts of the project are expected to be **largely positive**, primarily through the **creation of employment opportunities for local residents of Rawalpindi District**.

Furthermore, no **archaeological sites, historical monuments, or culturally significant locations** have been reported within the project site.

## **10. Environmental Management Plan and Proposed Monitoring**

The purpose of the **Environmental Management Plan (EMP)** is to minimize potential environmental impacts associated with the project.

The EMP reflects the commitment of **VS Environmental Solutions Waste Management Facility** to protect the environment and safeguard the health and well-being of surrounding communities.

The EMP provides a **framework for implementing mitigation measures, monitoring environmental performance, and ensuring compliance with environmental regulations** throughout all phases of the project.

The contractor will prepare **Quarterly Environmental Monitoring Reports** describing the environmental management activities carried out during the construction and operational phases of the project. These reports will be submitted to the **Environmental Protection Department, Government of Punjab**, for review and compliance monitoring.

The estimated **environmental management budget for the project is PKR 1,000,000.**

## **11. Conclusion and Recommendations**

Based on the overall environmental impact assessment and the evaluation of potential environmental impacts identified in this EIA, it is concluded that the **VS Environmental Solutions Waste Management Facility** may generate both **positive and negative environmental impacts during its operational phase.**

However, these impacts can be effectively mitigated provided that the **project activities are implemented in accordance with the mitigation measures and environmental management strategies outlined in this report.**

Therefore, the proposed **capacity enhancement of the hospital waste treatment facility** is recommended for approval, subject to the **implementation of all mitigation measures and environmental management practices described in this EIA report.**

## List of Abbreviations

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AI	Artificial Intelligence
BMW	Bio-Medical Waste
COVID-19	Corona Virus Infectious Disease 2019
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
GPD	Gallons per Day
HCWM	Health Care Waste Management
HSE	Health, Safety and Environment
HWM	Hospital Waste Management
NCS	National Conservation Strategy
NEQS	National Environment Quality Standards
NOC	No Objection Certificate
PEPA	Pakistan Environmental Protection Act 1997
PEPC	Pakistan Environmental Protection Council
PEQS	Punjab Environment Quality Standards
PLC	Programmable Logic Controller
PPE	Personal Protective Equipment
ToR	Terms of Reference
VS	Vandcor-Spectrum

## List of Units

%	Percent(age)
°C	Degree centigrade
cm	Centimeter
dB (A)	Decibel
ft <sup>2</sup>	Square foot
ft <sup>3</sup>	Cubic foot

## List of Abbreviations

Km	Kilometer
Km/h	Kilometer/hour
m	Meter
m <sup>2</sup>	Square meter
m <sup>3</sup>	Cubic meter
MT	Metric Ton
Rft	Running Feet

# Table of Contents

Executive Summary .....	II
List of Abbreviations .....	14
List of Units .....	15
List of Abbreviations .....	15
List of Exhibits .....	<b>Error! Bookmark not defined.</b>
List of Figures .....	<b>Error! Bookmark not defined.</b>
Chapter 1: Introduction .....	20
1.1 Project Background and Overview.....	20
1.2 Brief Description of Nature, Size Location of Project .....	20
1.3 Details of the Consultant .....	21
1.4 Identification of Project and Proponent.....	22
1.4.1 Contact Persons.....	23
1.5 Screening of the Project .....	23
1.6 Structure of the Report.....	23
1.7 Methodology .....	24
1.7.1 Orientation Session: .....	25
1.7.2 Development of Data Acquisition Plan:.....	25
1.7.3 Primary Data Collection: .....	25
1.7.4 Secondary Data Collection and Review: .....	25
1.7.5 Site Visits:.....	25
1.7.6 Reporting .....	25
1.8 Limitations .....	26
1.9 Purpose of Environmental Impact Assessment Report.....	26
1.10 Scope of EIA .....	26
Chapter 2: Institutional Legislative and Policy Framework Related to EIA Requirements.....	28
2.1 Laws and Regulations .....	28
2.1.1 Punjab Environmental Protection Act, 1997 (Amended 2012) .....	28
2.1.2 Punjab Environmental Protection Agency (Review of IEE and EIA Regulations), 2022.....	29
2.1.3 Hazardous Substance Rules, 2003 .....	30
2.2 Hospital Waste Management Rules, 2005 .....	30
2.3 Punjab Hospital Waste Management Rules 2014 .....	31
2.4 Punjab Environmental Quality Standards (PEQS).....	31
2.4.1 Punjab Environmental Quality Standards for Treatment of Liquid and Disposal of Bio-Medical Waste by Incineration, Autoclaving, Microwaving and Deep Burial .....	32
2.4.2 PEQS for Liquid Effluent.....	34
2.4.3 PEQS for Gaseous Emission .....	36
2.4.4 PEQS for Vehicular Emission.....	37
2.4.5 PEQS for Drinking Water, 2010.....	37
2.4.6 PEQS for Ambient Air and Noise.....	40
2.7 Administrative orders of the EPA under section 6 of PEPA.....	41
2.8 The Implication of Legislations to the project .....	44
Chapter 3: Project Description .....	45
3.1 Objective of the Project.....	45
3.2 Project Administrative Jurisdiction.....	45
3.3 Location and Site Layout Plan.....	45
3.4 Road Access .....	45
3.5 Description of Project .....	52
3.5.1 Segregation.....	52

3.6 Process Flow of each incinerator.....	66
3.7 Cost and Magnitude of Project.....	67
3.8 Vegetation Features of the Project Site .....	67
3.9 Land Use on Site .....	67
3.10 Restoration and Rehabilitation Plans .....	68
3.11 Compliance of Punjab Environmental Quality Standards for Treatment of Liquid and Disposal of Biomedical Waste for Incinerator to Be Installed .....	68
3.12 Compliance of Punjab Environmental Quality Standards for Treatment of Liquid and Disposal of Biomedical Waste for Autoclave Unit to Be Installed .....	68
3.13 Schedule of Implementation .....	68
Chapter 4: Consideration of Alternatives .....	70
4.1 Site Alternative .....	70
4.2 Economic Alternative.....	70
4.3 Environmental Alternative.....	70
4.4 Technology Alternative.....	71
4.4.1 Incineration.....	71
4.4.2 Sanitary Land fill .....	72
4.5 Conclusion .....	73
Chapter 5: Description of the Environment .....	74
5.1 Project Area of Influence .....	74
5.2 Physical Environment .....	74
5.2.1 Topography and Geography .....	74
5.2.2 Geology and Soils.....	75
5.2.3 Surface Water.....	76
5.2.4 Ground Water.....	76
5.2.5 Seismicity .....	80
5.2.6 Climate.....	81
5.2.7 Air Quality .....	84
5.2.8 Noise Level Monitoring.....	85
5.3 Ecology.....	89
5.3.1 Flora .....	89
5.3.3 Protected Areas/ National Sanctuaries .....	99
5.3.4 Game Reserves & Wildlife Sanctuaries.....	99
5.3.5 Conclusion .....	99
5.4 Socioeconomic Environment .....	99
5.4.1 Sarain .....	99
5.4.2 Naika Mera .....	100
Chapter 6. Stakeholder Consultation.....	105
6.1 Introduction .....	105
6.2 Approach to Public Consultation .....	105
6.3 Objectives of Consultation.....	105
6.4 Categories of Stakeholders Contacted .....	106
6.5 Major Stakeholders Involved .....	106
6.6 Scoping Session.....	106
6.7 Issues Discussed.....	107
6.8 Major Stakeholders and their Apprehensions.....	107
6.9 Consultation with the Communities (Affected and Wider Communities) .....	111
Chapter 7. Impact Assessment and Mitigation Measures.....	115
7.1 Environmental Screening of the Proposed Project .....	115
7.1.1 Impact Identification with Matrices .....	115
7.1.3 Identification of individual Environmental Impacts .....	121

7.2 Pre-Construction Phase Impacts.....	123
7.2.1 Project Location.....	123
7.2.2 Design and Land use for Project site.....	123
7.3 Construction Phase Impacts.....	124
7.3.3 Loss of Vegetation.....	124
7.3.4 Noise and Vibration.....	124
7.3.5 Sites of Archaeological or Historical Significance.....	124
7.3.6 Solid Waste and Effluent Disposal.....	124
7.3.7 Soil Degradation.....	124
7.4 Operational Phase Impacts.....	124
7.4.1 Air Quality Deterioration.....	125
7.4.2 Incinerator Ash Disposal.....	128
7.4.3 solid waste disposal.....	128
7.4.4 Wastewater Disposal.....	129
7.4.5 Public Health and Safety Hazards.....	129
7.4.6 Soil Contamination.....	130
7.5 Positive Impacts of the Project (Potential Environment Enhancement Measures).....	131
7.5.1 Reduction of Waste.....	131
7.5.2 Socio-Economical benefits.....	131
7.5.3 Business Opportunity.....	131
7.5.4 Infection Control.....	132
7.5.5 Employment.....	132
Chapter 8. Environmental Management Plan.....	133
8.1 Objectives of EMP.....	133
8.2 Management Approach/ Institutional Capacity.....	134
8.2.1 Pre-Construction and Construction Phase.....	134
8.2.2 Operation Phase.....	135
8.3 Legislation and Guidelines.....	136
8.4 Approvals.....	136
8.5 Environmental Mitigation Matrix.....	136
8.6 Environmental Monitoring Plan.....	144
8.7 Reporting and Feedback Mechanism.....	146
8.7.1 Meetings.....	147
8.7.2 Change-Record Register.....	147
8.8 Change Management.....	147
8.9 Environmental Training.....	148
8.10 Frameworks for Key EMP-Related Plans.....	148
8.10.1 Solid Waste Management Plan.....	148
8.10.2 HSE Management Plan.....	149
8.10.3 Traffic Management and Construction Material Transportation Plan.....	150
8.10.4 Emergency Preparedness, Response and Site Evacuation Plan.....	151
8.10.5 Fire Fighting Plan.....	151
8.10.6 Plantation Plan.....	152
8.10.7 Restoration and Rehabilitation Plan.....	154
8.10.8 Grievance Redress Mechanism.....	154
8.10.9 Project Monitoring.....	154
8.10.10 Equipment Maintenance Detail.....	155
8.10.11 Quarterly Environmental Monitoring Report.....	155
8.10.12 Post Project Monitoring.....	155
8.11 Environmental Budget.....	155
Chapter 9. Conclusion and Recommendations.....	157

9.1 Introduction ..... 157  
9.2 Conclusions ..... 157  
9.3 Recommendations ..... 158  
Annexure 1: List of Names, Qualification and Roles of EIA Team Members... **Error! Bookmark not defined.**  
Annexure 2: Terms of Reference .....**Error! Bookmark not defined.**  
Annexure 3: References.....**Error! Bookmark not defined.**  
Annexure 4: Glossary ..... 160  
Annexure 5: List of People Met During EIA .....**Error! Bookmark not defined.**  
Annexure 6: Brochure of Incinerator and Autoclaving Unit ..... 167  
Annexure 7: References of Incinerator Plant .....**Error! Bookmark not defined.**  
Annexure 8: Stack Emission Report of Incinerator ..... 182  
Annexure 10: Basic Information Document for Consultation .....**Error! Bookmark not defined.**  
Annexure 11: Ambient Air and Noise Quality Monitoring Report ...**Error! Bookmark not defined.**  
Annexure 12: Land Document ..... 192  
Annexure 13: Hospital Waste Management Questioniers.....**Error! Bookmark not defined.**  
Annexure 14: NOC for Wastewater Disposal..... 197  
Annexure 15: Quarterly Environmental Report .....**Error! Bookmark not defined.**

**Annexures:**

**Annexure 1: Glossary**

**Annexure 2: Brochure of Incinerator**

**Annexure 3: Stack Emission Report of Incinerator**

**Annexure 04 Waste water analysis report**

**Annexure 05: Ambient Air and Noise Quality Monitoring Report**

**Annexure 06: Land Document**

**Annexure 07: NOC for Wastewater Disposal**

# Chapter 1: Introduction

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## 1.1 Project Background and Overview

Hazardous waste mismanagement and Improper treatment and disposal of infectious waste is a serious environmental issue that needs to be addressed immediately. Untreated hazardous and infectious waste has the potential to contaminate the surrounding waste leading generation of even more infectious waste.

In addition, hazardous wastes including hospital waste has been reported to be poorly handled and managed by the waste collecting and disposal staff. This leads to not only environmental complications but also and health consequences within hospitals as well as to the outside population. The soil contamination and ultimately sub soil aquifer contaminations are the real threats in hazardous waste if not managed in environment friendly manner. The cost of soil pollution cleaning is very much high, once it goes under ground.

In developing countries like Pakistan, awareness regarding hospital waste management in terms of its segregation, collection, storage, transportation and disposal is lacking. In Pakistan, every hospital must comply with the Waste Management Rules 2005 (Environment Protection Act 1997), of the Government of Pakistan. It also must ensure its level of service and waste management system according to international standards.

Studies from Pakistan show that around 1.35 Kg of waste is produced every day for each hospital bed occupied.

Pakistan generates over 49.6 million tons of solid waste annually, with a 2.4% yearly growth rate. While precise, nation-wide, hazardous-only figures are often not tracked, estimates suggest up to 14% of municipal waste can be hazardous, including over 1,790 kilotons of e-waste annually. Major sources include industrial, commercial activities, medical, and electronic waste.

However, it is a reality that the treatment and disposal of hazardous and infectious waste are expensive and not every waste generating facility can afford it.

To solve this impasse, Vandcor-Spectrum (VS) Environmental Solutions (Pvt.) Limited has already established a hospital waste treatment facility. Presently the hospital waste management facility is of 150 kg per hour and steam auto calving has 400 litre capacities, Now the proponent plans to add two more incinerators of 500 kg per hour in two phases. The enhanced capacity will be 1150 kg/hour incineration capacity and 400 autoclaving capacities. The hazardous and non-hazardous materials will be brought from hospitals and industrial units and incinerated or disposed of at this waste management facility. The cost of the project is 200 million PKR. Area of the proposed project is 9 kanal and 17 Marla.

## 1.2 Brief Description of Nature, Size Location of Project

**Nature:** The project is the capacity enhancement of already working Vandcor-Spectrum (VS) Environmental Solutions Hospital Waste Treatment Facility.

**Size:** The project will have 1150 kg/hour capacity for incineration of hazardous and nonhazardous waste incineration. Presently one incinerator of 150 kg/hour (Model C120, Strongman Ideal Engineering, and Pakistan) has been operating along with an autoclave unit (Model SMS 400, Strongman Medi Engineering) of 400 liter capacity. Two more incinerators of 500 Kg per hour will be added to achieve the capacity of 1150 Kg per hour. The project site is a land area of 11.3 Kanals at Singhori, Rawalpindi.

**Location:** The project site is located near Sanghori, Tehsil Gujar Khan, District Rawalpindi. The project site can be accessed through GT Road. The GPS Coordinates of the project site are 33°24'14.18"N, 73°15'39.01"E.

The keymap of the project location has been shown in **Figure 1.1**.

**Exhibit 1-1: Key Map of the Project Site**



### 1.3 Details of the Consultant

Sustainable Environmental Solutions (SES) is working in the field of environment since 2014. It has been providing technology and guidance to its customers related to the environment sector. The project team is headed by the EPA Punjab veteran officer Muhammad Farooq Alam who has been working in EPA Punjab as Director Multi-Lateral Agreements (MEAs) and Deputy Director Lab Head Quarter. It has experienced team for this assignment. SES has undertaken many assignments of cement sector, waste management and incineration, Textile, power generation Highways and motorways, sugar mills, commercial buildings and ambient air quality monitoring. The details of the team are the following:

No	Name and Designation	Academic Qualification
1	Muhammad Farooq Alam Chief Executive and Chief environmentalist. Retd, Director Environment Protection Agency, Punjab.	M. Phil Environmental Science GCU, Lahore. 3 month training in Environmental Management, Hiroshima , Japan 3 months training on Air Pollution Control, OSAKA, Japan. 1 month training on Environmental Monitoring, Tokyo, Japan. Foreign training in Paris, France. Foreign Training in Bangkok, Thailand.
2	Mr. Usmanul Haq EIA expert. Retired Assistant Director EPA, Punjab	MSc. Environmental Science, Punjab University, Lahore
3	Mr. Shafqat Saeed Farooqi EIA Specialist Retd. Deputy Director EPA Punjab	MSC. Environmental Sciences, Punjab University, Lahore
4	Mr. Afnan Farooq GIS and AI expert	MS computer Science (LUMS) BS Electrical Engineering (ITU)
5	Salahuddin Field Officer Retd. EPA Punjab official	Bachelor of Arts.

#### 1.4 Identification of Project and Proponent

Vandcor-Spectrum (VS) Environmental Solutions is an SECP – registered company currently operating in Pakistan. The company specializes in providing environmental services and integrated waste management solutions with a particular focus on the treatment of medical and hazardous waste. VS provides waste collection, transport, sorting, and treatment and disposal services in Northern Punjab.

VS deploys an innovative and integrated approach towards waste management keeping in mind the needs of its clients and focusing on environmental sustainability. At VS, we believe waste management to not only be an issue of cost and convenience but also consider social responsibility and environmental impact. Our mission is to be able to provide efficient, cost-effective and environmentally friendly waste management solutions and establish safe, compliant and reliable practices that protect the public and environment.

VS is committed to making the process of waste disposal convenient, smooth and economical for its clients. Our team consists of skilled workers trained to handle

hazardous waste according to international safety guidelines and stringent protocols. We provide guidance to our clients in order to ensure waste production is minimized and sorted and handled properly at source and collected on a daily basis.

### 1.4.1 Contact Persons

The authorized representative of proponent for installation, commissioning and operation of hospital waste treatment facility is the following:

<b>Vandcor-Spectrum (VS) Environmental Solutions</b>	<b>Environmental Consultant</b>
M. Arslan Khawaja Director VS Environmental Solutions (Pvt) Ltd Office # 1, First Floor, Shahbaz Center, Khayaban-e-Shurwardy, Abpara, G-6, Islamabad Contact: 0300 5191 950 Email: <a href="mailto:info@vandcor.com">info@vandcor.com</a>	Muhammad Kashif Chief Executive Officer Nouveau Energy Management Services (Pvt) Ltd 1st Floor, Zaman Plaza, Hospital Boulevard, DHA Phase 2, GT Road, Islamabad Contact: 0345 5207290, 0340 0333 779 Email: <a href="mailto:kashif@nemspk.com">kashif@nemspk.com</a>

### 1.5 Screening of the Project

The project is capacity enhancement of existing 150 kg/hr incinerator and 400 litter capacity autoclave unit to 1150 kg/hour hazardous and non-hazardous waste management facility near Sanghori, Tehsil Gujar Khan, District Rawalpindi.

EIA is mandatory according to the section 12 clause (1) of the Punjab Environmental

Protection Act (Amended 2012) for all the development interventions. According to

Punjab EPA (Review of IEE EIA Regulations, 2022), the proposed projects fall under

**Category G (Waste Disposal) of Schedule II**, which states that “Waste Incinerators and autoclaves are required to submit EIA study.

### 1.6 Structure of the Report

The Environmental Impact Assessment (EIA) Study comprises of Executive Summary following nine chapters as detailed below;

#### Chapter 1,

**Introduction;** gives rationale and overview of the Project, need for Environmental Impact Assessment study, its objectives and finally structure of the report.

#### Chapter 2,

**Environmental Legislative, Regulatory and Institutional Framework;** provides an overview of the policy framework and national legislation that applies to the proposed Project. The Project is expected to comply with all national/provincial legislation relating to environment in Pakistan, and to obtain all the required regulatory clearances. It also deals with the requirements of international agencies and other international protocols for protection of biodiversity for which Pakistan has firm commitment.

**Chapter 3,**

**Project Description;** gives a rather detailed account of the Project particularly emphasizing those Project components which are of importance in relation with environmental and social aspects.

**Chapter 4,**

**Description of the Baseline Conditions;** provides information about the environmental and social settings of the Project Area including geology, climate, flora, fauna, water resources, socioeconomic conditions etc.

**Chapter 5,**

**Review of Project Alternatives;** describes the analysis of alternatives, which could be site alternative, design or technology alternatives.

**Chapter 6,**

**Stakeholders and Public Consultations;** deals with the outcome of the consultation carried out with the local communities, knowledgeable people, public representatives, etc. It discusses the concern of various types of the people and provides an outline how these have been addressed within the EIA of the Project.

**Chapter 7, Screening of potential Environmental and Social Impacts and Mitigation Measures;** identifies the potential impacts due to the implementation of Project on the physical, biological and social environment of the Project Area.

**Chapter 8,**

**Environmental Management and Monitoring Plan;** outlines the environmental management plan, identifies the roles and responsibilities to implement EMMP, suggest monitoring frequencies of various parameters and EMMP costs etc.

**Chapter 9,**

**Conclusion and Recommendations;** sums up the report and conclusions and recommendations resulting from the study.

**1.7 Methodology**

The methodology adopted by the consultants for this assignment was agreed with the proponents at the proposal stage. The following methodology was adopted:

### **1.7.1 Orientation Session:**

Meetings and discussions were held with the relevant key officials of the client and the project design team. This activity was aimed at achieving a common ground of understanding on various issues of the EIA study.

### **1.7.2 Development of Data Acquisition Plan:**

Following the concept clarification and understanding, a detailed data acquisition plan was developed for the internal use of the consulting team. This plan was revised and updated throughout the EIA process. The plan identified specific requirements of the primary and secondary data and their sources; determined time schedules and responsibilities for their collection; and indicated the logistics and facilitation needs for the execution of the data acquisition plan.

### **1.7.3 Primary Data Collection:**

Primary data was collected for the parameters identified in the gap analysis. Socioeconomic surveys were conducted to validate the data available through other primary sources of this project. The survey tools included questionnaires and focused discussions. The Socio-economic Questionnaire is attached as **Annexure I** at the end of this report. A more detailed description of socioeconomic data acquisition is also given in Chapter 6 of this report.

### **1.7.4 Secondary Data Collection and Review:**

The secondary data about the physical, technical, and institutional aspects of similar projects available with the proponents was also reviewed. The additional data was collected from Pakistan Meteorological Department and Geological Survey of Pakistan. On the basis of the secondary information and its review, primary survey plan was developed. Gap analysis was also carried out to exhaustively identify all the data required to conduct the EIA study.

### **1.7.5 Site Visits:**

The consulting team made visits to the proposed site and its surroundings to collect necessary data pertaining to their respective areas of responsibility for the assignment.

A conceptual environmental management plan for smooth and effective implementation of all recommended mitigation measures was developed and included in the EIA report.

### **1.7.6 Reporting**

The draft EIA report was prepared under the guidelines issued by the PEPA 1997 and submitted to the client for their comments.

The report has been finalized, after review and comments by the client's management. The consultant discussed the comments with the client before incorporating them in the final Report.

The main text of this EIA report is focused on findings, conclusions and recommended actions. It is supported by summaries of the data collected and citations for any references used in interpreting those data.

### **1.8 Limitations**

This EIA document has been prepared drawing inferences from site visits, primary data and secondary information. The study has been conducted by the consultant in a manner consistent with the level of care and skill exercised by members of environmental and social Sciences and consulting professionals. The consultants have tried to cover all important aspects and relevant impacts of the proposed project.

The conclusions in this study are based on primary and secondary data, results derived from earlier studies, and a subjective evaluation of the possible environmental aspects during construction and operations of the proposed project. In evaluating the proposed project, the consulting team has relied on information provided by the management of the client. The consultant assume that the information provided is factual and accurate. Also the consultant accepts no responsibility for any deficiency, misstatement, or inaccuracies contained in this report as a result of omission or misrepresentation by any person interviewed or contacted. The mitigation measures and other recommendations put forth in this report are of the level of implementation framework.

### **1.9 Purpose of Environmental Impact Assessment Report**

The Environmental Impact Assessment (EIA) is the assessment of the environmental consequences (positive and negative) of a plan, policy, program, or actual projects prior to the decision to move forward with the proposed action.

The EIA is the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development project prior to major decisions being taken and commitments made. Furthermore, the report will enable VS Environmental Solutions to obtain environmental approval of Hospital Waste Treatment Facility from Punjab Environmental Protection Department, Government of Punjab.

The purpose of the EIA is to ensure that decision-maker consider the environmental impacts when deciding whether or not to proceed with a project.

### **1.10 Scope of EIA**

The project requires the Environmental Impact Assessment to identify environmental impacts of construction and operational phases of the proposed project.

The scope of EIA of VS Environmental Solutions Hazardous and non-hazardous waste management facility is as follows:

- The identification and assessment of all major and minor impacts during operational phases;
- Identification of all significant impacts that may require detailed assessment;
- Propose mitigation measures to minimize, eliminate or to compensate the potential adverse impacts that may arise during operational phases of the project;

- Public consultation with all the stakeholders of the proposed project;
- Preparation of Environmental Management Plan;
- Conclusions and recommendations; and
- Preparation of an Environmental Report for submission to Environmental Protection Agency, Government of Punjab.

## Chapter 2: Institutional Legislative and Policy Framework Related to EIA Requirements

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Pakistan being a signatory of multilateral international treaties has a comprehensive set of environmental legislation covering multiple environmental issues facing Pakistan like pollution of freshwater bodies and coastal water, air pollution, deforestation, loss of biodiversity, lack of proper waste management and climate changes. The basic policy and legislative framework along with detailed rules, regulations and guidelines required for the implementation of the policies and enforcement of legislation for the protection of the environment and overall biodiversity are in place.

The compliance status of the Vandcor-Spectrum (VS) Environmental Solutions Hospital Waste Treatment Facility was reviewed with reference to the legislation and existing legal framework on the environment in Pakistan and International level as described henceforth.

### 2.1 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.

#### 2.1.1 Punjab Environmental Protection Act, 1997 (Amended 2012)

After 18<sup>th</sup> Constitutional Amendment in the Constitution of Pakistan, the Federal Ministry of Environment has been dissolved and the subject of the environment has been handed over to provinces. EPA Punjab has formulated its own act. The major content of the act is same as of Pakistan Environmental Protection Act (PEPA), 1997. Minor amendments/changes have been made viz.

- The Name of Act has been changed into “Punjab Environmental Protection (Amendment) Act, 2012”.
- For the words “Federal Government”, wherever occur, the word “Government” shall be substituted;
- For the words “Federal Agency”, wherever occur, the words “Provincial Agency” shall be substituted; and **Institutional Legislative and Policy Framework Related to EIA Requirements**
- For the word “National”, wherever occurs, the word “Punjab” shall be substituted.

All the other clauses, sub-clauses, sections and sub-sections are almost same.

The Punjab Environmental Protection Act, 1997 (Amended 2012) is the basic legislative tool empowering the Punjab government to frame regulations for the

protection of the environment. The Act is applicable to a broad range of issues and extends to air, water, soil, marine and noise pollution, as well as the handling of hazardous waste.

The discharge or emission of any effluent, waste, air pollutant or noise in an amount, concentration or level in excess of the Punjab Environmental Quality Standards (PEQS) specified by the Punjab Environmental Protection Agency (Punjab EPA) has been prohibited under the Act, and penalties have been prescribed for those contravening the provisions of the Act.

The requirement for environmental assessment is laid out in Section 12 (1) of the Act. Under this section, “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”.

Section 12(6) of the act states that this provision is applicable only to such categories of projects as Punjab Environmental Protection Agency (Review of IEE and EIA Regulations) 2012.

### **2.1.2 Punjab Environmental Protection Agency (Review of IEE and EIA Regulations), 2022**

The Punjab Environmental Protection Agency (Review of IEE and EIA Regulations), 2022 (the Regulations) prepared by the Punjab Environmental Protection Agency 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 in Schedule I and EIA projects in Schedule II serve as scoping of the projects whether it requires IEE or EIA study.

Projects have been classified on the basis of the expected degree of adverse environmental impacts. Project types listed in Schedule-I are designated as potentially less damaging to the environment and those listed in Schedule-II as having potentially serious adverse effects. Schedule-I projects require an IEE to be conducted, provided they are not located in environmentally sensitive areas. For the Schedule-II projects, conducting an EIA is necessary. Salient features of the regulation, relevant to the proposed project are listed below:

#### **Institutional Legislative and Policy Framework Related to EIA requirements**

Categories of projects requiring IEE and EIA are issued through two schedules attached to the Regulations.

- A fee, depending on the cost of the project, has been imposed for review of EIA and IEE.
- The submittal is to be accompanied by an application in prescribed format included as schedule V of the Regulations.

- The EPA Punjab is bound to conduct preliminary scrutiny and reply within 10 days of submittal of the report a) confirming completeness, b) asking for additional information, or c) requiring additional studies.
- The EPA Punjab is required to make every effort to complete the review process for IEE within 45 days and of the EIA within 90 days, of issue of confirmation of completeness.
- EPA Punjab accord their approval subject to following conditions:
- Before commencing construction of the project, the proponent is required to submit an undertaking accepting the conditions.
- Before commencing operation of the project, the proponent is required to obtain from EPA Punjab a written confirmation of compliance with approval conditions and requirements of the IEE/ EIA.
- An EMP is required to be submitted with the request for obtaining confirmation of compliance.
- The EPA Punjab are required to issue confirmation of compliance within 15 days of receipt of request and complete documentation.

The IEE/EIA approval will be valid for three years from the date of accord.

A monitoring report is required to be submitted to the EPA Punjab after completion of construction, followed by annual monitoring reports during operations.

The project falls in Schedule-II of the regulations. Hence, this type of project needs an EIA to be conducted.

### **2.1.3 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 cancelation of license; packing; and labelling; safety precautions; entry, inspection and monitoring; safety plan; waste management plan; import; and transport of hazardous substances.

### **2.2 Hospital Waste Management Rules, 2005**

Ministry of Environment, Government of Pakistan has prepared the hospital waste management rules in 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 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.

### **2.3 Punjab Hospital Waste Management Rules 2014**

These rules are made by Punjab Government to ensure the safe handling and disposal of hospital waste.

The summary of the key features of these rules are;

- The hospital superintendent shall form a waste management team comprising different professionals of the hospital
- The responsibilities of the waste management team shall be defined
- Every hospital's waste management team should hold review at least once a month
- Hospital engineer shall be appointed, and responsibilities should be defined regard hospital waste management
- Waste management plan shall be made by the waste management officer for approval by the waste management team
- Proper procedures shall be followed to collect, store, transport and dispose the hospital waste
- The rules also discuss the accidents and spillage and waste minimization and reuse strategies

### **Institutional Legislative and Policy Framework Related to EIA Requirements**

#### **2.4 Punjab Environmental Quality Standards (PEQS)**

The PEQS, promulgated under the PEPA 1997 (Amended 2012), specify the following standards:

The Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources.

- For power plants operating on oil and coal:
  - Maximum allowable emission of Sulphur dioxide,
  - Maximum allowable increment in concentration of sulfur dioxide in ambient air,
  - Maximum allowable concentration of nitrogen oxides in ambient air, and
  - Maximum allowable emission of nitrogen oxide for steam generators as function of heat input.
- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment and sea (three separate set of numbers).

The PEQS for liquid effluents discharged to inland waters, gaseous emission from industrial sources and emissions from motor vehicles are provided as on the following web site. Web site: [http://epd.punjab.gov.pk/rules\\_regulations](http://epd.punjab.gov.pk/rules_regulations)

The Punjab Environmental Quality Standards (PEQS) specify the following standards:

- 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 generator, process waste etc. The standards for vehicles will apply during the construction as well as operation phase of the project. Standards for air quality have not been prescribed as yet.

**2.4.1 Punjab 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 Punjab Environmental Quality Standards for Treatment of Liquid and Disposal of Bio-medical waste by Incineration, Autoclaving, Microwaving and Deep Burial.

***Incineration***

The summary of the standards has been described in **Exhibit**

- The combustion efficiency, computed should be at least 99.0 %
- The minimum temperature of the primary chamber shall be 800°C.
- The gas residence time in secondary chamber shall be at least 1 second at the temperature of around 1200°C with at least 3% oxygen in the stack emission.

**Exhibit 2-1: Emission Standards**

No	Parameters	Standards
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		Limiting concentration in mg/NM <sup>3</sup> unless stated	Sampling Duration in minutes, unless stated
1	Particulate matter	50	30 or 1NM <sup>3</sup> of samples volume, whichever is more
2	Nitrogen Oxides expressed as NO <sup>2</sup>	400	30 for online sampling or grab sample
3	HCL	50	30 or 1NM <sup>3</sup> of samples volume, whichever is more
4	Total Dioxins and Furans	0.1 ng TEQ/N3 (at 11% O <sub>2</sub> )	8 hours or 5NM <sup>3</sup> of sample volume, whichever is more
5	Hg and its compounds	0.05	2 hours or 1NM <sup>3</sup> of samples volume, whichever is more

**Steam Autoclaving**

Dedicated autoclave shall be used for disinfecting and treating bio-medical waste,

- In a gravity-flow autoclave, medical waste shall be subjected to:
  - i. A temperature of not less than 125°C at 15 pound per square inch (psi) with the residence time not less than 60 minutes ; or
  - ii. A temperature of not less than 135°C and a pressure of 30 psi with an autoclave residence time of not less than 45 minutes; or
  - iii. A temperature of not less than 150°C and a pressure of 50 psi with an autoclave residence time of not less than 30 minutes,
- In a vacuum autoclave , medical waste shall be subjected to a minimum of one pre-vacuum, pulse to purge the autoclave of all air. Waste shall be treated at;
  - i. A temperature of not less than 125oC and pressure 15 psi with a autoclave residence time of not less than 45 minutes; or
  - ii. A temperature of not less than 135 C and a pressure of 35 psi with an autoclave residence time of not less than 30 minutes.
- Medical waste shall be deemed treated if all parameters (residence time, temperature and pressure) indicators indicates that their required value were reached during the autoclave process. If for any reason, either of the parameter (residence time, temperature of pressure) was not reached, the entire batch of waste shall be autoclaved again until all the required parameter (temperature, pressure and residence time ) are achieved.

- For recording of operational parameters, each autoclave shall have graphic or computer recording devices which will automatically and continuously monitor and record dates, time of the day, load identification number and operational parameters through the entire length of autoclave cycle.
- The autoclave should completely and consistently kill the approved biological indicator at its maximum design capacity, biological indicator for autoclave shall be ***bacillus stearothermophilus*** spores using vials or spore strips with at least  $1 \times 10^4$  spores per millilitre.
- Under no circumstances will an autoclave have minimum operating parameters less than a residence time of 30 minutes, regardless of temperature and pressure, a temperature less than 125°C of a pressure less than 15 psi.
- A chemical indicator strip/tape that changes color when a certain temperature is reached can be used to verify that a specific temperature has been achieved. It may be necessary to use more than one strip over the waste package at different location to ensure that the inner content of the package has been adequately autoclaved.

**2.4.2 PEQS for Liquid Effluent**

The Punjab Environmental Quality Standards (PEQS) for discharge of effluent from industry are presented in **Exhibit 2-2**.

**Exhibit 2-2: PEQS for Liquid Effluent Discharge**

Parameters	Into Waters	Inland	Into Treatment	Sewage
Temperature	=<3°C		=<3°C	
pH Value	6-9		6-9	
Biological Oxygen Demand (BOD) <sub>5</sub> at 20°C	80		250	
Chemical Oxygen Demand (COC)	150		400	
Total Suspended Solids (TSS)	200		400	
Total Dissolved Solids (TDS)	3500		3500	
Grease & Oil	10		10	
Phenolic Compounds (as phenol)	0.1		0.3	
Chlorides (as Cl')	1000		1000	
Fluoride (as F')	10		10	

Cyanide (CN <sup>-</sup> ) total	1.0	1.0
An-ionic Detergents (as MBAs)	2.0	20
Sulphate (SO <sup>2-</sup> )	600	1000
Sulphide (S <sup>2-</sup> )	1.0	1.0
Ammonia (NH <sup>3</sup> )	40	40
Pesticides	0.15	0.15
Cadmium (Cd)	0.1	0.1
Chromium (trivalent & hexavalent)	1.0	1.0
Copper (Cu)	1.0	1.0
Lead (Pb)	0.5	0.5
Mercury (Hg)	0.01	0.01
Selenium (Se)	0.5	0.5
Nickel (Ni)	1.0	1.0
Silver (Ag)	1.0	1.0
Total Toxic Metals	2.0	2.0
Zinc (Zn)	5.0	5.0
Arsenic (As)	1.0	1.0
Barium (Ba)	1.5	1.5
Iron (Fe)	8.0	8.0

**Institutional Legislative and Policy Framework Related to EIA Requirements**

Parameters	Into Waters	Inland	Into Treatment	Sewage
Manganese (Mn)	1.5		1.5	
Boron (B)	6.0		6.0	
Chlorine (Cl <sub>2</sub> )	1.0		1.0	

**Source:** PEQS, Punjab Environmental Protection Agency

### 2.4.3 PEQS for Gaseous Emission

The Punjab Environmental Quality Standards (PEQS) for permissible limits of gaseous emission from industry are presented in **Exhibit 2-3**.

**Exhibit 2-3: PEQS for Gaseous Emission**

Parameter	Source of Emission	Standard
Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann Scale or equivalent smoke number
Particulate Matter	Boilers & Furnaces: Oil Fired Coal Fired Cement Kilns Grinding, crushing, clinker coolers and related processes, metallurgical processes, converters, blast furnaces and cupolas	300 500 300 500
Hydrogen Chloride	Any	400
Chlorine	Any	150
Hydrogen Fluoride	Any	150
Hydrogen Sulphide	Any	10
Sulphur Oxides	Sulfuric Acid/sulphonic Acid Plants Other Plants except power plants operating an oil and coal	5000 1700
Carbon Monoxide	Any	800
Lead	Any	50
Mercury	Any	10
Cadmium	Any	20
Arsenic	Any	20
Copper	Any	50

Parameter	Source of Emission	Standard
Animony	Any	20
Zinc	Any	200
Oxides of Nitrogen	Nitric Acid Manufacturing Unit Other plants except power plants operation on oil or coal: Gas fired Oil fired Coal fired	3000 400 600 1200

Source: PEQS, Punjab Environmental Protection Agency

**2.4.4 PEQS for Vehicular Emission**

The Punjab Environmental Quality Standards (PEQS) for permissible limits of exhaust emissions from vehicles are presented in **Exhibit 2-4**.

**Exhibit 2-4: PEQS for Vehicular Emission**

Parameters	Standards (Maximum permissible limits)	Measuring Method
Smoke	40% or 2 on the Ringleman Scale During engine acceleration mode	To be compared with Ringleman chart at a distance of 6 meters or more
Carbon Monoxide	6%	Under idling conditions: non-dispersive infrared detection through gas analyzer.
Noise	85 dB (A)	Sound meter at 7.5 meter from the source

Source: PEQS, Punjab Environmental Protection Agency

**2.4.5 PEQS for Drinking Water, 2010**

The Punjab Environmental Quality Standards (PEQS) for drinking water quality, 2016 are presented in **Exhibit 2-5**.

**Exhibit 2-5: PEQS for Drinking Water Quality**

Parameter	Standard values	WHO standards
Biological		

All water intended for drinking (E. Coli or Thermotolerant Coliform bacteria)	Must not be detectable in any 100 ml sample.	Must not be detectable in any 100 ml sample.
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**Institutional Legislative and Policy Framework Related to EIA Requirements**

Parameter	Standard values	WHO standards
Treated water entering the distribution system (E. Coli or Thermo-tolerant Coliform and total Coliform bacteria)	Must not be detectable in any 100 ml sample.	Must not be detectable in any 100 ml sample.
Treated water in the distribution system (E. Coli or Thermo-tolerant Coliform and total Coliform bacteria)	Must not be detectable in any 100 ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100 ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12month period.
<b>Physical</b>		
Color	≤ 15 TCU	≤ 15 TCU
Taste	Non acceptable	Non acceptable
Odour	Non acceptable	Non acceptable
Turbidity	< 5 NTU	< 5 NTU
Total hardness	< 500 mg/L	---
TDS	<1000	<1000
pH	6.5- 8.5	6.5- 8.5
<b>Chemical</b>		
Essential Organic	mg/Litre	mg/Litre
Aluminium	≤ 0.2	0.2
Antimony	≤ 0.005	0.02

Arsenic	≤ 0.05	0.01
Barium	0.7	0.7
Boron	0.3	0.3
Cadmium	0.01	0.003
Chloride	≤ 250	250
Chromium	≤ 0.05	0.05
Copper	2	2
Toxic Inorganic		mg/Litre
Cyanide	≤ 0.05	0.07

**Institutional Legislative and Policy Framework Related to EIA Requirements**

<b>Parameter</b>	<b>Standard values</b>	<b>WHO standards</b>
Flouride	≤ 1.5	1.5
Lead	≤ 0.05	0.01
Mangnese	≤ 0.5	0.5
Mercury	≤ 0.001	0.001
Nickel	≤ 0.02	0.02
Nitrate	≤ 50	50
Nitrite	≤ 3	3
Zinc	5	3
Pesticides mg/L		PSQCA No.4639-2004.page No 4 Table No. 3serial No. 20-58
Phenolic Compounds		<0.002
Polynuclear aromatic hydrocarbons		0.01
<b>Radioactive</b>		
Alpha emitters bq/L	0.1	0.1

Beta emitters	1	1
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**Source:** PEQS, Punjab Environmental Protection Agency

**2.4.6 PEQS for Ambient Air and Noise**

The Punjab Environmental Quality Standards (PEQS) for Ambient Air and Noise, 2016 are presented in **Exhibit 2-6** and **Exhibit 2-7**.

**Exhibit 2-6: PEQS for Ambient Air**

Pollutants	Time Weighted Average	Concentration in Ambient Air (ug/m <sup>3</sup> )
Sulfur Dioxide (SO <sub>2</sub> )	Annual Average* 24 hrs**	80 120
Oxides of Nitrogen as (NO)	Annual Average* 24 hrs**	40 40
Oxides of Nitrogen as (NO <sub>2</sub> )	Annual Average* 24 hrs**	40 80
Ozone (O <sub>3</sub> )	1 hour	130
Suspended Particulate Matter (SPM)	Annual Average* 24 hrs**	360 500

**Institutional Legislative and Policy Framework Related to EIA Requirements**

Pollutants	Time Weighted Average	Concentration in Ambient Air (ug/m <sup>3</sup> )
Respirable Particulate Matter (PM <sub>10</sub> )	Annual Average* 24 hrs**	120 150
Respirable Particulate Matter (PM <sub>2.5</sub> )	Annual Average* 24 hrs** 1 hr	15 35 15
Lead (Pb)	Annual Average* 24 hrs**	1 1.5
Carbon monoxide (CO)	8 hrs 1 hr	5 mg/m <sup>3</sup> 10 mg/m <sup>3</sup>

\*\* Annual Arithmetic mean of minimum 1040 measurements in a year taken twice a week 24 hourly at uniform interval

\* 24 hourly /8 hourly values should be met 98 % of the year, 2 % of time, it may exceed.

**Source:** PEQS, Punjab Environmental Protection Agency

**Exhibit 2-7: PEQS for Noise**

Category of Area/ Zone	Effective from 1st July, 2010		Effective from 1st July, 2013	
	Limits in dB(A) Leq			
	Day time	Night time	Day time	Night time
Residential area	65	50	55	45
Commercial area	70	60	65	55
Industrial area	80	75	75	65
Silence area	55	45	50	45

**Source:** PEQS, Punjab Environmental Protection Agency

**2.7 Administrative orders of the EPA under section 6 of PEPA**

Since last two years EPA Punjab has been issuing executive orders under section 6 of PEPA, 1997. The orders pertain to compulsory installation and operation of Emission Control Systems, installation of WWTP and its operation, compulsory



No.409/PA to DG/EPA/2025  
GOVERNMENT OF THE PUNJAB  
ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL HOCKEY STADIUM, LAHORE  
Dated:25.11.2025



**Subject:- ESTABLISHMENT OF STANDARDS FOR MANDATORY PLACEMENT OF WASTE BINS AT COMMERCIAL CENTERS, SHOPPING MALLS, PLAZAS, BAZARS, OFFICE BUILDINGS AND EDUCATIONAL INSTITUTIONS**

### ORDER

**WHEREAS**, the Environmental Protection Agency (EPA) Punjab is mandated to provide for the protection, conservation, rehabilitation, and improvement of the environment, prevention and control of pollution, and promotion of sustainable development;

2. **AND WHEREAS**, unsegregated solid waste is adding additional load on waste management and disposal facilities which can otherwise be reduced through at source segregation and subsequent efficient disposal of the generated waste;

3. **AND WHEREAS**, waste recycling process directly contributes towards achieving the Sustainable Development Goals, in particular SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action);

4. **AND WHEREAS**, the Climate Resilient Punjab Vision and Action Plan 2024, under Clause 5.14, underscores the importance of introducing segregation of waste at source, recycling, and institutional capacity-building as a critical measure to reduce environmental stress and build resilience;

5. **AND WHEREAS**, Section 6(1)(n) of the Punjab Environmental Protection Act 1997 empowers the Environmental Protection Agency to establish standard for proper disposal of wastes and to assist the local councils, local authorities, Government Agencies and other persons to implement schemes so as to ensure compliance with the said standards;

6. **AND WHEREAS**, Section 6(1)(t) of the Punjab Environmental Protection Act, 1997 empowers the Environmental Protection Agency (EPA) Punjab to take or cause to be taken all necessary measure for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development;

compliance of PEQS by the motor vehicles and segregation of solid waste at the source point. Different color codes of the waste bins are some of the examples.

7. **NOW, THEREFORE**, in exercise of the powers conferred upon me under Section 6(1)(n) read with Section 5(4) of the Punjab Environmental Protection Act, 1997, I, Dr. Imran Hamid Sheikh (PAS), Director General, Environmental Protection Agency, Punjab, do hereby establish the following standards for classification and color coding of waste bins to be placed at Commercial centers, Shopping malls, Plazas, Bazars, Office buildings and Educational institutions, for at source segregation:

- a) **Yellow Bin – Paper waste** (paper, cartons, office paper, packaging material)
- b) **Green Bin – Glass waste** (bottles, jars, broken glass items, laboratory glassware)
- c) **Grey Bin – Organic / Biodegradable waste** (food scraps, fruit peels, leaves, garden waste)
- d) **Red Bin – Metal waste** (aluminum cans, tins, foils, small scrap)
- e) **Orange Bin – Plastic waste** (wrappers, bottles, disposable cutlery, bags)

8. In addition, under Section 6(1)(t) of the Punjab Environmental Protection Act, 1997, it is hereby ordered that the concerned managements of Commercial centers, Shopping malls, Plazas, Bazars, Office buildings and Educational institutions shall ensure the placement of waste bins with the said classification and color coding in their respective establishments at conspicuous places.

9. Any contravention to this order shall be dealt with as per relevant legal framework.

10. This order comes into force with immediate effect and shall remain in force until modified or withdrawn.

Issued under my hand and seal on this 25<sup>th</sup> day of November, 2025.

**DR. IMRAN HAMID SHEIKH (PAS)**  
**DIRECTOR GENERAL**  
**ENVIRONMENTAL PROTECTION AGENCY**  
**PUNJAB**

**Copy forwarded for information & necessary action to:**

1. The Secretary Environment Protection and Climate Change Department Punjab
2. All the Commissioners of Punjab
3. All the Deputy Commissioners of Punjab

## **2.8 The Implication of Legislations to the project**

The implication of the above-mentioned legislations to the operational phase of Waste management Facility would be as follows:

- VS Environmental Solutions Pvt. Limited, being the proponent of the project will ensure that construction and operational phases of the project be carried out in accordance with the EIA report and Environmental Management Plan is effectively implemented.
- The project will be subjected to four basic provisions relating to pollution control under the Punjab Environmental Protection Act, 1997 (Amended 2012), as contained in section 11, 13, 14 and 15 as follows:
- Section 11, prohibits discharge or emission of any effluent or waste or air pollutant or noise in excess of the PEQS, or the established ambient standards for air, water or land.
- Section 13, prohibits of hazardous wastes.
- Section 14, prohibits the handling of hazardous substance expect under license or in accordance with provision of any local law or international agreement.
- Section 15, prohibits operation of motor vehicles for each air pollutant or noise is being emitted in excess of the PEQS or the established ambient standard.
- The incinerators will be installed, commissioned and operated as per
- Punjab Environmental Quality Standards for Treatment of Liquid and Disposal of Bio-Medical Waste by Incineration, Autoclaving, Microwaving and Deep Burial for 2 years.

## Chapter 3: Project Description

---

### 3.1 Objective of the Project

The objective of the project is to enhance the capacity of the existing hospital waste management facility for handling hazardous and nonhazardous wastes coming from the industrial and commercial sources. The ability of this project to incinerate the hospital waste will remain intact.

The important objective of the project is to help to overcome the hazardous and infectious waste management and disposal problems and help in compliance of Punjab Environmental Quality Standards for Treatment and Disposal of Biomedical Waste by Incineration, Autoclaving, Deep Burial and Microwaving, 2016. At the same time it will help to comply the Hazardous waste management Rules 2005 and section 14 of the PEPA 1997.

### 3.2 Project Administrative Jurisdiction

The project site is located in Mouza Natha Dolaal, Tehsil Gujjar Khan, District Rawalpindi. Therefore, the project is in the Jurisdiction of Government of Punjab.

### 3.3 Location and Site Layout Plan

The Vandcor-Spectrum (VS) Environmental Solutions Waste Management Facility is located near Sanghori Sarwar Shaheed Mazar on a semi-pucca road. The coordinates of the facility are 33.404207, 73.261282.

The location of the VS Environmental Facility is shown in **Figure 3-1**. The surrounding areas near the project site are as follows:

- East: Sarain village (125 m)
- West: Agricultural Fields (5 m)
- Northwest: Nika Mehr (415m)
- North: Agricultural Land (2m) + Kas (205 m)
- South: Semi-pucca road (2m) + Agriculture Land (5m)

### 3.4 Road Access

VS Environmental Solutions Waste Management Facility is accessible via Sarain Road. Sarain Road is connected to National Highway N5 (GT Road) via Sanghori -Sarwar Shaheed Road. The road access to the project site is shown in **Figure 3.2**.

Project Description 3-1

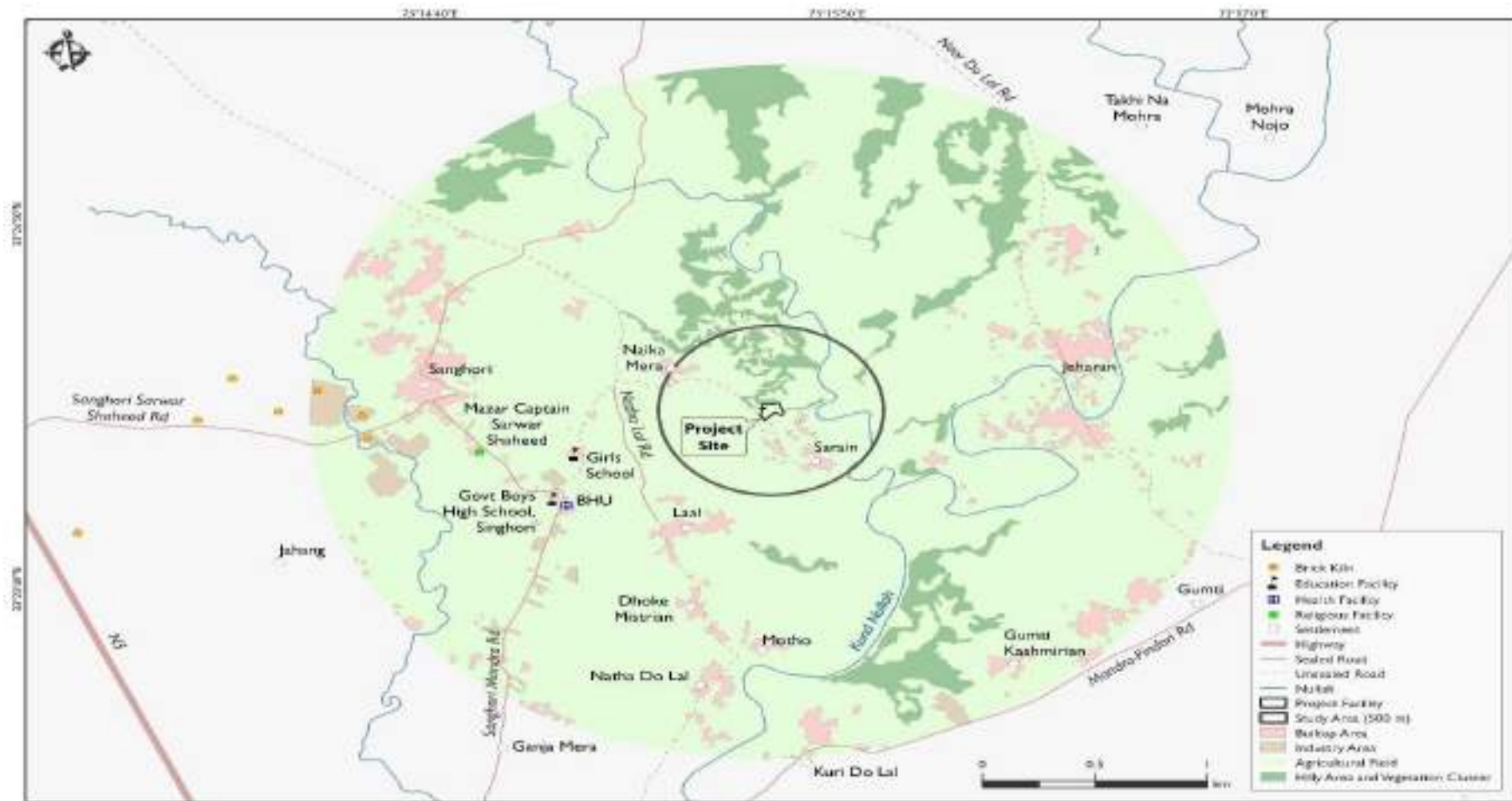
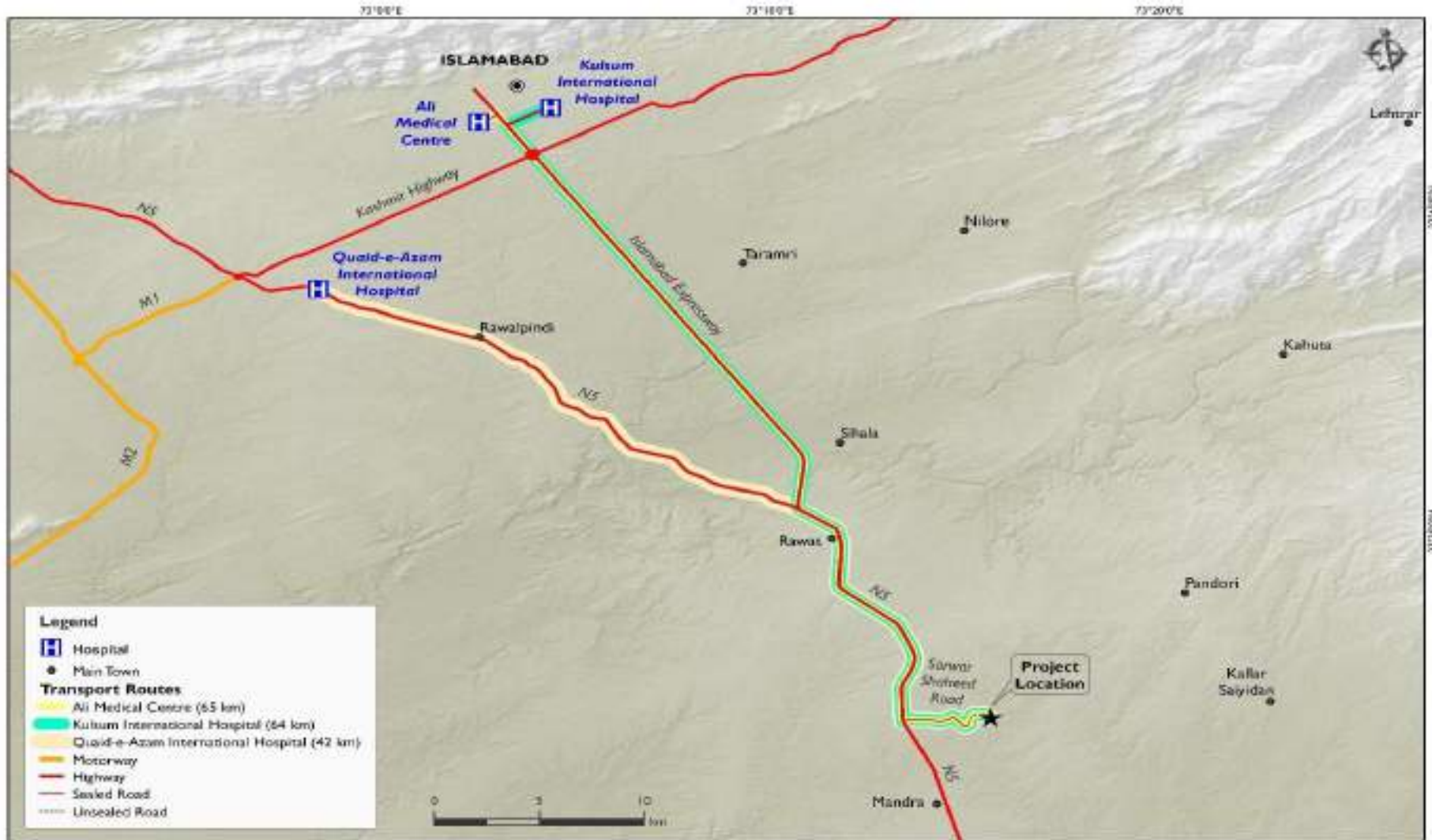


Figure 3-1: Location of VS Environmental Solutions Hospital Waste Treatment Facility

VS Environmental Solutions for waste management facility



SES  
22/02/26

Project Description  
3-2

*Environmental Impact Assessment (EIA) of  
Vandcor-Spectrum (VS) Environmental Solutions  
Hospital Waste Treatment Facility*

**Figure 3-2: Road Access to the Project Site**



### 3.5 Description of Project

The project consists of the capacity enhancement of the existing Hospital Waste Treatment Facility where infectious hospital waste is brought in from different hospital to be treated / sterilized through incineration or autoclaving. Now other hazardous and non-hazardous wastes will also be brought to this facility and will be managed through segregation, recycling, reuse, reduce, sterilization and incineration. Its capacity will be enhanced from 150 kg/hour to 1150 kg/hour through installation of two incinerators of 500 kg/hr capacity. The shed is already constructed where one incinerator of 150 Kg is operative whereas platform for two more incinerators have already been made for capacity enhancement the details of the waste management option to be installed at the project site are as follows:

#### 3.5.1 Segregation

The hazardous and non-hazardous wastes will be segregated at source of the waste generation where each type of waste will be stored separately in different colored bins as notified by the Director General EPA, Punjab vide his letter NO 409/ PA/ DG(EPA)/2025 dated 25<sup>th</sup> November , 2025. The nonhazardous waste will be recycled, reused and sold in the market for the recycling purpose. The inert waste will be sent to the TMA Rawalpindi landfill site.





No.409/PA to DG/EPA/2025  
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NATIONAL HOCKEY STADIUM, LAHORE  
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Subject:- **ESTABLISHMENT OF STANDARDS FOR MANDATORY PLACEMENT OF WASTE BINS AT COMMERCIAL CENTERS, SHOPPING MALLS, PLAZAS, BAZARS, OFFICE BUILDINGS AND EDUCATIONAL INSTITUTIONS**

**ORDER**

**WHEREAS**, the Environmental Protection Agency (EPA) Punjab is mandated to provide for the protection, conservation, rehabilitation, and improvement of the environment, prevention and control of pollution, and promotion of sustainable development;

2. **AND WHEREAS**, unsegregated solid waste is adding additional load on waste management and disposal facilities which can otherwise be reduced through at source segregation and subsequent efficient disposal of the generated waste;

3. **AND WHEREAS**, waste recycling process directly contributes towards achieving the Sustainable Development Goals, in particular SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action);

4. **AND WHEREAS**, the Climate Resilient Punjab Vision and Action Plan 2024, under Clause 5.14, underscores the importance of introducing segregation of waste at source, recycling, and institutional capacity-building as a critical measure to reduce environmental stress and build resilience;

5. **AND WHEREAS**, Section 6(1)(n) of the Punjab Environmental Protection Act 1997 empowers the Environmental Protection Agency to establish standard for proper disposal of wastes and to assist the local councils, local authorities, Government Agencies and other persons to implement schemes so as to ensure compliance with the said standards;

6. **AND WHEREAS**, Section 6(1)(t) of the Punjab Environmental Protection Act, 1997 empowers the Environmental Protection Agency (EPA) Punjab to take or cause to be taken all necessary measure for the protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development;

7. **NOW, THEREFORE**, in exercise of the powers conferred upon me under Section 6(1)(n) read with Section 5(4) of the Punjab Environmental Protection Act, 1997, I, Dr. Imran Hamid Sheikh (PAS), Director General, Environmental Protection Agency, Punjab, do hereby establish the following standards for classification and color coding of waste bins to be placed at Commercial centers, Shopping malls, Plazas, Bazars, Office buildings and Educational institutions, for at source segregation:

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- c) **Grey Bin – Organic / Biodegradable waste** (food scraps, fruit peels, leaves, garden waste)
- d) **Red Bin – Metal waste** (aluminum cans, tins, foils, small scrap)
- e) **Orange Bin – Plastic waste** (wrappers, bottles, disposable cutlery, bags)

8. In addition, under Section 6(1)(t) of the Punjab Environmental Protection Act, 1997, it is hereby ordered that the concerned managements of Commercial centers, Shopping malls, Plazas, Bazars, Office buildings and Educational institutions shall ensure the placement of waste bins with the said classification and color coding in their respective establishments at conspicuous places.

9. Any contravention to this order shall be dealt with as per relevant legal framework.

10. This order comes into force with immediate effect and shall remain in force until modified or withdrawn.

Issued under my hand and seal on this 25<sup>th</sup> day of November, 2025.

**DR. IMRAN HAMID SHEIKH (PAS)  
DIRECTOR GENERAL  
ENVIRONMENTAL PROTECTION AGENCY  
PUNJAB**

**Copy forwarded for information & necessary action to:**

1. The Secretary Environment Protection and Climate Change Department Punjab
2. All the Commissioners of Punjab
3. All the Deputy Commissioners of Punjab

## Incinerator

The hazardous and hospital waste will be incinerated in the incinerator. The project has already an incinerator of 150 kg/hr (Model C120, Strongman Ideal Engineering, Pakistan) where hospital waste is being incinerated. Now two more incinerators will

be added to enhance the capacity of the waste management facility up to 1150 Kg/Hour.

This proposed 500 kg incinerators will be modular package type unit with primary, secondary and third chamber and is designed to give a gas residence time of 02 seconds at a minimum of 1050°C within the combustion zone in which oxidizing conditions prevail as described in PEQS.

A specially designed Educator system will be incorporated with the outlet for decreasing of flue gases temperature, which is conforming to strict pollution control norms. The Incinerator totally converts the waste into sterile ash without any odor. The unit is three chambers, semi-automatic type machine.

The combined chamber casing is rectangular and will be constructed from mild steel plate (braced and stiffened externally).

The outer shell is heavy gauge 8 mm mild steel sheet. The incinerator is internally lined with block insulation plus high-quality low iron content refractory. The floor is easy to clean and uses the forced air system “beneath the flame” to guarantee complete combustion. High-temperature refractory is used throughout.

#### **The Principal of Operation of Incinerator:**

This will be a batch load unit. Waste is manually loaded into the unit via the charge door. Machine controls are semiautomatic. Burners start and stop using push buttons. The burners can be controlled with digital temperature controllers. The incinerator is designed to allow adjustments of both blowers and burners.

There are digital temperature controllers indicating the temperature of chambers. The temperature of chambers can control by this digital controller.

The brochure of the incinerator is provided in **Annexure 6**.

#### **Components of Two Incinerators (500kg/hour) to be installed**

The following are the major components of each Incinerator:

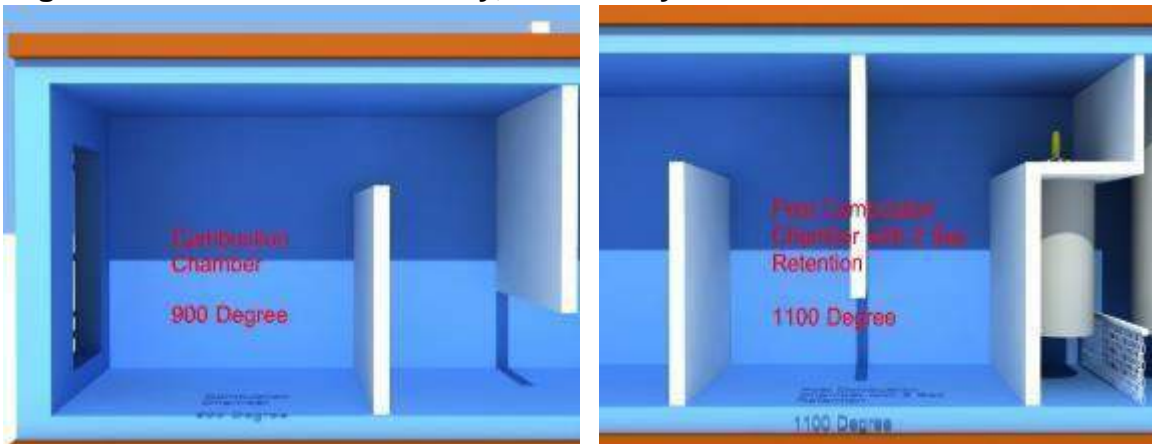
##### **A. Chambers**

There are three chambers in each incinerator. Primary chamber is sized to sufficient residence time for complete decomposition of the waste. Internally the casing forming the primary, secondary and third chambers is lined with good quality castable refractory and firebrick suitable for temperature upto 1400°C, backed by thermal insulation to give combined thickness of 200 mm. The three-chamber design provides a maximum decomposition of flue gases. There is separate small door for secondary & third chamber for cleaning

**Primary Chamber:** Primary chamber is sized to sufficient residence time for complete decomposition of the waste, total heat release will not exceed 25,000 BTU/cu. Ft/hr(220,000kcal/m<sup>3</sup>h).

**Secondary & Third Chamber:** The incinerator will provide a minimum secondary chamber retention time of 2 sec at mix burning rate. The retention time is calculated at 800 to 1200 °C and will be accommodated within the confines of the incinerator. The incinerator's secondary chamber is thermally designed for 1400°C.

**Figure 3-3: X-Section of Primary, Secondary and Third Chamber**



**Figure 3-4: View of Chambers and Composition of Insulation Layer**



## B. Burners

There are six burners in each incinerator. All the burners are fully automatic and can be operated by a single push button. Burners are consisting of a blower, a motor with overload protection, and electric spark ignition device, and a flame sensing rod.

Temperature controllers, each having for independently adjustable set points control the burners. The temperature controller sensor is Type K thermocouple.

The high and low setpoints are interlocked such that the ignition burners will fire until the primary chamber temperature reaches 850°C. The burner then switches off and remains off until the temperature falls to 750°C.

The high and low set points are interlocked such that the afterburners will fire until the secondary chamber temperature reaches 1050° C. the burners then switch off and remain off until the temperature fall to 950°C.

The operation of each burner is monitored by its own automatic start-up programmer and flame detector. If the flame is not detected while the burner is firing the programmer will shut down the burner and lockout red lockout lamps on the programmer and the control panel will light.

### Figure 3-5: View of Burner



## C. Air Supply

Excess air is the key component of the combustion in any combustion engine. The chambers of each incinerator are provided by direct drive centrifugal fans. Primary air is injected at low level into the base of the fire through jets located along each side of the chamber. Removable caps give access to the jets so that they can be easily cleared of any obstruction by manually rodding through. Each blower is equipped with air control valve; use to control the excess air inlet in the chamber. The excess air provides oxygen which helps in burning.

**Figure 3-6: View of Air Supply Fans**



#### **D. Integrated Flue Gas Washers (Air Pollution Control Device)**

Control of the Dioxin formation is important feature of the incineration process. Rapid Cooling (Quenching) is applied to control the Dioxin formation. It often form as flue gas cools down. Quickly cooling the gas from 450°C to below 200°C ("quenching") significantly reduces the time in the 250°C–450°C window where *de novo* synthesis occurs. Therefore, water showering will be done to decrease the formation of Dioxin in post combustion stage.

Particulate matter is the other pollutant to be controlled from the combustion process. Gasses from the retention chamber pass through the integrated gas washing system; gases are scrubbed via gas washer sprays and pass through a chain filter removing particulate from the gas stream. It consists on steel Column, full cone spray nozzle, water collection tray with drain pipe and stain less steel chain filters.

#### **E. Microprocessor Control Panel**

The microprocessor control panel of each incinerator is specially designed for easy operating. All controls of the incinerator are housed in the main panel.

- Microprocessor temperature controller indicating the temperature of all chambers. The temperature of the chambers could be controlled by these digital temperature controllers.
- Main blower on/off push button.

- Burners on/off push buttons
- Over Loading Protection
- Door Interlocking. Indication on control panel if door not closed properly. Combustion process stops automatically.
- Flame detector: In case of flame failure or air pressure failure, burners shut downs with buzzer
- Low water cut off

#### F. Ignition and Afterburners

Each incinerator will be equipped with ignition and after burners. Two temperature controllers, each having for independently adjustable set points control the burners. The temperature controller sensor is Type K thermocouple. In the event of thermocouple failure, the temperature controller will show maximum temperature (1200° C) on the indicator scale.

The afterburner controller set points are adjusted as follows.

Extra Low set point	150°C approx.
Low set point	950°C approx.
High Low set point	1050°C approx.

The high and low set points are interlocked such that the afterburners will fire until the secondary chamber temperature reaches 1050° C. the burners then switch off and remain off until the temperature fall to 950°C.

The Ignition burner controller set points are adjusted as follows.

Low set point	750°C approx.
High Low set point	850°C approx.

The two other set points are not used.

- ⊗ The high and low set points are interlocked such that the ignition burners will fire until the primary chamber temperature reaches 850°C. The burner then switches off and remains off until the temperature falls to 750°C.
- ⊗ The operation of each burner is monitored by its own automatic start-up programmer and flame detector. If the flame is not detected while the burner is firing the programmer will shutdown the burner and lock out red lockout lamps on programmer and the control panel will light.

**Figure 3-7: Typical PLC of Strongman Engineering Incinerator**



### G. Chimney

Each incinerator will have a chimney for flue gas emission and dispersion in the atmosphere at the reasonable height (almost 10--15 m). It is made up of several Mild Steel sheets, cylindrical pipes, which are flanged and bolted together. Its height can be established case by case, however not below 10 meter from ground level. First Stack of the chimney is of Stainless steel in integrated washer machine The chimney is stretched to the ground from all around (4 – 6 places according to the site requirement) with the flexible wire shillings for safety purpose.

### H. Wastewater Treatment Unit

The present WWT Unit consists of three chambers each with a volume of 500-600 cubic feet. The primary chamber will be connected to a neutralizer which monitors and adjusts the pH accordingly. The concentrations of reaction products such as salts and surplus reagents such as lime will be measured and adjusted to make them suitable for absorption by plants in the tertiary chamber.

The secondary chamber will contain a sand filter pond with varying levels of fineness, to ensure efficient filtering of large particles and heavy metals.

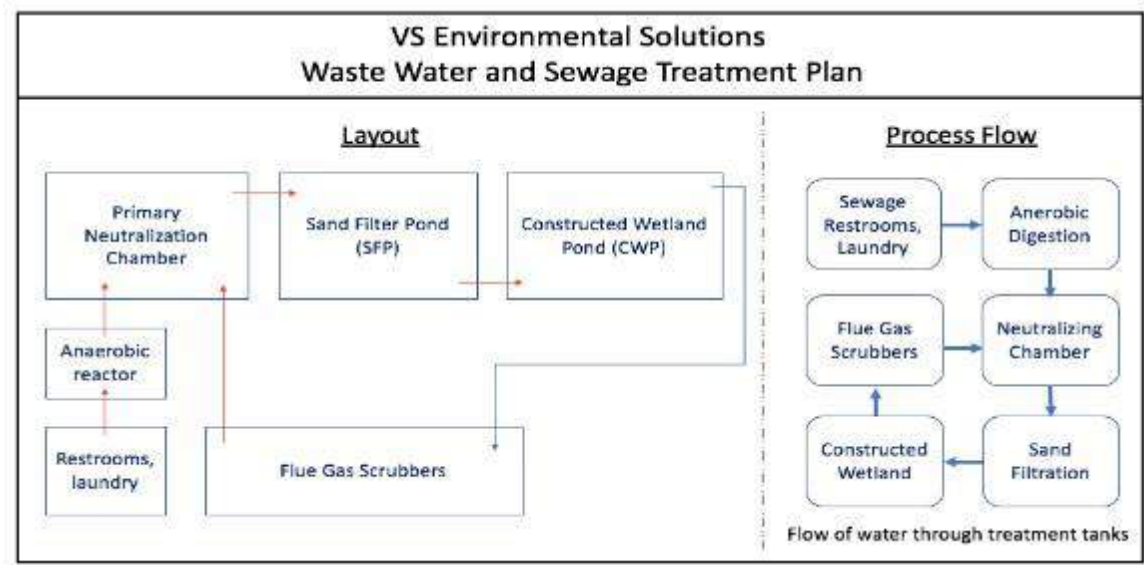
Finally, the water will overflow into the tertiary chamber, which consists of a constructed wetland pond. The chemistry and pollutant concentration of the water will determine which plants are most suitable for the CWP. Water not absorbed by

the plants will flow out of the final chamber to be collected for reuse in our filtration system. This waste water treatment facility will be increased to accommodate the additional load of the waste water from two more incinerators

Additionally, sewage from restrooms and laundry must be treated first in an anaerobic bio-remediation tank before being introduced to the WWT system. This is necessary because wastewater from the flue gas cleaning process contains far less organic material than sewage, and thus needs to be treated accordingly. The treated wastewater will be disposed of in the nearby open drainage channel and the NOC for disposal of wastewater is attached in **Annexure 14**.

A schematic of this plant is shown in **Figure 3.8**.

**Figure 3-8: Layout Plan & Process Flow of Wastewater Treatment Plant**



**Technical Specifications of the Incinerators**

**Exhibit 3-1: Technical Specification of 500 Kg/hour Incinerator**

Technical Data	
Manufacture (Local or imported)	Local
Burning capacity	500 kg/hr
Number of burners	6 no.
Incinerator type	Batch type three chamber

Incinerator design	Controlled air
Fuel to be used	Natural Gas /LPG or Diesel
Loading system	Manual /batch type
Warm up time	20 min's
Type of paint	Heat resistant enamel paint
Thermal insulation	>100mm
Refractory thickness	>100mm
Electricity	3 phase 440V
Composition of thermal insulator	Calcium silicate slab
Composition of refractory	High Alumna Castable 46% AL <sup>2</sup> O <sup>3</sup>
Number of blowers	3 no.
Temperature controller	3 no of digital temperature controller
Thermocouple	3 no.
Chimney height	10 to 15 meter from ground level
Programmiers	Microprocessor controlled
Relays	Automatic
Cabling	Heat Proof cables
Scrubbing	Shower system (Dual)
Pump	Pressure fog pump
Switches	Pressure switch

**Source:** Strongman Ideal Engineering

The cross-sectional view and typical front view of the incinerator is shown in **Figure 3-9** and **Figure 3-10**. The topographic survey map of the project site is shown in **Figure 3-11**.

The site layout plan is shown in **Figure 3-12**.

Figure 3-9: Cross-sectional view of the incinerator

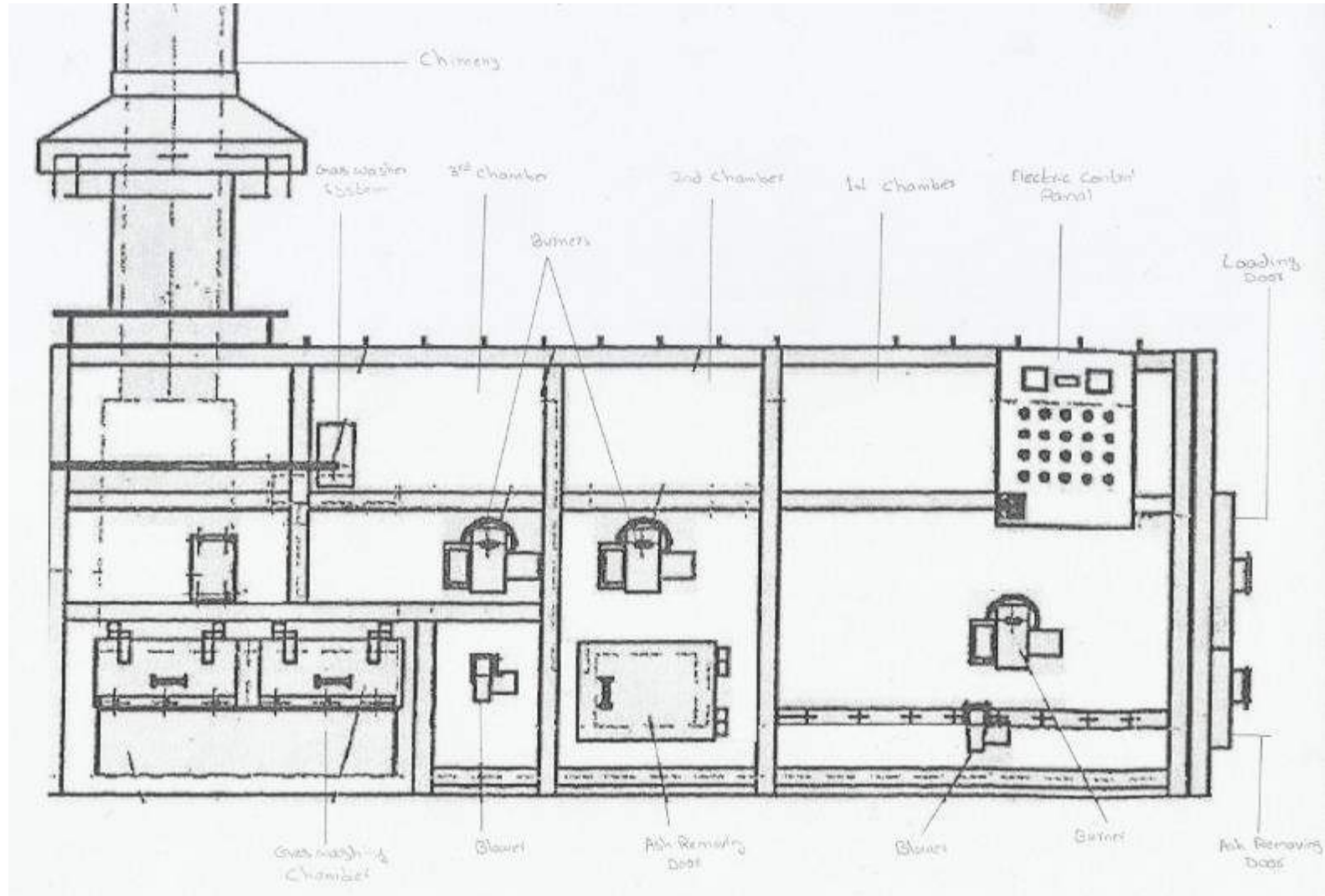


Figure 3-10: Typical Front View of Incinerator

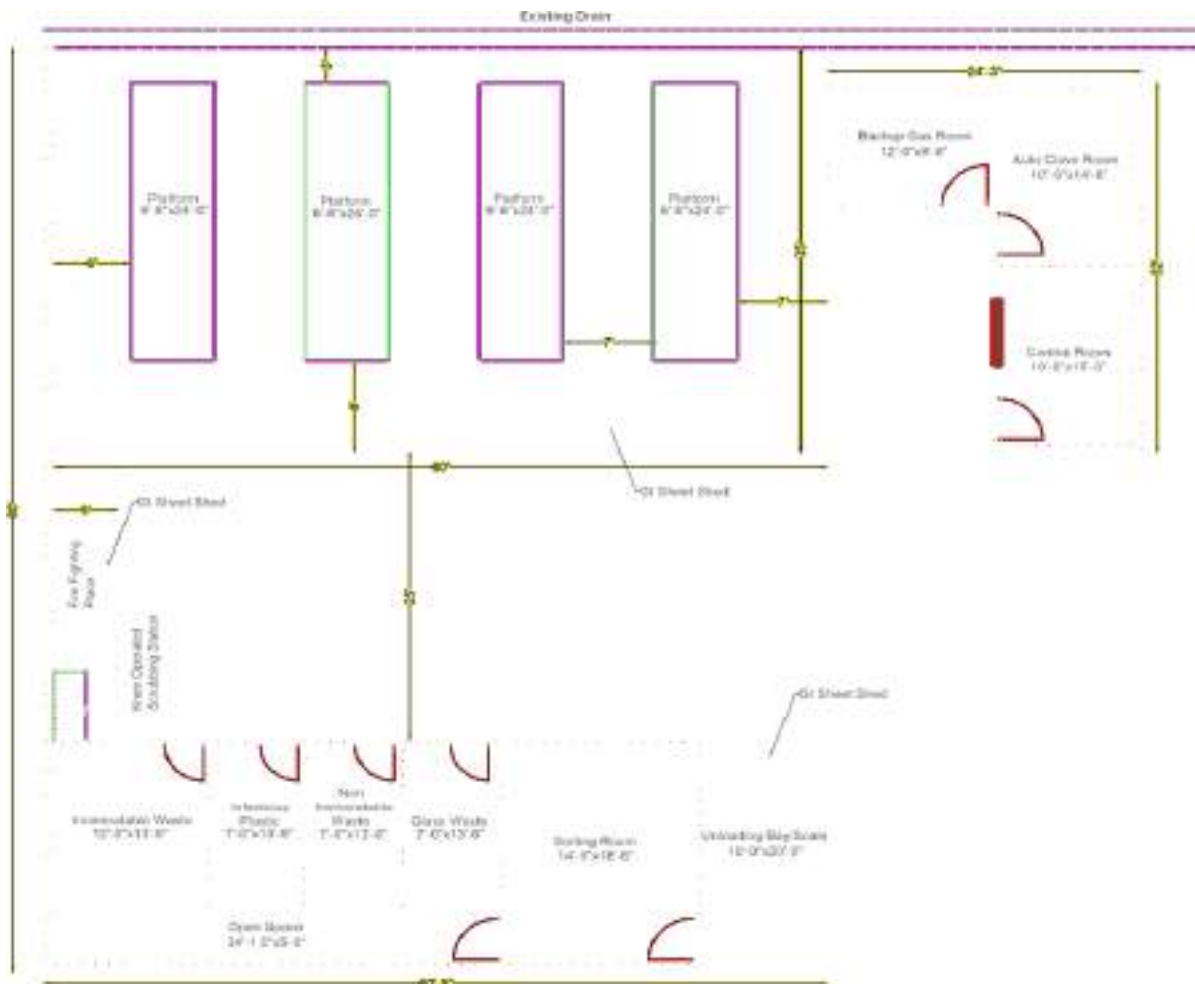


## **Project Description**

Sustainable Environmental Solutions

Figure 3-12: Layout Plan of VS Environmental Solutions Hospital Waste Treatment Facility





### 3.6 Process Flow of each incinerator

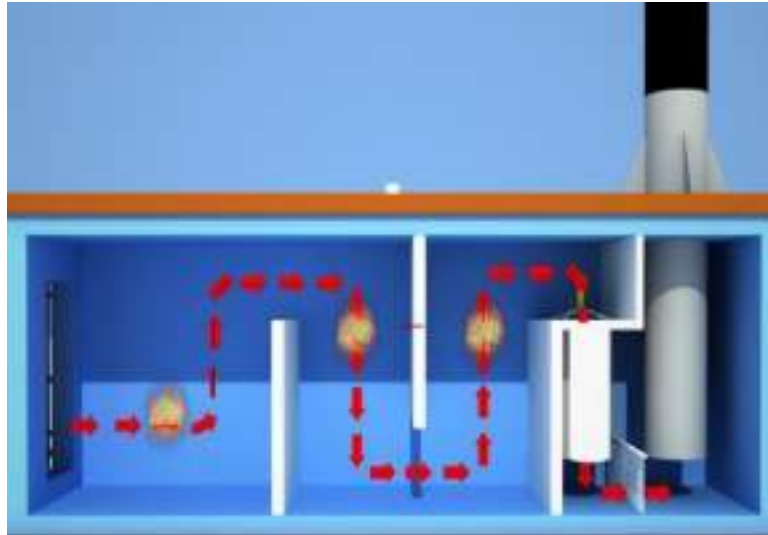
The process flow of the treatment option is described below:

#### 2x Incinerator:

The incinerator uses two-step combustion processes where primary combustion occurs in the charge

Section and final combustion occur in the retention section. Smoke is eliminated as it passes through the retention section. Smoke is eliminated as it passes through the retention chamber where the temperature is 900 - 1200 °C. The waste is burned in combination with fresh air that is forced into the machine through blowers. As temperature rises inside the machine, waste is consumed more quickly.

**Figure 3-13: Process Flow of Incineration**



Source: Strongman Ideal Engineering

### 3.7 Cost and Magnitude of Project

The total estimated cost of the Project is Rs. 200 Million. Details are mentioned in Exhibit 3-3.

**Exhibit 3-3: Cost breakup of Project**

No	Description	Rupees (Million)
1	Infrastructure Cost	16.0
2	Machinery Cost (including manifold)	176
3	Land Cost	8.0
<b>Total Cost</b>		<b>200</b>

### 3.8 Vegetation Features of the Project Site

The site is already industrial use and no vegetation exist at the proposed project site. However, the surrounding area around the project site is covered with agricultural lands and have trees. Mainly, phulai, ber, shahtoot, kikar and sheesham trees are present in the project area.

### 3.9 Land Use on Site

The project site is already in use for the incineration and autoclave facility. Hence no change in land use is there for the proposed project. The project site is nonagricultural land.

### **3.10 Restoration and Rehabilitation Plans**

Already site has been restored and beautified after operation of the project. The addition of two more incinerators will not involve land excavation or foundation building. However, more plantation of trees and grass will be carried out and maintained during the operational phase of the project.

### **3.11 Compliance of Punjab Environmental Quality Standards for Treatment of Liquid and Disposal of Biomedical Waste for Incinerator to Be Installed**

Strongman Ideal Engineering is one of the oldest manufacturers of incinerators in Pakistan. The strongman incinerators are robust, reliable and are designed according to the environment and needs of Pakistan.

Incinerators of Strongman Ideal Engineering system are installed in numerous Government and Private Hospitals of Pakistan. The stack parameters of CO<sub>2</sub>, CO, NO<sub>x</sub>, SO<sub>x</sub>, Smoke and Particulate Matter, were compared to Punjab Environmental Quality Standards. The emissions are within the permissible range and the reports are provide in **Annexure 8**. Some of the satisfaction letters / performance certificates from different clients is attached in **Annexure 9**.

### **3.12 Compliance of Punjab Environmental Quality Standards for Treatment of Liquid and Disposal of Biomedical Waste for Autoclave Unit to Be Installed**

Punjab Environmental Quality Standards for treatment and disposal of biomedical waste for an autoclaving state that the temperature

The autoclave units already installed in the VS Environmental Solutions Hospital Waste Treatment Facility treat the waste at:

- i. A temperature of not less than 125°C and pressure 15 psi with an autoclave residence time of not less than 45 minutes; or
- ii. A temperature of not less than 135°C and a pressure of 35 psi with an autoclave residence time of not less than 30 minutes.

### **3.13 Schedule of Implementation**

The construction of the facility has already been done. Only two more incinerators are to be installed in the existing shed. Installation and commissioning of the incinerators will be completed in a period of 3 months.

**Exhibit 3-4: Time Schedule/Flow Chart for of Capacity Enhancement of VS Environmental Solutions Waste management Facility**

Installation Plan												
Task	Weeks											
	1	2	3	4	5	6	7	8	9	10	11	12
Excavation and foundation building												
Erection and plumbing												
Electrical Work												
Incinerator's procurement												
Equipment commissioning												
Trial testing												

**Solid Waste Management:** During operation and maintenance phase, two categories of solid waste will be generated from the incineration process.

- ☞ **Municipal Solid Waste:** Solid waste generated from the operator's office will be dumped at the municipal waste storage site of the facility which will be collected by the Municipal Committee Gujar Khan for its final disposal.
- ☞ **Ash:** Ash produced from the incinerator as final residue will be collected in ash bins and will be deeply buried in the ash pit which will be constructed near the incinerator site. The ash can also be used as construction material as it become an inert material after incineration.
- ☞ **Treated Medical Waste:** The treated medical waste that has been completely sterilized by the autoclave will be sent to RWMC designated landfill site for disposal.

**Staff:** During the operational phase a total staff of 10 will be engaged in the operation and maintenance of the incineration facility. Out of which six are already engaged.

**Staff Training:** The operating staff will be trained for safety health and environment on regular basis.

## Chapter 4: Consideration of Alternatives

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This section covers the project alternatives which were examined for the capacity enhancement of the project in VS Environmental Solution Hospital Waste Treatment Facility, Tehsil Gujar Khan, District Rawalpindi.

An analysis of the available alternatives is necessary to establish that the most suitable management and technology options will be adopted for the project. In particular it outlines the following project options were considered:

1. Site Alternative
2. Economic Alternatives
3. Environmental Alternatives
4. Technology Alternative

### 4.1 Site Alternative

The incinerators required to be installed in open area and vast land. Therefore VS Environmental Solutions has established this facility at the present location. Already one incinerator is operating at this site. All the required infra-structure and land required is present here .Therefore, no other alternative of site was considered.

### 4.2 Economic Alternative

No land is required for the capacity building of this project. The same administration will look after the proposed project. Infrastructure development has a reasonable cost. Therefore, economically it was rational to add the incinerators here instead of using new site. The cost of the investment is considerably at the present site. Hence no other site was considered.

By establishing one facility where the infectious waste of different small and big hospitals can be treated is very economical as compared to every small or big hospital having to establish its own hospital waste treatment facility.

### 4.3 Environmental Alternative

The environmental alternative to establishment of VS Environmental Solutions Hospital Waste Treatment Facility is that each hospital treats its infectious waste on site. This option is more environmentally degrading as for each hospital big or small a treatment facility will be built which means more possible sources of pollution and more importantly within dense urban environments.

Therefore, the establishment of VS Environmental Solutions Waste management Facility is the most **environmentally and economically feasible option**.

#### **4.4 Technology Alternative**

The Government of Punjab has made Environmental Quality Standards for four types of bio-medical waste treatment technologies. Therefore, the four technologies can be practiced in the Punjab province to treat its bio-medical waste.

Incineration of waste has been highly practiced, and Incineration is chosen for most hazardous and infectious healthcare waste treatment all over the globe. However, the other three alternatives such as autoclaving, deep burial and microwaving could also be evaluated to seek the best option for the final disposal of infectious hospital waste in Punjab.

A comparison to evaluate the best hospital waste treatment and disposal option of incineration and autoclaving with other technologies has been described as hereunder:

##### **4.4.1 Incineration**

Incineration is a process where complete combustion takes place at higher temperatures in the presence of fuel and air. The fuel provides heat energy to attain incineration temperature, and air provides oxygen for combustion. In some cases, the waste itself provides heat energy. Incineration is effective when the waste is combustible, which is reduced to exhaust gaseous products and the incombustible waste is reduced to ash. The nature of gaseous emissions and ash from an incinerator depends upon the type of waste being incinerated and incineration conditions.

Incinerator can treat Healthcare and Industrial hazardous waste at the same time. Incineration at high-temperature dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter and results in a very significant reduction of waste volume and weight, this process is usually selected to treat wastes that cannot be recycled, reused or disposed of in a landfill site.

Incineration breaks down the infectious, nonmetallic organic wastes and destroys bacteria and viruses, which is the main benefit of incineration of hospital waste. In considering the infectious waste incineration option, one must weigh the benefits of incineration against the significant capital and operating cost, potential environmental impacts, and technical difficulties of operating an incinerator.

##### **Advantages of Incinerator**

- Infectious waste incineration is cost-effective in regions where land for landfilling is not suitable and is scarce.
- Volume reduction, especially for bulky solids with a high combustible content.
- Detoxification of pathologically contaminated material, toxic organic compounds or biologically active materials.
- Power and Heat generation.
- Filters trap pollution.

- Socio-environmental compliance, especially for fumes containing odorous compounds, carbon monoxide or other combustible materials subject to regulatory emission limitations.
- Environmental Impact mitigation, especially for organic material that would leach from landfills or create an odour nuisance.
- Reducing atmospheric pollution caused by smoke emitted during open burning.

#### **Disadvantages of Incinerator**

- Incineration facilities are expensive to build, operate, and maintain.
- These facilities also require skilled staff to run and maintain them.
- Smoke and ash emitted by the chimneys of incinerators include acid gases, nitrogen oxide, heavy metals, particulates, and dioxin, which is a carcinogen if proper wet scrubber/ pollution control devices are not installed.
- Incinerators require large volumes of waste to keep the fires burning.
- High temperature is required.

#### **4.4.2 Sanitary Land fill**

Alternatively, a special small burial pit in sanitary way could be prepared to receive health-care and hazardous waste. The pit should be at least 2 m deep and filled to a depth of 1–1.5m. the pit should be lined to stop the seepage of leachate into the subsoil water. After each waste load, the waste should be covered with a soil layer 10–15cm deep. If coverage with soil is not possible, lime may be deposited over the waste. The leachate of these pits is required to be collected, treated and disposed of in the water channel / drain.

In case of an outbreak of an especially virulent infection, both lime and soil cover may be added. Access to this dedicated disposal area should be restricted, and the use of a pit would make supervision by landfill staff easier and thus prevent scavenging.

The burial site should be relatively impermeable, and no shallow well should be close to the site. When fresh waste is added to the pit, a layer of 10 cm of soil shall be added to cover the fresh waste.

The pit should be safely away from any habitation and sited so as to ensure that no contamination occurs to any surface or underground water source. The area should not be prone to flooding or erosion. The location of the site shall be authorized by the prescribed environmental agency, and the institution shall maintain a record of all pits for deep burial.

Deep burial of infectious hospital waste provides several advantages over disposal in surface structures or by shallow burial. The primary advantage is the high degree of physical isolation that it provides.

#### **Advantages**

- Increase in length of the flow path of contaminants that may become dissolved in ground water.
- Increased protection of waste against weathering and erosion.
- For some wastes and waste containers, elimination of free oxygen that may mobilize certain constituents.
- For plutonic rocks and to some extent all rocks, reduction of permeability with depth.
- Human intrusion is less likely.

**Disadvantages of sanitary land fill.**

- The high cost of exploration, development, and monitoring of deep disposal system
- Contamination of ground water

**4.5 Conclusion**

After the evaluation of the benefits and drawbacks of all the alternatives explained above, also on the basis of many local factors the final choice is addition of the incinerators at the same site where VS Environmental Solutions is operating one incinerator and autoclaving unit. Incineration was chosen for the following reasons:

- Cost effective ness and presence of unfractured at the site.
- Volume and mass reduction efficiency
- Disinfection efficiency
- The quantity of waste treated per day and the disposal system
- Occupational health and safety considerations
- Almost all types of hospital waste can be treated and disposed of.
- This type of technology is allowed to be installed by Punjab Hospital Waste Management guidelines.
- Training requirement for the operation of the method.
- Available space for installation of the plant on site of waste generation source.
- Investment and operating cost.
- Regulatory requirements

## Chapter 5: Description of the Environment

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This section describes the existing physical, ecological and socioeconomic conditions in the Project area. It opens with the discussion of the Area of Influence (AoI) selected for describing the environment followed by the description of the physical, ecological and socioeconomic environment. The information presented in this section was collected from the field surveys and the available literature.

### 5.1 Project Area of Influence

For this impact assessment, the definition of the AoI given in International Finance Corporation Performance Standard 1 (IFC PS1) is used.

*“The area likely to be affected by (i) the project and the client’s activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project; (ii) impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities’ livelihoods are dependent”*

For the Project, the direct AoI is the spatial extent of the Project footprint and related facilities as well as on the associated effects on the receiving environment (**Figure 5-1**). The project area is the area falling within a 500-meter radius of the project site. The project site is located in Sanghori village, Tehsil Gujjar Khan, District Rawalpindi, Punjab, Pakistan.

### 5.2 Physical Environment

The physical baseline includes a description of the topography, land use, geology and soils, seismicity, climate, water resources, water quality, ambient air quality and sound levels in the AoI of the Project.

#### 5.2.1 Topography and Geography

Gujjar Khan lies in the belt of the rough and sloping area. The Kanshi stream rises from the Kahuta hills, drains the Gujjar Khan Tehsil and joins the Jhelum River. According to the Geological reports, this area is blessed with rich deposits of crude oil, large reserves of oil and gas were discovered in February 2002 at Tobra, about ten kilometers from Gujjar Khan. The field is being developed by the Oil and Gas Development Company (OGDCL). The field could produce 1,600 barrels of crude

oil daily. The Ahdi oil and gas field is about 30 km from Gujar Khan, situated near Daultala town and is being operated by Pakistan Petroleum. According to the Oil and Gas Development Company, huge oil and gas reserves have been discovered at Missa oil and gas field, ten kilometers from Gujar Khan. Arid Agriculture is the main profession of area and cattle at homes. Gujar Khan is not thickly wooded, but in the ravines small shunted trees are common. However, the trees like Eucalyptus, Kikar, Phulai and Shisham are planted along GT Road and Railway track. A topographic map showing the project location is presented in **Figure 5-2**.

### 5.2.2 Geology and Soils

Gujjar Khan is situated at an average elevation of 461 meters above mean sea level. Gujar Khan lies in the area where deposits of yellow-brown very fine sand and loamy are often found in the vertically eroded faces and pinnacles characteristics of loess. In many other places, the surface mantle is definitely of alluvial materials which are also very common.

The clay of the Gujar Khan area shows five distinct layers. Lower layers are of coarse pebbles with sand or clay. The next strata are that of alluvium deposit over the pebble beds of older times. Then comes the top airborne layer of silt or clay called loess and at the top is the gravely conglomerate and loose gravel cape deposit, pebbles, pebble beds, pebble mounds and pebble ridges form a conspicuous feature of the landscape.<sup>1</sup>

The area in and around Rawalpindi has a complex geological history of mountain formation, alluvial-loess depositions and erosion cycles. In the west of the Potohar Uplands, the main depositions of loess are from the Pleistocene period. Streams and ravines cut the loess plain, affected by gully erosion and steep slopes. Such land is unsuitable for cultivation. The area is composed of sandstone and limestone. There is an extensive area with exposed bedrock and fragmentary, thin soil formations.

Important minerals like limestone, marble and fireclay are found in the area. Limestone is found abundantly in the Margalla Hills and marble in the western section of Margalla Range. Clay soils in the district Exhibit five distinct strata, from bottom to top:

(i) coarse pebbles with sand or clay, (ii) an alluvial stratum deposited by an older river system in the Soan Basin, (iii) alluvial deposits of the present river system, (iv) an airborne top layer of silt or clay (loess), and (v) conglomerate and loose gravel deposits.

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The project site falls in the Quaternary type which consists of alluvium, unconsolidated surficial deposits of silt sand and gravel as shown in **Figure 5.3**.

### **5.2.3 Surface Water.**

The Soan and Kurang Rivers are the main streams draining the area. Their primary tributaries are the Ling River, draining northwestward into the Soan; Gumreh Kas, draining westward into the Kurang from the area between the Kurang and Soan; and Lei Nala, draining southward into the Soan from the mountain front and urban areas. The Kurang and Soan Rivers are dammed at Rawal and Simly Lakes, respectively, to supply water for the urban area. The water observed in these rivers has high turbidity due to the upstream activities. The water of this stream/Nullah is used for agro-domestic purposes. It is a perennial surface water channel with occasional flooding during the monsoon season. Extensive forest reserves in the headwaters of the Kurang and Soan Rivers benefit the quality and quantity of supply.

### **5.2.4 Ground Water**

The groundwater of the project area is available from 60-65 ft. The groundwater in the Islamabad / Rawalpindi region forms from an aquifer of Quaternary alluvial gravels. The altitude of the water table decreases from about 600 m at the foot of the Margalla Hills to less than 450 m near the Soan River, so that the saturated zone generally lies 2–20 m below the natural ground surface.

Figure 5-1: Project Direct Area of Influence

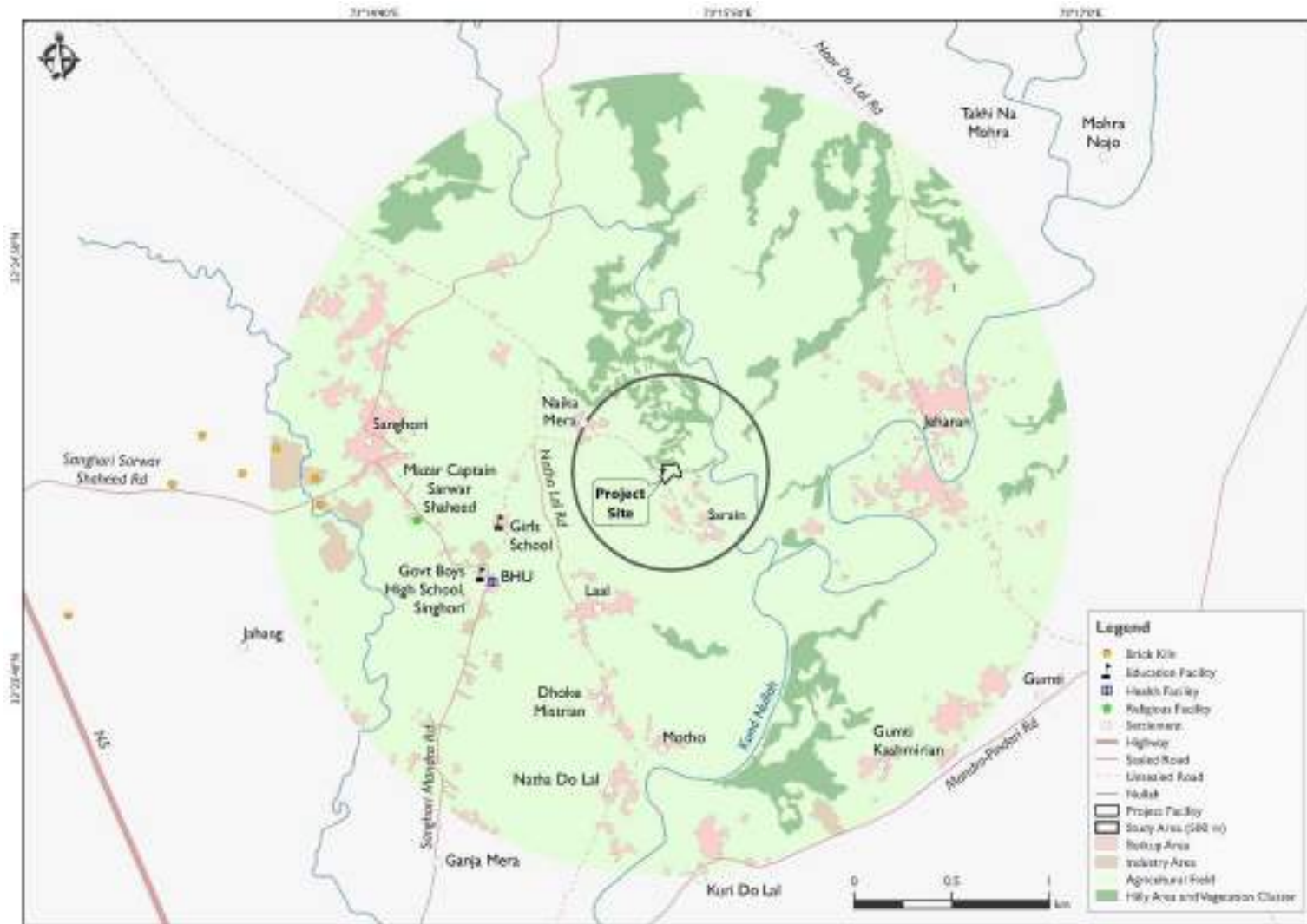


Figure 5-2: Topography of the project area

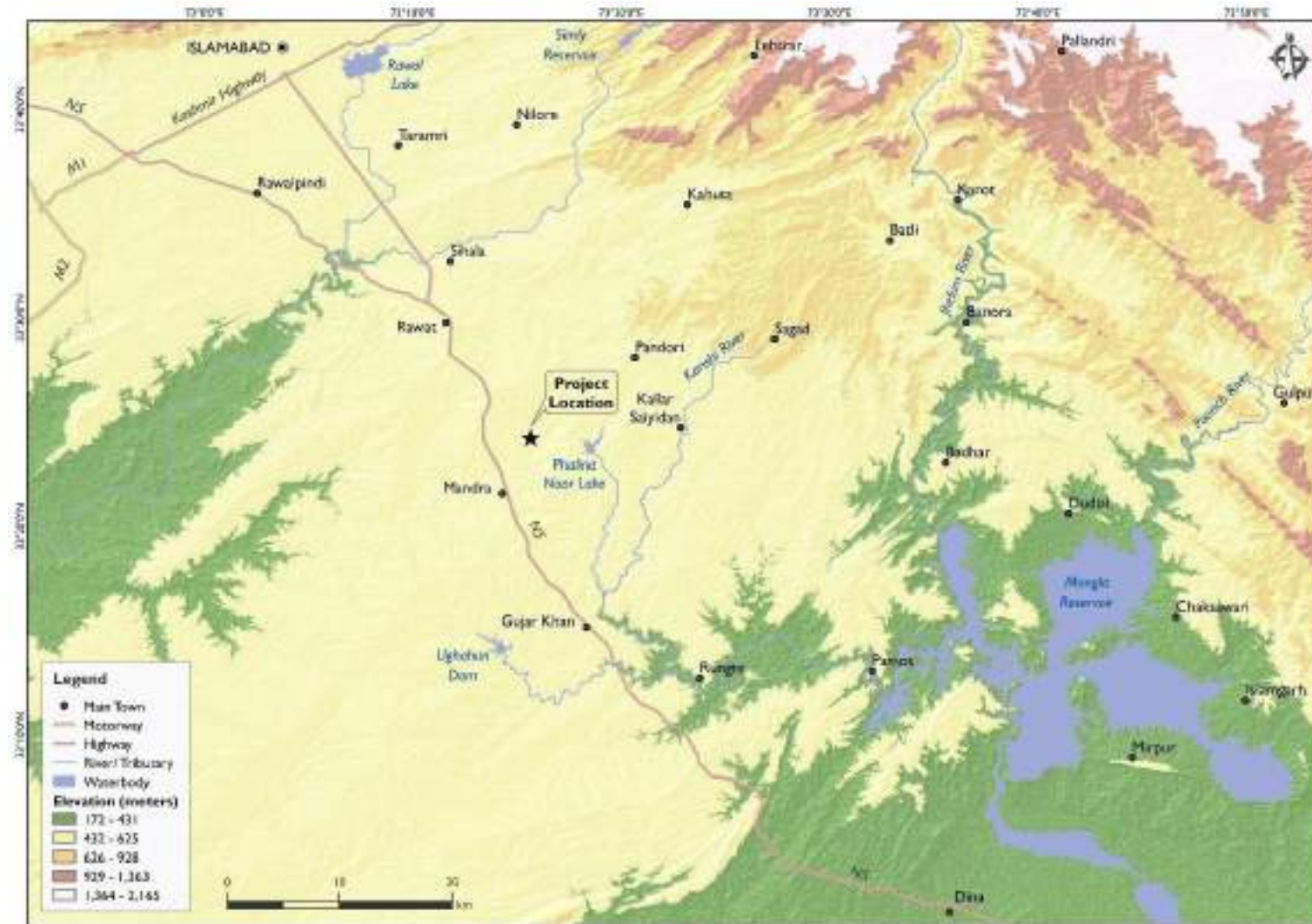
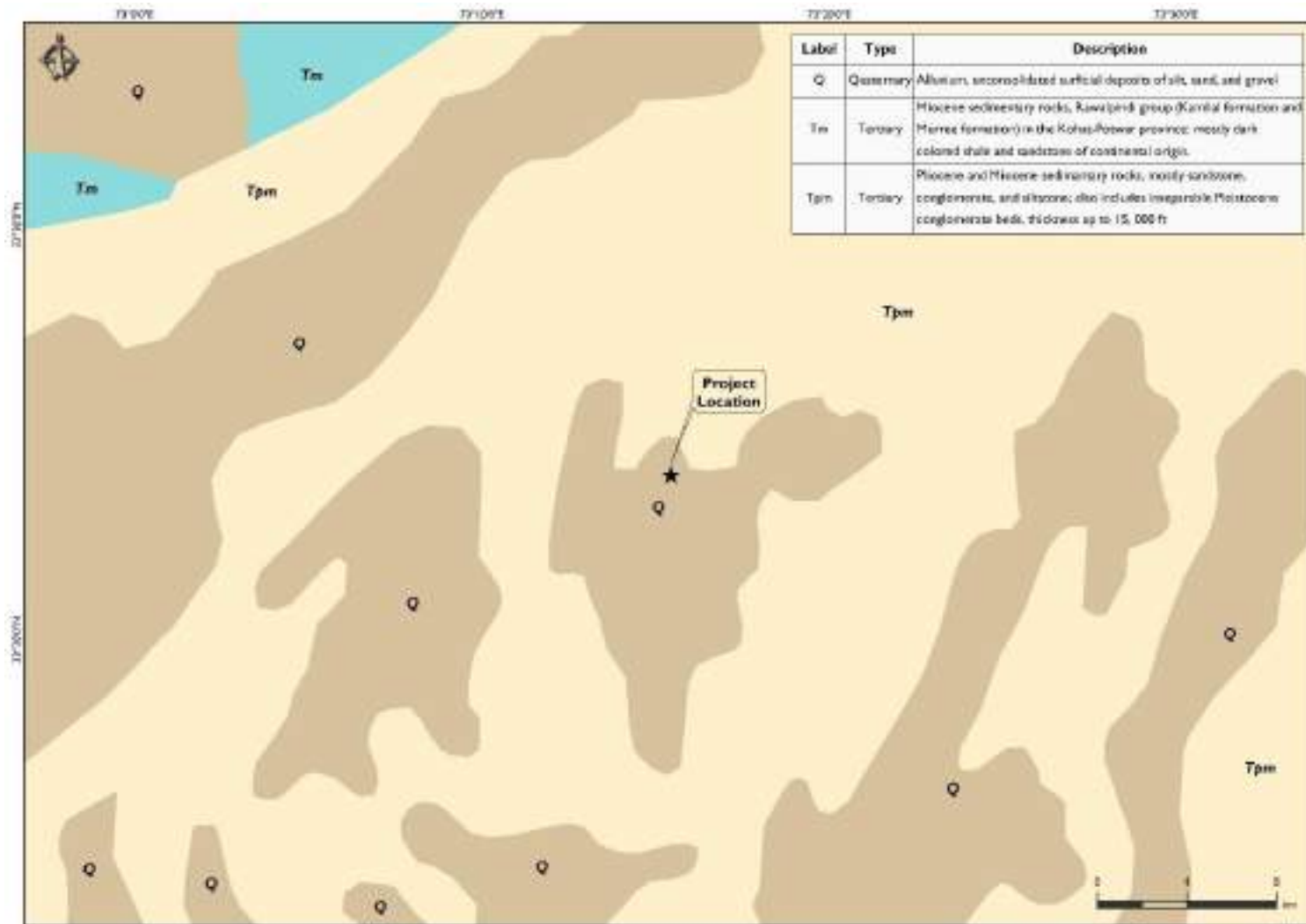


Figure 5-3: Geology of the Project Area



### 5.2.5 Seismicity

In 2007, Pakistan Building Code (PBC) revised the seismic zone categorization to 5 seismic zones based on peak ground acceleration<sup>4</sup> as shown in **Exhibit 5-1**.

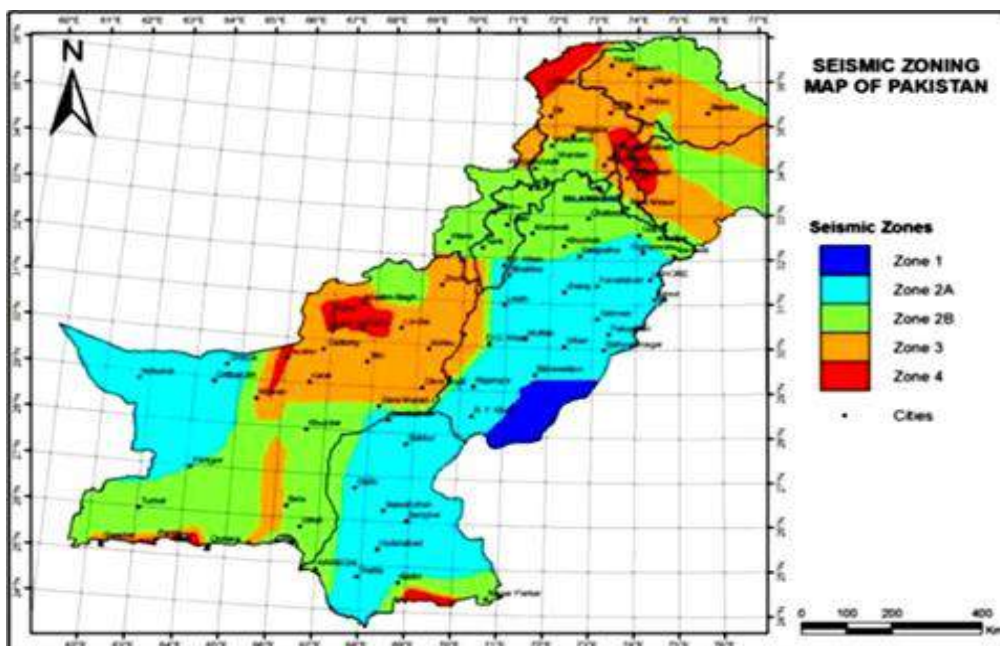
According to this classification, the Project is located in Zone 3.

**Exhibit 5-1: Seismic Zone Categorization, PBC 2007**

Seismic Zone	Peak Horizontal Ground Acceleration
1	0.05 to 0.08g
2A	0.08 to 0.16g
2B	0.16 to 0.24g
3	0.24 to 0.32g
4	> 0.32g

**Note:** g is the acceleration due to gravity, where  $g = 9.81 \text{ m/s}^2$ .

The Global Seismic Hazard Assessment Program (GSHAP)<sup>5</sup> launched in 1992, carried out a seismicity analysis in 1999. The Seismic Hazard Map of Pakistan is shown in **Figure 5-4**. Peak ground acceleration is equal to the maximum ground acceleration that occurred during earthquake shaking at a location. PGA is equal to the amplitude of the largest absolute acceleration recorded on an accelerometer at a site during a particular earthquake.



**Figure 5-4: Seismic Hazard Map**

**Source:** Adapted from Geological survey of Pakistan.

**5.2.6 Climate**

The area falls under the subhumid climate. The climate is cold in winter and hot in summer. The coldest month is January when the mean maximum temperature is 16C and a minimum of 2.7C. The highest temperature may touch the 46C mark.

The monsoons set in July and the rain showers cool the atmosphere. The temperature ranges between 2.7C - 47C degrees and this vast range of 26.6C is responsible for making the climate healthy and bracing.

The maximum and minimum mean temperature during the various months of summer, winter and spring seasons is shown in **Exhibit 5.2:** The normal mean annual temperature of the area from historical data, is shown in **Figure 5-5.**

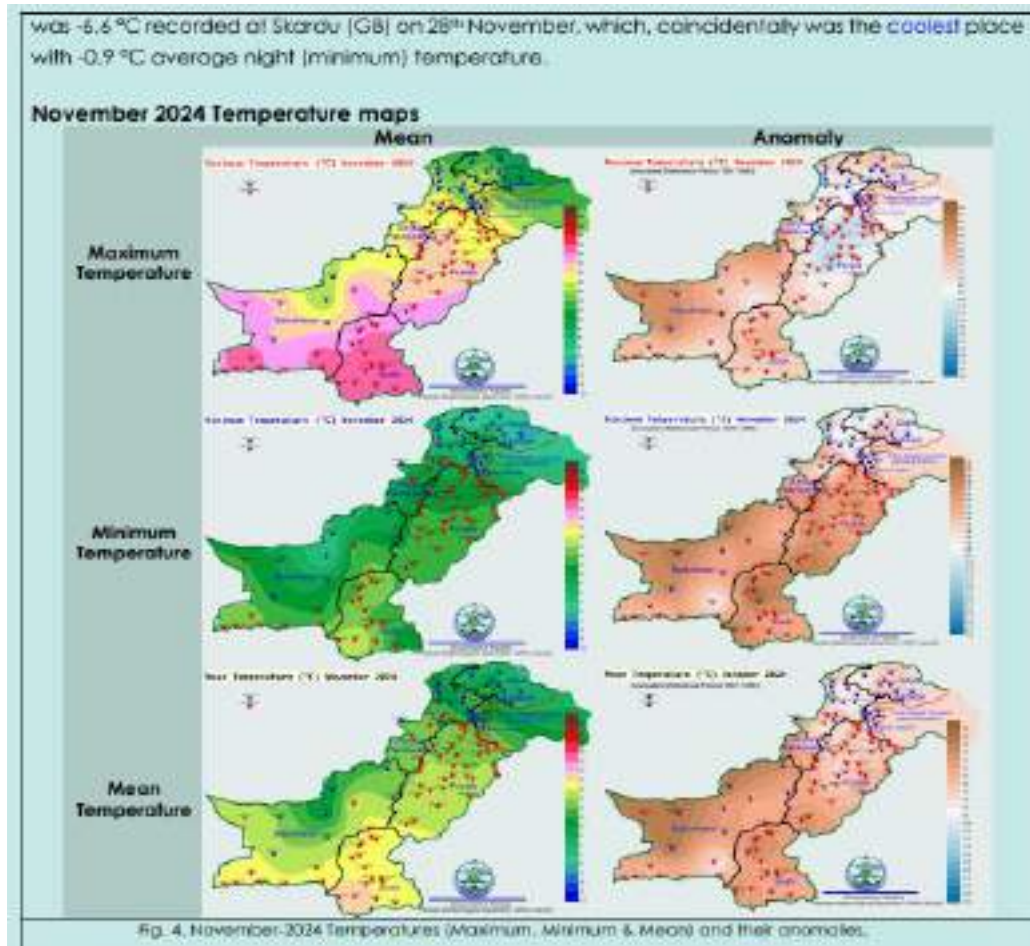
**Exhibit 5-2: Mean Monthly Meteorological Representation of Tehsil Gujjar Khan**

<b>Maximum and Minimum Temperatures (C) of Gujjar Khan</b>			
<b>Season</b>	<b>Maximum</b>	<b>Minimum</b>	<b>Average</b>
Summer	36.4	23.5	30
Winter	23.6	7	15.3
Spring	24.8	12.3	18.6

Source: Meteorological Department.

The hottest month is June, where average highs routinely exceed 36 °C. The wettest month is August, with heavy rainfalls and evening thunderstorms with the possibility of cloudbursts. The coolest month is January with dense fog.

**Figure 5-5: Normal Mean Temperature Map**



**Exhibit 5-3** shows the temperature and rainfall patterns of Gujjar Khan in the year 2016. The lowest temperature was recorded in January, i.e. 15 °C while the hottest temperature was recorded in June, i.e. 36 °C. The lowest rainfall was experienced in November, i.e. 17.8 mm and the highest rainfall was received in August, i.e. 309.9 mm. The normal annual rainfall of the area is shown in **Figure 5-6**.

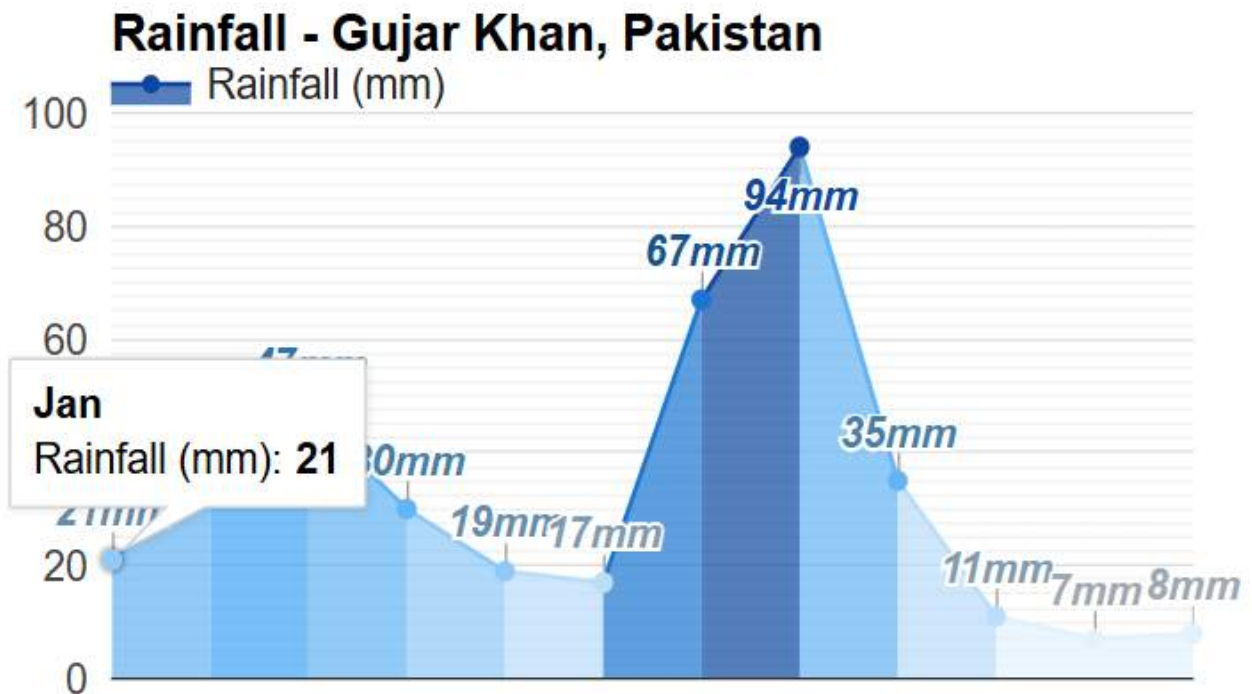
**Exhibit 5-3: Mean Yearly Temperature and Rainfall Representation of Gujjar Khan Tehsil**

Month	Maximum Temperature (°C)	Minimum Temperature (°C)	Rainfall (mm)
Jan	15	5	56.1
Feb	17	7	73.5
March	22	12	89.8

April	29	17	61.8
May	34	22	39.2
June	36	25	62.2
July	32	26	267
Aug	31	25	309.9
Sept	31	22	98.2
Oct	29	16	29.3
Nov	23	10	17.8
Dec	17	6	37.3

Source: <http://www.meteovista.co.uk/Asia/Pakistan/Gujar-Khan/3313125>

Figure 5-6: Normal Rainfall Map



### Average rainfall Gujar Khan, Pakistan

### 5.2.7 Air Quality

There are no major anthropogenic sources in the project area other than brick kilns and cooking stoves in villages. The agricultural land results in windblown dust in dry conditions.

The pollutants selected for evaluation, based on the expected emissions from the Project activities and the level of risk to human health posed by these pollutants, are as follows:

- ☞ Respirable particulate matter—Coarse (PM<sub>10</sub>)<sup>2</sup>, Fine (PM<sub>2.5</sub>)<sup>3</sup>, and Particulate Matter (PM Total)
- ☞ Sulfur dioxide (SO<sub>2</sub>)
- ☞ Ozone (O<sub>3</sub>)
- ☞ Oxides of Nitrogen (NO<sub>x</sub>)—Mainly Nitrogen dioxide (NO<sub>2</sub>) and Nitric oxide (NO)
- ☞ Carbon Monoxide (CO)

The emission analysis of the existing incinerator has been done on quarterly basis. The emissions of CO, NO<sub>x</sub>, SO<sub>2</sub>, PM and metals remain within the PEQS.

Air quality sampling was carried out at one location within the plant where all parameters are found within the PEQS. The purpose was to assess the impact of the air emissions in the nearby surroundings. The results show that the air quality is clean in the area.

#### Exhibit 5-5: Methodology and Duration of Sampling

Parameter	Method/Equipment	Date and Duration of Sampling	Lab for Analysis
CO	Non-Dispersive Infrared Absorption (NDIR)	August 22 and August 23, 2020 1-hour sampling	Environmental Services Pakistan

Parameter	Method/Equipment	Date and Duration of Sampling	Lab for Analysis
		8-hour sampling	
NO and NO <sub>2</sub>	Chemiluminescence Detection	August 22 and August 23, 2020 24-hour sampling	Environmental Services Pakistan
SO <sub>2</sub>	UV Fluorescence (UVF)	August 22 and August 23, 2020 24-hour sampling	Environmental Services Pakistan

<sup>2</sup> PM<sub>10</sub> is particulate matter 10 micrometers or less in diameter

<sup>3</sup> PM<sub>2.5</sub> is particulate matter 2.5 micrometers or less in diameter

O <sub>3</sub>	Non-Dispersive Absorption UV	August 22 and August 23, 2020 1-hour sampling	Environmental Services Pakistan
PM <sub>10</sub> , PM <sub>2.5</sub> and PM Total	Particulate Sensor	August 22 and August 23, 2020 24-hour sampling	Environmental Services Pakistan

### Results and Conclusion

The sampling results are provided in **Exhibit 5-6**. The complete results are given in **Annexure 11**.

### Exhibit 5-6: Summary of 24 hours Air Quality monitoring Results (µg/m<sup>3</sup>)

Sample ID	Limit Values (PEQS)	Concentration
Carbon Monoxide (CO)	10 mg/m <sup>3</sup> (1 hour)	0.5 – 1.0 mg/m <sup>3</sup>
Carbon Monoxide (CO)	5 mg/m <sup>3</sup> (8 hours)	2.07 mg/m <sup>3</sup>
Sulfur Dioxide (SO <sub>2</sub> )	120 µg/m <sup>3</sup> (24 hours)	40 µg/m <sup>3</sup>
Nitrogen oxide (NO)	40 µg/m <sup>3</sup> (24hour)	9.61 µg/m <sup>3</sup>
Oxides of Nitrogen as NO <sub>2</sub>	80 µg/m <sup>3</sup> (24 hours)	32.84 µg/m <sup>3</sup>

From the measured values the following conclusions can be drawn:

All the parameters measured were under the PEQS limits for the respective time of measurement.

### 5.2.8 Noise Level Monitoring

Ambient noise levels were also continuously recorded at the project site of VS Environmental Solutions for 24 hours. The sound pressure level (dB) were frequency weighted on A-curve (dB (A)) and time-weighted (dB (A) L<sub>eq</sub>) on an hourly basis.

The 24-hour monitoring period for noise is divided into two periods, i.e. daytime hours (01: 00pm – 6: 00pm and 05: 00am-12: 00pm) and nighttime hours (06: 00pm – 05: 00am). Since the project site is located near a residential area, therefore, residential area zone standard of PEQS was followed for comparison.

The noise level data for daytime was 41 dB(A) and 37 dB(A) at nighttime. The average sound level was noted as 39 dB (A) for the 24 hours. The PEQS for noise at day time in a residential area is 55 dB (A) and nighttime is 45 dB (A).

**Exhibit 5-7** shows the noise sampling locations. Photographs of the sampling equipment setup are provided in **Figure 5-8**. **Exhibit 5-8** provides the results of the noise monitoring compared with PEQS.

Overall, the noise level meets the PEQ values at the project site.

**Exhibit 5-7: Noise Sampling Locations**

ID	Coordinates	Location	Dates of Survey	Description and Rationale for Selection
N1	33°24'14.27"N 73°15'39.14"E	Project Site, Sarain, Sanghori	January 31, 2026	This point is at the project site and its boundary walls were selected to measure the impact..

**Exhibit 5-8: Noise Results at the Project Site**

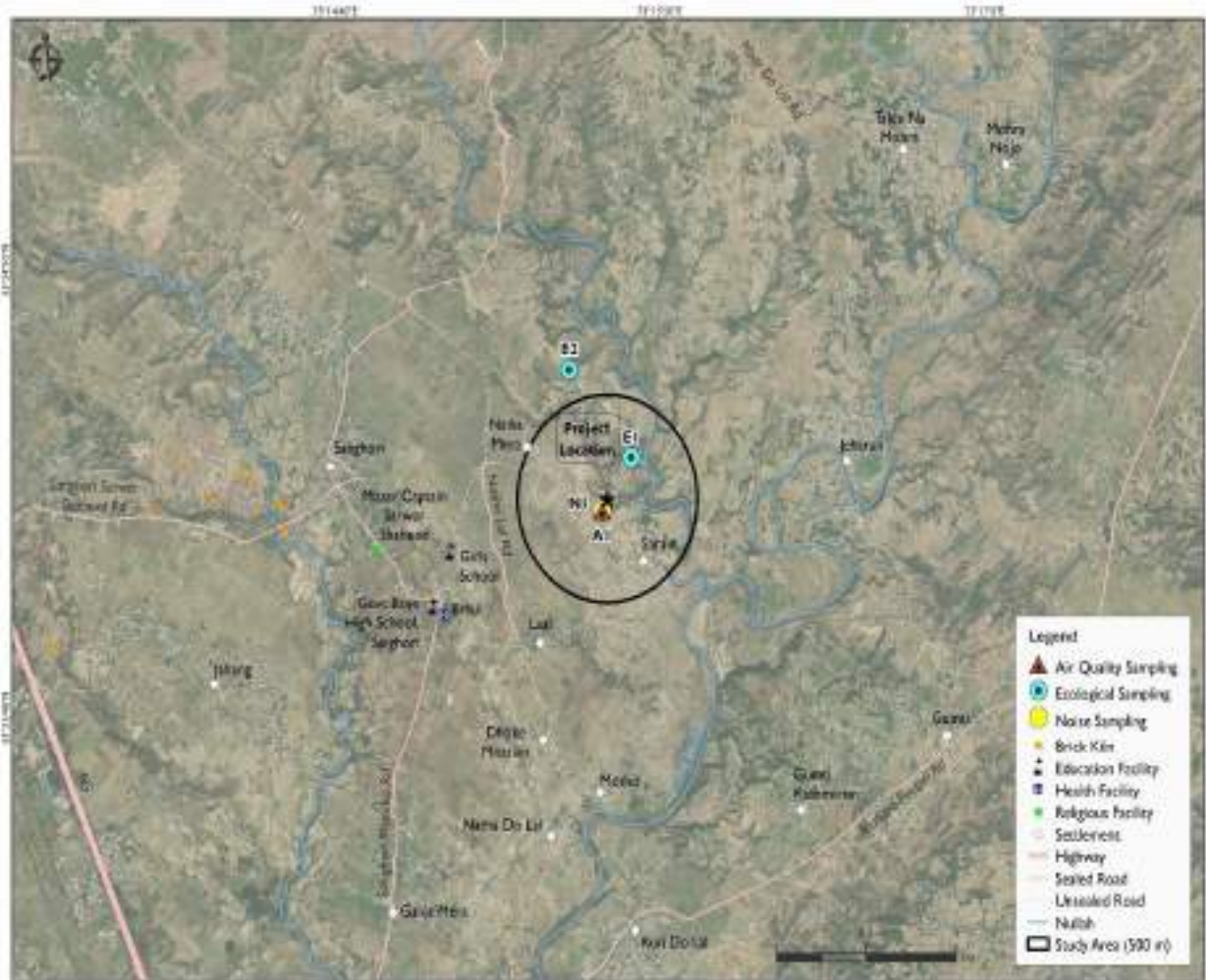
Sr. no	Location	Equivalent Noise level dB(A) / day time
01	Eastern side boundary	60.5
02	Western boundary	57
03	North side	59.4
04	Southern side boundary	
PEQS day time		65

Ambient air quality as recorded by EPA , air quality monitors in Rawalpindi is tabulated below:

**Figure 5-9: Air quality in Rawalpindi**

Date & Time	Dominant AQI	Pollutant	Ozone (µg/m3)	Carbon Monoxide (CO)(mg/m <sup>3</sup> )	Sulfur Dioxide (SO <sub>2</sub> ) (µg/m3)	NO (µg/m3)	Nitrogen Dioxide (NO <sub>x</sub> ) (µg/m3)	
2/8/2026								
0:00	125	PM2.5	3.733	1.731	9.453	109.831	95.775	
2/8/2026								
1:00	141	PM10	5.652	2.59	14.07	177.909	76.703	
2/8/2026								
2:00	163	PM10	5.327	3.099	16.903	208.879	63.516	
2/8/2026								
3:00	293	PM10	6.079	2.764	18.812	218.779	58.367	
2/8/2026								
4:00	311	PM10	5.085	3.168	15.283	251.306	52.192	
2/8/2026								
5:00	176	PM10	5.019	3.097	18.119	239.532	42.212	
2/8/2026								
6:00	337	PM10	5.635	3.386	19.669	252.23	40.38	
2/8/2026								
7:00	160	PM2.5	6.041	3.658	17.672	261.878	38.59	
2/8/2026								
8:00	166	PM10	4.026	3.506	15.499	239.086	33.669	
2/8/2026								
9:00	164	PM2.5	7.965	2.874	11.905	191.832	39.79	
2/8/2026								
10:00	162	PM2.5	23.881	0.975	9.007	18.764	61.952	
2/8/2026								
11:00	154	PM2.5	38.762	0.752	7.127	7.675	53.671	
2/8/2026								
12:00	129	PM2.5	52.324	1.029	4.969	7.154	45.605	
2/8/2026								
13:00	110	PM2.5	55.384	0.742	3.574	7.62	45.176	
2/8/2026								
14:00	87	PM2.5	74.172	0.616	3.467	6.747	37.738	48.06
2/8/2026								
15:00	84	PM2.5	84.515	0.75	3.856	6.068	32.027	41.311
2/8/2026								
16:00	99	PM10	80.677	0.823	2.905	6.764	34.597	44.946
2/8/2026								
17:00	89	PM10	73.329	0.83	3.033	6.687	35.056	45.288
2/8/2026								
18:00	99	PM10	47.82	1.036	3.132	9.518	40.812	55.374
2/8/2026								
19:00	114	PM10	21.629	1.984	3.566	15.756	50.455	74.562
2/8/2026								
20:00	147	PM10	6.923	2.555	5.003	25	49.885	88.135

2/8/2026	21:00	153	PM10	4.808	2.745	8.82	92.249	112.999	254.14
2/8/2026	22:00	189	PM10	4.612	2.97	8.129	85.769	75.253	206.48
2/8/2026	23:00	184	PM10	5.946	4.539	12.864	89.583	51.527	188.59
2/9/2026	0:00	254	PM10	8.095	7.367	25.199	207.83	45.266	363.245



### 5.3 Ecology

The ecology baseline has been prepared to provide an overview of the ecological conditions in the Aol and surroundings. It includes information collected from a literature review and site visits.

The Aol for Ecology is the same as defined in **Section 4.1**.

The areas come into sub-Himalayan foothills, comprising of open scrub evergreen vegetation zone. The climate of mountain peaks like Sakesar, Diljabba, Tret and Kathar is much cooler that receives occasional snowfall during winters (Hameed et al., 2008).

The Potohar region is quite rich in Poaceous flora that is economically very important for providing food for domestic animals and wildlife species, a shelter for many birds and mammals, construction work, hay production and folk medicinal uses (Ahmad et al., 2010)

The soil of the area has developed from wind and water-transported material consisting of loess, old alluvial deposits, mountain outwash and recent stream valley deposits; some are derived from shales and sandstones. The climate is temperate in the northeast to sub-tropical semi-arid in the southwest. Annual rainfall varies from 250 mm in the southern part of the Salt Range to over 1500 mm in Islamabad. Temperature extremes are 45°C in June and often drop below freezing point during January.

#### 5.3.1 Flora

The project site is surrounded by an agriculture field. While the natural vegetation of the area is under high biological pressure, trees and vegetation, only survived along the farmland or trees are present in surrounding villages.

The area is rainfed, hence the irrigation of the crops mostly depends on the rainfall. The local people mostly cultivate, maize, barley, oat and groundnut. The underground water table is 65ft-70ft deep. The community dig wells for drinking water.

In addition to that, the local people keep livestock, include cows, buffalos, goats and sheep, to meet their requirement of meat and milk. they graze their animals in the area and they feed on the available trees and shrubs.

The dominant forest species of the area phulai, shisham, dhab grass and ack, etc. A list of flora is provided in **Exhibit 5-9** and pictures of the site flora is provided in **Figure 5-12**.

**Exhibit 5-9: List of Flora of Project Area**

No	Scientific Name	Local Name	Family	Life Form
1.	<i>Acacia modesta</i>	Phulai	Mimosaceae	Tree

2.	<i>Acacia nilotica</i>	Kikar	Mimosaceae	Tree
3.	<i>Azadirachta indica</i>	Neem	Meliaceae	Tree
4.	<i>Albizia lebbek</i>	Siris	Mimosaceae	Tree
5.	<i>Bombax ceiba</i>	Simal	Bombacaceae	Tree
6.	<i>Dalbergia sissoo</i>	Shisham	Papilionaceae	Tree
7.	<i>Eucalyptus globulus</i>	Sufaida	Myrtaceae	Tree
8.	<i>Eugenia jambolana</i>	Jaman	Myrtaceae	Tree
9.	<i>Ficus benghalensis</i>	Bargad	Moraceae	Tree
10.	<i>Phoenix dactylifera</i>	Khajoor	Palmae	Tree
11.	<i>Ficus elastica</i>	Rubber Plant	Moraceae	Tree
12.	<i>Ficus religiosa</i>	Peepal	Moraceae	Tree
13.	<i>Ficus virgata</i>	Phagwara	Moraceae	Tree
14.	<i>Melia azadirach</i>	Dhrek	Meliaceae	Tree
15.	<i>Moringa oleifera</i>	Sohanjna	Moringaceae	Tree
16.	<i>Morus alba</i>	Shahtoot	Moraceae	Tree
17.	<i>Broussonetia papyrifera</i>	Jungli Toot/ Paper mulberry	Moraceae	Tree
18.	<i>Cassia fistula</i>	Amaltas	Caesalpiaceae	Tree
19.	<i>Populus indicum</i>	Poplar	Salicaceae	Tree
20.	<i>Psidium guajava</i>	Amrood	Myrtaceae	Tree
21.	<i>Zizyphus mauritiana</i>	Ber	Rhamnaceae	Tree
22.	<i>Punica granatum</i>	Anar	Punicaceae	Shrub
23.	<i>Ricinus communis</i>	Harnoli	Euphorbiaceae	Shrub
24.	<i>Calotropis procera</i>	Desi Ack	Asclepiadaceae	Shrub
25.	<i>Canabis sativus</i>	Bhang	Canabaceae	Shrub

26.	<i>Prosopis glandulosa</i>	Devi	Mimosaceae	Shrub
27.	<i>Prosopis juliflora</i>	Ack	Fabaceae	Shrub
28.	<i>Chenopodium album</i>	Bathu	Chenopodiaceae	Herb

**Description of the Environment**

No	Scientific Name	Local Name	Family	Life Form
29.	<i>Chenopodium ambrossioides</i>	Chandan Bathwa	Chenopodiaceae	Herb
30.	<i>Datura innoxia</i>	Dhatura	Solanaceae	Herb
31.	<i>Parthenium hysterophorus</i>	Chitti Booti	Asteraceae	Herb
32.	<i>Salvia moorcroftiana</i>	laphra	Lamiaceae	Herb
33.	<i>Leucas cephalotes</i>	Jungli tumba/ Dronapushpi	Lamiaceae	Herb
34.	<i>Phragmites karka</i>	Narra	Poaceae	Grass
35.	<i>Sorghum helepense</i>	Barru	Poaceae	Grass
36.	<i>Pennisetum orientale,</i>	Oriental fountain grass	Poaceae	Grass
37.	<i>Saccharum spontaneum</i>	kana	Poaceae	Grass
38.	<i>Desmostachya bipinnata</i>	Dhab		Grass

**Figure 5-10: Flora Photographs Near the Project Site**



*Pennisetum orientale*, the oriental fountain grass *Chrysopogon serrulatus*



Saccharum spontaneum



Paper Mulberry



Bakain



Shisham



Bhang

Ack , Keekar

### 5.3.2 Fauna

The main wildlife of the area are jackal, fox, hare, wild boar, grey partridges and black partridges. The ecology of the project area is under huge human pressure. They graze their livestock in the farmland and the animals feed on standing scattered tree species, crop residues and grasses. Hence ecology has become very fragile. Similarly, there is very much hunting pressure on the fauna of the area. The local people are the main hunters and they facilitate the hunting. They usually hunt grey partridges and hares. However, they capture black partridges, which is a very precious bird. The status of black partridges in the IUCN Red List as Vulnerable.

A list of Ave-fauna is provided in **Exhibit 5-10**, a list of mammals is provided in **Exhibit 5.11** and a list of reptiles of the project area is provided in **Exhibit 5.12**.  
**Exhibit 5-10: List of Ave-Fauna of Project Area**

No	Common Name of Birds	Scientific Name	Status		Occurrence				Listing				
1.	Black Drongo	<i>Dicrurus macrocercus</i>		X	X								
2.	Black Kite	<i>Milvus migrans</i>		X	X								II
3.	Brown Hill Warbler	<i>Prinia criniger</i>		X			X						
4.	Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>		X	X								
5.	Collared Dove	<i>Streptopelia decaocto</i>		X		X							
6.	Common Babbler	<i>Turdoides caudatus</i>		X		X							
7.	Common/Indian Myna	<i>Acridotheres tristis</i>		X		X							
8.	Crested lark	<i>Galerida cristata</i>		X		X							
9.	Greater Grey Shrike	<i>Lanius excubitor</i>		X		X							
10.	Grey Partridge	<i>Francolinus pondicerianus</i>		X		x							
11.	Black Partridge	<i>Melanoperdix niger</i>		X				X	X				
12.	House crow	<i>Corvus splendens</i>		X		X							
13.	House Sparrow	<i>Passer domesticus</i>		X		X							
14.	Indian Pond Heron	<i>Ardeola grayii</i>		X		X							
15.	Indian Robin	<i>Saxicoloides fulicata</i>		X	X								
16.	Indian Roller	<i>Coracias benghalensis</i>		X	X								

17.	Indian Tree-Pie	<i>Dendrocitta vagabunda</i>		X	X								
18.	Koel	<i>Eudynamys scolopac</i>		X	X								
19.	Little Grebe	<i>Tachybaptus ruficollis</i>		X	X								
20.	Little Green Beeeater	<i>Merops orientalis</i>		X		X							
21.	Pied Kingfisher	<i>Ceryle rudis</i>		X	X								
22.	Purple Moorhen	<i>Porphyrio porphyrio</i>		X	X								
23.	Little Egret	<i>Egreta gerzetta</i>			X								
24.	Red wattled Lapwing	<i>Hoplopterus indicus</i>		X		X							

No	Common Name of Birds	Scientific Name	Status		Occurrence			Listing			
25.	Red-vented Bulbul	<i>Pycnonotus cafer</i>		X	X						
26.	Rose-ringed Parakeet	<i>Psittacula krameri</i>		X			X				
27.	See see Partridge	<i>Ammoperdix griseogularis</i>		X			X				
28.	White breasted Kingfisher	<i>Halcyon smyrnensis</i>		X	X						
29.	White cheeked Bulbul	<i>Pycnonotus leucogenys</i>		X	X						
30.	Lapwing	<i>Vanellinae</i>		X			X				
31.	Wagtail	<i>Motacila alba</i>		X			X				

**Exhibit 5-11: List of Mammals of Project Area**

No	Common Name of Mammals	Scientific Name	Occurrence			Listing		
1.	Asiatic jackal	<i>Canis aureus</i>		X	X			III
2.	Cape hare	<i>Lepus capensis</i>		X	X			
3.	Common Red Fox	<i>Vulpes vulpes</i>		X	X			III
4.	Five stripped Palm Squirrel	<i>Funambulus pennantii</i>		X	X			
5.	House Mouse	<i>Mus musculus</i>		X	X			
6.	Indian crested Porcupine	<i>Hystrix indica</i>		X	X			

7.	Little Indian Field Mouse	<i>Mus booduga</i>		X	X				
8.	Wild Boar	<i>Sus scrofa</i>		X	X				

**Exhibit 5-12: List of Ave-Fauna of Project Area**

No.	Common Name	Scientific Name	Listing		
			WPO/Act	IUCN	CITES Appendix
1.	Black Rock Agama	<i>Laudakia melanurus</i>			
2.	Dhaman/Rat snake	<i>Ptyas mucosus</i>	X		II
No.	Common Name	Scientific Name	Listing		
			WPO/Act	IUCN	CITES Appendix
3.	Garden Lizard	<i>Calotes versicolor</i>			
4.	Indian Monitor lizard	<i>Varanus bengalensis</i>	X		I
5.	Saw scaled Viper	<i>Echis carinatus pyramidum</i>			

**Fauna of the Project area**





### 5.3.3 Protected Areas/ National Sanctuaries

There is no protected area in the vicinity of the project area.

### 5.3.4 Game Reserves & Wildlife Sanctuaries

No game reserves and wildlife sanctuaries exist in the vicinity of the project area even up to a 5 km distance

### 5.3.5 Conclusion

Based on the above assessment, it can be concluded that the Project is not located in an environmentally sensitive area.

## 5.4 Socioeconomic Environment

This section provides a detailed discussion of the socio-economic and socio-cultural environment of the local community in the project area namely in the Sanghori Area.

This area may get direct positive or negative impacts of the construction of the Project. The project area receptor in a 500m radius is the soil, wild vegetation and some solitary and cluster population.

### 5.4.1 Sarain

**Location:** Sarain is located 450 m away from the project site. Sarain is a village of Tehsil Gujjar Khan, District Rawalpindi, Punjab, Pakistan.

**Demographics:** Sarain comprises of estimated more than 60 households with an estimated population of 450 inhabitants. The average family size is six. Most of the houses are built with good construction material.

**Ethnic Structure:** The major clans residing in Sarain are Raja and Langryal Rajputs. The main language spoken is Punjabi.

**Agriculture:** Sarain has sufficient agricultural land. The crops grown are wheat, maize and peanuts.

**Irrigation:** Agricultural lands are mostly rain-fed. The depth of the water table is 65 ft.

**Livestock and Poultry Development:** Buffaloes and goats are the major livestock that the people of Sarain keep.

**Transport/Communications:** Sarain is accessible from GT Road, so public transport is easily available.

**Education:** There are government and private schools in nearby areas.

**Health Care:** There is a Basic Health Unit in Sanghori village which is used by inhabitants of Sarain.

**Drinking-Water Supply:** There is no water supply system in the village.

**Employment:** People of Sarain have mixed professions. Most of the population is engaged in agriculture, labor and other jobs.

**Cultural Heritage and Archeology:** The population of Sarain is Muslim. There is one mosque in the Sarain.

**Other Facilities:** Sarain has gas and electricity supply. The village has also access to mobile networks.

#### 5.4.2 Naika Mera

**Location:** Naika Mera is located 500 m away from the project site. Naika Mera is a village of Tehsil Gujar Khan, District Rawalpindi, Punjab, Pakistan.

**Demographics:** Naika Mera comprises of estimated more than 30 households with an estimated population of 250 inhabitants. The average family size is six. Most of the houses are built with good construction material.

**Ethnic Structure:** The major clans residing in Naika Mera is Raja. The main language spoken is Punjabi.

**Agriculture:** Naika Mera has sufficient agricultural land. The crops grown are wheat, maize and peanuts.

**Irrigation:** Agricultural lands are mostly rain-fed. The depth of the water table is 65 ft.

**Livestock and Poultry Development:** Buffaloes and goats are the major livestock that the people of Naika Mera keep.

**Transport/Communications:** Naika Mera is accessible from GT Road, so public transport is easily available.

**Education:** There are government and private schools in nearby areas.

**Health Care:** There is a Basic Health Unit in Sanghori village which is used by inhabitants of Naika Mera.

**Drinking-Water Supply:** There is no water supply system in the village.

**Employment:** People of Naika Mera have mixed professions. Most of the population is engaged in agriculture, labor and other jobs.

**Cultural Heritage and Archeology:** The population of Naika Mera is Muslim. There is one mosque in the Naika Mera.

**Other Facilities:** Naika Mera has a gas and electricity supply. The village has also access to mobile networks.

## Chapter 6. Stakeholder Consultation

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### 6.1 Introduction

During the EIA processing, the stakeholders were involved in the public consultation to know their opinions, concerns, issues and suggestions regarding the project.

This chapter provides details of public consultations carried out with the community and stakeholders at different levels.

### 6.2 Approach to Public Consultation

A stakeholder is either an individual, group, or organization who is impacted by the outcome of a project. There are two types of stakeholders, i.e. community and institutions. Firstly, these stakeholders were identified. Then separate consultations have been done with both and their concerns, suggestions and opinions have been recorded on a consultation form. Their concerns, suggestions and opinions are included in the project's potential impacts and mitigation measures are advised for each of the impacts.

The baseline survey for the EIA was planned for collection of baseline data and stakeholder consultations and a basic information document shared with the stakeholders is presented in **Annexure 10**.

### 6.3 Objectives of Consultation

The overall objective of the consultation with the stakeholders is to verify the environmental and social issues that have been presumed to arise and to identify those which are not known or are unique to the project.

The objectives of the public consultation process are:

- ⑥ Provide key project information to the stakeholders and to solicit their views on the project's potential or perceived impacts,
- ⑥ Identification of potential problems and needs,
- ⑥ To devise the way for collaborative problem solving,
- ⑥ Develop and maintain communication links between the project proponents and stakeholders, providing opportunities to the public to influence the project design in a positive manner and
- ⑥ Ensure that the views and concerns of the stakeholders are incorporated into the project design and implementation with the objectives of reducing

or offsetting negative impacts and enhancing the benefits of the proposed project.

### 6.4 Categories of Stakeholders Contacted

Potential stakeholders for consultation and participation were identified and discussions were held with the community living in the project area of impact, pedestrians, vendors and business/shop owners. Moreover, government and private employees, private hospitals and local public representatives were also contacted.

### 6.5 Major Stakeholders Involved

The stakeholders contacted during the survey belonged to different categories of people, as shown in **Exhibit 6.1**.

**Exhibit 6-1: Categories of Stakeholders Interviewed in the Project Area**

No.	Stakeholder Category
1	Proponent
2	The responsible authority (EPA, Rawalpindi)
4	Environmental practitioners and experts
5	The affected and wider community

### 6.6 Scoping Session

During the public consultation process, both primary and secondary stakeholders were consulted. Consultation with the primary stakeholders was in the form of informal meetings and interviews.

The consultation with the secondary stakeholders was formal since most of them are government functionaries or professionals.

During these interviews, a simple, non-technical description of the project was given, along with an overview of the project’s likely impacts on people and the environment. Following the project description, a discussion was held so that people could voice their concerns.

The community was well aware of the project due to their complaints against the operation of this incinerator. People have positive and negative views about the project. The negative and positive impacts were communicated to them.

With the complete combustion process, the stake emissions from the incinerator are found to be within the PEQS limits. On the other hand, some persons gave positive gestures towards the project because they consider that it is driving the

economic or employment circle of the close community. The provision of the services at some level is also in favor of the project. Whereas odor some time emitting from the facility make them offensive.

## **6.7 Issues Discussed**

Following issues were discussed during the stakeholder consultation:

- ⑥ Overall activities of the project and their possible impacts;
- ⑥ Possible impacts on natural vegetation, flora and fauna;
- ⑥ Possible mitigation measures and
- ⑥ Beneficial factors and involvement opportunities of the local people in the set of activities of Project.

## **6.8 Major Stakeholders and their Apprehensions**

Meetings with major stakeholders were organized to discuss project-specific issues and their potential impacts on the local and regional environment.

Most of the meetings were done in person and some of them were made on telephone calls e.g environmental experts. Stakeholders consulted and their valuable suggestions and comments are described hereunder:

**Exhibit 6-2: Stakeholder Consultation**

Date & Time	Name and Designation	Location	Opinions/Concerns/Issues/Suggestions
<b><i>Proponent</i></b>			
30 <sup>th</sup> January, 2026	M. Arslan Khawaja, Director of Vandcor-Spectrum (VS) Environmental Solutions	At proposed site.	<ul style="list-style-type: none"> <li>◆ Hazardous waste including Hospital waste management is very important as hospital waste is infectious and is the cause of the spread of various diseases. The mishandling fo the hazardous waste may lead to the constmination of soil and the sub soil aquifer.</li> <li>◆ VS feels proud that it is destroying the hazardous waste iin a friendly way. He also expressed his efforts which he is making to make the project PEQS compliant. They are providing the employment to the local level. They are also implementing all possible emission control and treatment measures to makr it environment friendly. The project is very beneficial in terms of waste management and also to the local economy.</li> <li>◆ Such types of projects should be initiated by the government and as well as from the private sector.</li> <li>◆ The government should also extend the waste management facilities to cater the municipal sector which has usually 5 % of total waste as hazardous. He emphasized to continue the compliance of all Environmental rules and regulation in the operation of enhanced capacity of the project.</li> </ul>
<b><i>The responsible authority</i></b>			
21 <sup>st</sup> , February 2026	Syed Faisal Maqsood, Deputy Director, EPA Rawalpindi	Telephonic	<ul style="list-style-type: none"> <li>◆ The incinerator technology should comply with the Punjab waste treatment standards.</li> <li>◆</li> </ul>

			<ul style="list-style-type: none"><li>◆ The temperature ranges for incineration and autoclaving should comply with operating conditions of Punjab environmental quality standards for the treatment of liquid and disposal of bio-medical waste by incineration, autoclaving, microwaving and deep burial.</li><li>◆ It's a good initiative as the quantity of hazardous waste is increasing along with the national growth.</li></ul>
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**Stakeholder Consultation**

**Stakeholder  
Consultation**

## 6.9 Consultation with the Communities (Affected and Wider Communities)

The general consultation included community members around the project site to find out their opinion about the project.

During the roadside discussion, the community adjacent to the project site was informed about the salient features of the project, its location and activities.

The following stake holders were consulted during the consultative session.

### List of individual consulted

Sr. No	Name	Designation	Address
1	Fida Hussain	Tailor Master	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi
2	Muhammad Aqib	Dander of vehicles	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi
3	Muhammad Shamrez	Mistari	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi
4	Ali Rizwan	Laborer	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi
5	Muhammad Zeshan	Student	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi
6	Danial Faisal	Student	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi
7	Muhammad Noman	Laborer	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi
8	Muhammad Imran	Laborer	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi
9	Muhammad Saleem	Electrician	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi
10	Mukhtar Ahmad	Laborer	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi
11	Zohaib	Student	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi
12	Muhammad Anees	Employee in hospital	Sarai Capt. Sarwar Shaheed, Sanghori, Rawalpindi

The viewpoints of respondents are as follows:

- The waste treatment/ management facility should be installed away from the community and should not pollute the environment.
- There should be a monitoring system for private hospitals, as well. As sometimes it is observed that private hospital dumps or burn their infectious waste in the open which is very harmful to the environment.
- The community should not be disturbed in any way by the operation of the hospital waste treatment facility.
- Proper plantation should be done along with the hospital waste treatment facility as it may cause smoke or other gaseous emissions.
- The workers at the hospital waste treatment facility should be equipped with PPEs and they should be properly trained for its operation.
- Pre-operative screening of patients for Hepatitis B or C is not performed routinely even if the patient is admitted for the first time.

The actions taken to satisfy the community:

- Good technology of incineration has been chosen.
- The high temperature burning is being conducted to avoid ant dioxin formation.
- Wet scrubbing is being used for discouraging the dioxin formation and Particulate matter control.
- Beg houses / dry scrubbing will also be done in the proposed incinerators.
- The monitoring of stack emissions and waste water is being done regularly to keep eye on the performance of the flue gases of the incinerator.
- Stack of the incinerators will be about 15-20 meter for effective dispersion of the air pollution being released from the combustion process.
- Local labour and operators have been employed.
- Reasonable amount has been spent on EMP.

### **Exhibit 6-3: Pictorial Presentation of Public and Stakeholders Consultation for Project**





**Figure 6-1: Community Consultation Map**

## Chapter 7. Impact Assessment and Mitigation Measures

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This chapter aims to screen potential environmental impacts of the proposed project, discuss views gathered from stakeholders and assess potential impacts and their environmental significance. The chapter also conclusively gives recommendations of mitigation measures that can be used to minimize or possibly eliminate the adverse impacts of the proposed activities.

### 7.1 Environmental Screening of the Proposed Project

To examine the environmental impact of the project, an Environmental Screening Matrix has been developed as part of the present EIA study that focuses on the potential environmental impacts of the project during pre-construction/design, construction and operational phases.

#### 7.1.1 Impact Identification with Matrices

A Matrix has been prepared for the identification of impacts and their associated risks. The Matrix also presents the mitigation measures for the identified impacts and the change in risk after the mitigations have been adopted.

##### *Impact Identification with Matrices*

A Matrix has been prepared for the identification of different environmental impacts and their associated risks or benefits. The Matrix also presents the mitigation measures or environmental enhancement measures for the identified impacts and the change in risk after the mitigation techniques have been adopted.

##### Risk Assessment

<b>NEMS</b>	<b>Stakeholder Consultation</b>
11/22/20	6-10

The risk assessment of the project activities is carried out for all the negative impacts following the basic steps listed below:

- ⑥ Identify the potential impact
- ⑥ Assess the risk
- ⑥ Apply the appropriate measure

Risk is assessed as the likelihood that the activity will have an effect on the environment as well as the consequence of the effect occurring. It is often described as this: Risk = Likelihood X Consequence

The likelihood is further classified and relatively valued into: Certain (5), Likely (4), Possible (3), Unlikely (2), Rare (1)

### Impact Assessment and Mitigation Measures

- ⊗ Certain: Will undoubtedly happen/recur on a frequent basis.
- ⊗ Likely: Will probably happen/recur, but it is not a persisting issue/circumstances.
- ⊗ Possible: Might happen or recur occasionally
- ⊗ Unlikely: Do not expect it to happen/recur but it may do so.
- ⊗ Rare: This will probably never happen/recur.

The consequence is further classified and relatively valued into: Remarkable (5), Major (4), Moderate (3), Minor (2), and Insignificant (1).

- ⊗ *Remarkable*: Impact on a larger area and highly sensitive receptors.
- ⊗ *Major*: Impact on a large area and slightly sensitive receptors.
- ⊗ *Moderate*: Impact on a small area with few receptors.
- ⊗ *Minor*: Impact on a very small area with almost no receptors.
- ⊗ *Insignificant*: Almost no impact.

Based on the classification and values, a risk analysis matrix has been developed and presented in **Exhibit 7.1**.

**Exhibit 7-1: Risk Analysis Matrix**

Likelihood	Consequence and Value				
	Remarkable (5)	Major (4)	Moderate (3)	Minor (2)	Insignificant (1)
Certain (5)	25	20	15	10	5
Likely (4)	20	16	12	8	4
Possible (3)	15	12	9	6	3
Unlikely (2)	10	8	6	4	2
Rare (1)	5	4	3	2	1

Based on the related values in Exhibit 7-1 following risk impact categories are identified.

- ⊗ Extreme Risk (score 20-25): require more intensive mitigation measures
- ⊗ High Risk (score 10-19): Will have a large impact which requires specific mitigations
- ⊗ Medium Risk (score 5-9): Will have a small impact which can be mitigated easily

- ☞ Low Risk (score 1-4): professional judgment

**Impact Assessment and Mitigation Measures**

Positive impacts

Positive impacts are also evaluated in the Matrix using the same methodology; however, a different color scheme is used.

Based on the classification and values, a positive impact analysis matrix has been developed and presented in **Exhibit 7-2**.

**Exhibit 7-2: Positive Impact Analysis Matrix**

Likelihood	Consequence and Value				
	Remarkable (5)	Major (4)	Moderate (3)	Minor (2)	Insignificant (1)
Certain (5)	25	20	15	10	5
Likely (4)	20	16	12	8	4
Possible (3)	15	12	9	6	3
Unlikely (2)	10	8	6	4	2
Rare (1)	5	4	3	2	1

Based on the related values in **Exhibit 7-3** following positive impact categories are identified.

- ☞ Extremely Beneficial (score 20-25): Will add a lot of value to the local environment
- ☞ Highly Beneficial (score 10-19): Will have a large positive impact on the environment
- ☞ Medium (score 5-9): Will have a small positive impact
- ☞ Low (score 1-4): Will not have any significant impact

**Exhibit 7-3: Impact Identification with Matrix**

Project activity	Environmental and Social issues	Risk Assessment			Mitigation Measures for risks/Enhancement measures for positive impacts	Risk Assessment after taking mitigation Measures		
	Waste Effluent Disposal	4	4	16	Waste effluent generated from the septic tank will be treated into the septic tanks and reused for gardening and extra water will be drained into the nearest sewerage line on the site.	3	3	9
Positive impact	Job opportunities	4	4	16	Training will be arranged to hire a local crew for the project.	5	4	20
<b>Operational Phase Impacts</b>								
Operation of pollution control equipment	Air Quality	3	5	15	The Emission Control system in present incinerator is operating very effectively and complying the PEQS. Similarly, the combination of wet and dry scrubbing which will ensure the compliance of the PEQS. Height of chimney will be above 10 meter which will ensure effective dispersion of the air pollutants so that the ambient air quality may not be affected through operation of two new incinerators.	2	4	8
	Safety Hazard, Public Health & Nuisance	4	4	16	Protected fencing around the construction area. The waste will not be piled up to avoid any decay or bad odor problem. The workers will be provided with personal protective equipment to avoid any infection. Regular training will be given on safety and the health issues.	3	3	9

	Noise	4	3	12	Presently there is no issue of the noise due to the operation of this incinerator. However, the new incinerators will be having low noise blowers and fans to reduce noise emission. If necessary protective metal sheets will be affixed round the generators for control of the noise.	3	3	9
	Wastewater	4	3	12	Wastewater is being treated in the waste treatment pit which usually has blow down from the wet scrubber. The ash is settled and water is reused in the wet scrubbing system. The extra water will be used for irrigation.	3	2	6
	Traffic congestion	3	3	9	Maximum 10 mini trucks visit site which contribute minimum traffic addition on the present access road. Addition of 10 more trucks per day will not exert pressure on the present sanghori road. Drivers will be trained for the defensive and best driving practices for usage of the access road for better safety.	2	2	4
	Monitoring	3	3	9				
	Ash disposal/ Solid waste	4	4	16	Ash pit for temporary storage is there. Whereas Local government land fill site will be used for disposal of the ash properly.	3	3	9
Maintenance of treatment Facility	Air Quality	4	4	16	Continuous operation of the wet and dry scrubber will be ensured for compliance of the PEQS. The replacement of bag filters and wet scrubber parts will be made properly for assuring the continuous operation of the emission control system. NO operation will be conducted if the ECS is not being operated. Only gas will be used for lighting up the incinerator. NO charge will be sent into the incinerator unless proper temperature has been achieved.	3	3	9
	Wastewater	3	4	12	Wastewater will be treated and reused and if required will be disposed of in nearest nullah or sewerage line.	2	3	6
<b>Project activity</b>	<b>Environmental and Social issues</b>	<b>Risk Assessment</b>		<b>Mitigation Measures for risks/Enhancement measures for positive impacts</b>		<b>Risk Assessment after taking mitigation Measures</b>		

Positive impact	Employment	4	4	16	Training for locals to increase their chances of recruitment.	5	4	20
	Infection control	4	4	16	Proper management of hazardous and infectious waste will ensure the control of the disease.	5	4	20
	Reduction of waste	4	4	16	Proper use of incineration facility will reduce the quantity of waste up to 70-80 %. By attaining complete combustion at high temperature.	4	5	20
	Business opportunities	4	3	12	Waste Management Facility will give rise to medium scale businesses in the vicinity.	4	4	16

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### 7.1.3 Identification of individual Environmental Impacts

During the environmental impact assessment process, the predicted impacts can be characterized as shown in **Exhibit 7.4**.

**Exhibit 7-4: Impact Identification of Hospital Waste Treatment Facility**

Categories	Definition	Characteristics
Nature	How it impacts the environment	<b>Direct:</b> The environmental parameter is directly changed by the project. <b>Indirect:</b> The environmental parameter changes as a result of a change in another parameter.

Categories	Definition	Characteristics
Type	-	<b>Positive</b> – An impact that benefits the local environment. <b>Negative</b> – An impact that has a negative effect on the environment. <b>Neutral</b> – An impact with no effect on the environment.
Duration of impact	Length of time over which an environmental impact occurs	<b>Short-term:</b> Lasting only for the duration of the project, such as noise from the construction activities. <b>Medium-term:</b> Lasting for a period of few months to a year the project before naturally reverting to the original condition such as loss of vegetation due to the clearing of the construction site, contamination of soil or water by fuels or oil. <b>Long-term:</b> Lasting for a period much greater than medium-term impact before naturally reverting to the original condition such as loss of soil due to soil erosion and air emissions.
Spatial Scale	Area affected by the impact	Local, regional or global
Timing	Phase of the Project	Pre-construction, Construction, and operation
Reversibility of impact	Potential for recovery of the endpoint from a negative impact	<b>Reversible:</b> When a receptor resumes its pre-project condition. <b>Irreversible:</b> When a receptor does not or cannot resume its pre-project condition.

Likelihood of the impact	Probability of the event occurring	<p><b>Certain:</b> Impact expected to occur under most circumstances</p> <p><b>Likely:</b> Impact will probably occur under most circumstances</p> <p><b>Possibly:</b> Impact may possibly occur at some time</p> <p><b>Unlikely:</b> Impact could occur at some time</p> <p><b>Rare:</b> Impact may occur but only under exceptional circumstances</p>
Impact consequence or severity	Gravity or seriousness of the change to the environment	<p><b>Major:</b> When an activity causes irreversible damage to a unique environmental feature; causes a decline in abundance or change in distribution over more than one generation of an entire population of species of flora or fauna; has longterm effects (period of years) on socio-economic activities of significance or regional level.</p> <p><b>Moderate:</b> When an activity causes long-term (period of years), reversible damage to a unique environmental feature; causes reversible damage or change in abundance or distribution over one generation of a population of flora or</p>
<b>Categories</b>	<b>Definition</b>	<b>Characteristics</b>
		<p>fauna; has short-term effects (period of months) on socioeconomic activities of significance on a regional level.</p> <p><b>Minor:</b> When an activity causes short-term (period of few months) reversible damage to an environmental feature; sight reversible damage to a few species of flora or fauna within a population over a short period; has short-term (period of months) effects on socio-economic activities of local significance.</p> <p><b>Negligible:</b> When no measurable damage to the physical, socio-economic, or biological environment above the existing level of public concern; and conformance with legislative of statutory requirements.</p>
Significance of impact	Importance or value of receptor	<p>High, Medium, or Low</p> <p>Based on the consequence, likelihood, reversibility, geographical extent, and duration; the level of public concern; and conformance with legislative of statutory requirements.</p>

Once the impacts are characterized, mitigation measures suited to the cause are also identified to reduce/minimize/eliminate the adverse impacts of the project activities listed. Finally, residual impacts were identified.

The impact characterization of the predicted impacts, mitigation measures and residual impacts are discussed below:

**7.2 Pre-Construction Phase Impacts**

**7.2.1 Project Location**

The impacts associated with the project location are those which relate to its location at the designated site. These impacts are different from those which are associated with the project’s construction and operational phases. The Pre-construction impacts mostly relate to the effect the presence of a facility might have at the selected location.

For the proposed project, the aspect of the project site, land use and design have been considered.

**7.2.2 Design and Land use for Project site**

The facility is located within the outskirts of the city of Rawalpindi. It is purely rural area with a small population. The project is operative at the project site. Now two more incinerators will be added in the same premises. NO change in the land use will be there. Hence impact due to the land use will be nil. The project will not have any impact on demographic patterns and the disruption of social and cultural values. In some cases, resettlement for locals will be inevitable. The socioeconomic impacts of the setting up of the hospital waste treatment facility are observed positive.

The design of the incinerators will be chosen which has two chambers , high temperature burning, automatic feeding, and combustion efficiency more than 99 %. It will also comply the following criteria:

**Emission Standards**

No	Parameters	Standards	
		Limiting concentration in mg/NM <sup>3</sup> unless stated	Sampling Duration in minutes, unless stated
1	Particulate matter	50	30 or 1NM <sup>3</sup> of samples volume, whichever is more
2	Nitrogen Oxides expressed as NO <sup>2</sup>	400	30 for online sampling or grab sample
3	HCL	50	30 or 1NM <sup>3</sup> of samples volume, whichever is more
4	Total Dioxins and Furans	0.1 ng TEQ/N3 (at 11% O <sub>2</sub> )	8 hours or 5NM <sup>3</sup> of sample volume, whichever is more
5	Hg and its compounds	0.05	2 hours or 1NM <sup>3</sup> of samples volume, whichever is more

### **7.3 Construction Phase Impacts**

Various construction activities will inevitably create environmental disturbances, which may have temporary impacts on the physical, biological, and social environment of the area and nearby communities during the construction phase. But in this case construction has already been made and project is in operation. Two incinerators are to be added at the already constructed platforms. Therefore no adverse impact of construction phase is involved in this capacity enhancement case. The fabricated incinerator will be installed by the contractor.

#### **7.3.3 Loss of Vegetation**

NO loss of the vegetation will be involved in this project hence no mitigation is required.

#### **7.3.4 Noise and Vibration**

Due to the movement of heavy machinery and vehicles which will transport the incinerators on different time span, no noise and vibration will be generated. This movement will be for short term and hence minimum impact of the noise and vibration is fore seen.

#### **7.3.5 Sites of Archaeological or Historical Significance**

There is no such archaeological and historical site in the project area.

#### **7.3.6 Solid Waste and Effluent Disposal**

During installation of the two more incinerators will not have generation of solid waste.

#### **7.3.7 Soil Degradation**

No soil degradation fore seen as project is for capacity enhancement on the site which is already in operation.

#### **7.3.8 Water Quality (Surface and Groundwater)**

No construction and no disturbance to the local surface water.

### **7.4 Operational Phase Impacts**

The project is capacity enhancement of the existing facility. 150 kg/hour incinerator is already in operation whereas two more incinerators will add up the air pollution load in the local atmosphere. It can affect the local ecosystem and atmosphere adversely if left unmitigated.

The interaction of hospital waste treatment facility with the various compartment of the environment may result in the following adverse impacts.

- ☉ Air quality deterioration
- ☉ Ash Disposal
- ☉ Wastewater Disposal

## ☞ Safety Hazards, Public Health and Nuisance

Below is the detail of the mitigation measures which will be taken to reduce the impacts of air pollution due to addition of two new incinerators.

### **7.4.1 Air Quality Deterioration**

Incineration of hazardous and infectious waste can pollute the air. The specific concern for this case will be dioxins which are produced by the burning of plastic and polyethylene products. The dioxins are carcinogenic and can affect the healthcare of the facility staff carrying out the waste burning, nearby staff, and communities.

Dioxins that may be formed during incineration in the low-temperature region of the incinerator, do not pose a problem in autoclaves. So, autoclaves will be used for the treatment of plastic and polyethylene products.

#### ***Stack emissions***

Burning of any substance leads to emissions which could be released into the air, and the emissions contain particulates, Sulfur oxides (SO<sub>x</sub>), Nitrogen oxides (NO<sub>x</sub>), Volatile Organic Compounds (VOCs) dioxins/furans and acidic gases.

The particulates generated because of the burning process of infectious waste also contain heavy metals which could cause serious health and environmental impacts.

The gaseous emissions of particulate, less than 10 microns in size, dioxins, furans, sulfuric oxides, and nitrogen oxides which are associated with immediate health and environmental concerns, need to be focused on. However, it is anticipated that the incinerator stack emissions are low, and the incinerator has a 15 m stack height which is enough to disperse and dilute the plume coming out of the incinerator.

Air emissions, because of the incinerator facility, can have major impacts on the local and regional air quality if not controlled properly. These air pollutants could seriously affect human health, vegetation, agriculture, and other entities. If left unattended.

#### ***Mitigation Measures***

In order to ensure a safe and healthy environment, the waste management facility needs to carry out the following measures:

- ☞ The incinerators are specifically designed for hazardous and infectious hospital waste which will be burned.

- ⑥ Properly trained staff will operate the incinerator and autoclaving unit according to standard operating procedures
- ⑥ In order to limit the emissions, the hospital waste treatment facility will be operated and maintained as per the manufacturer's operational manual.
- ⑥ The temperature in the primary chamber will be around 600-800°C, and in the secondary chamber, it will be 1200°C  $\pm$  50°C.
- ⑥ To lessen the health and ecological impacts higher chimney height of the facility (15m) will be designed to minimize the ground level concentration of pollutants.
- ⑥ Latest pollution control equipment has been provided in the incinerator to remove air emissions in order to meet environmental standards.

If properly operated the best air pollution control equipment can potentially remove up to 99% of dioxins and furans, more than 99% of heavy metals, 99% of PM, more than 99% of hydrogen chloride, more than 90% of Sulfur dioxide and up to 65% of Nitrogen Oxides.

- ⑥ Exhaust gas from an incinerator can be forced through a Venturi Scrubber System to remove toxic gases. Scrubbers are used primarily to control acid gases, but they remove some heavy metals as well. Wet scrubbers also reduce the temperature of the flue gases to discourage the dioxin formation.
- ⑥ Primary pollutants emitted from a incineration will be monitored continuously.
- ⑥ Production of Carbon-monoxide (CO) and Hydrogen Chloride (HCl) is directly related to combustion efficiency. Therefore, the optimum conditions must be ensured to prevent their production. The reason could be the incomplete burning of waste overloading of the furnace and insufficient temperature caused by the high moisture content of the waste.
- ⑥ Regular and thorough cleaning of the incinerator, including ash removal is essential for efficient operation. An accumulation of ash/unburnt material/incombustible matter will cause the excessive temperature to be generated and should, therefore, be avoided.

The incinerator will be cleaned, and all ash removed regularly. Free passage of air is essential for combustion as well as for the cooling process. Therefore, the removal of deposits from within as well as underneath the combustion chamber is critical.

**Mitigation Measures to Eliminate Dioxins and Furans:** Dioxins and Furans are regarded as very harmful chemicals which can have serious health effect causing cancer, reducing

Immunity. Dioxins and Furans will not be an issue when the waste is treated through the autoclave. However, in the case when the incinerator is used for treatment, there are several methods practiced to date around the globe which can be broadly categorized as:

- 1) Good combustion practice coupled with the end of pipe wet treatment,
- 2) Selective catalytic reduction/oxidation,
- 3) Low CO production.

Firstly is the homogeneous reactions at temperatures between 773 K (500°C) and 1073 K(800°C) and the main mechanism behind the process is the rearrangement reaction of chlorinated precursors such as Chlorophenols (CP), Chlorobenzenes (CBs) in the gas phase and the Polychlorinated dibenzo-p-dioxins (PCDD/Fs) formed undergoing this process are either called homogeneous PCDD/Fs or high-temperature PCDD/Fs.

The incinerator to be installed will adopt the first method to control dioxins and furans emissions.

Studies have shown [(Mukherjee et .al, 2016) and (Hu, 2010)] that Dioxins and Furans are eliminated when temperatures 850°C to 1000°C with a residence time of 2 s. The temperature in the secondary chamber will achieve a temperature of  $1200 \pm 50^\circ\text{C}$  and have a minimum residence time of 2 seconds.

However, the materials like plastic and polyethylene products will be treated in Autoclave to minimize the chances of production of dioxins and furans.

In cases without air pollution control, PM concentrations in the flue gas can range from 180 to over 4000 mg per dry standard cubic meter, resulting in a very high generation rate, often in the range of **several kilograms per hour**. But the well-operated 500 kg/hr incinerator using Best Available Techniques (BAT), such as baghouse filters or electrostatic precipitators (ESP), PM emissions are extremely low. It will range up to 10 mg/Nm<sup>3</sup> or 0.03kg/hour. The PEQS allows 50 mg/Nm<sup>3</sup> for incinerator. The combined effect of three incinerators will be 30 mg/Nm<sup>3</sup> against the permitted values.

#### ***Residual Impacts of stack emissions***

There will be a moderate level of the residual impact of air contamination associated with the operational activities. The significance of these residual impacts is expected to be low after taking the above-mentioned mitigation measures. The long term monitoring will be conducted to ass the residual and long term impact.

### **7.4.2 Incinerator Ash Disposal**

The ash generated in the incinerators contains a concentration of heavy metals, such as lead, cadmium, mercury, arsenic, copper, and zinc.

The principal environmental concern regarding incinerator ash is that when ash is disposed of in a landfill, the metals and organic compounds can leach and migrate into groundwater or nearby surface water.

In addition to possibly contaminating water supplies, incinerator ash could also affect human health through direct inhalation or ingestion of airborne or settled ash.

The unmitigated impact associated with the residual ash is direct, long term and irreversible.

#### ***Mitigation Measures***

- ⑥ An ash pit will be constructed in the vicinity of the hospital waste treatment facility as a part of the project where the ash residue will be buried deep. Approximately 2kg of ash will be produced on burning 100 Kg of waste per hour. About 20 Kg of ash is expected to be generated if this facility operates on full capacity.
- ⑥ The ash pit will be constructed of concrete lining and will be watertight so that no water enters the ashpit. This will ensure that soil and groundwater are not contaminated.
- ⑥ Ash produced by the proposed incinerator will be collected in ash bins which will be conveyed to the ash pit for its final disposal.
- ⑥ Bottom ash and fly ash are often managed together and referred to as “Combined ash”. Incinerator ash is usually disposed of in a Hazardous Waste (HW) landfill or an ash-only landfill known as an Ash Mono fill.
- ⑥ Ash Mono fill is specially designed to reduce the ability of heavy metals to migrate from the ash into the environment. Mono fill is often co-located with hospital waste incinerators or existing landfills to reduce transportation distances and sitting difficulties.
- ⑥ If the ash has to be landfilled, it can be stabilized and solidified by encasing in concrete before disposal, thereby significantly reducing the potential for the contaminant to migrate.

#### ***Residual Impact***

The above measures will reduce the magnitude of the adverse impacts on the environment. The significance of the residual impacts on air quality is expected to be low.

### **7.4.3 solid waste disposal**

The inert waste collected along with the hazardous waste will be segregated and sent to the Rawalpindi waste management Company. Similarly the recycle waste

will be sent to the recycling market e.g tins, cans , metals , papers and card boards etc.

#### **7.4.4 Wastewater Disposal**

During operation, wastewater will be generated from the scrubber and few quantities of wastewater will also be generated from the autoclave unit. The wastewater will be treated in an on-site wastewater treatment facility and the treated water within PEQS limits will be disposed of in the nearby nullah.

The unmitigated impact associated with the Wastewater disposal on the area may be direct long term and irreversible.

##### *Mitigation Measures*

- ⑥ The wastewater generated will be treated in an on-site wastewater treatment facility.
- ⑥ The wastewater treatment facility and associated water channels will be properly lined to minimize any leakages.
- ⑥ It will be ensured that the wastewater being released from the facility will be within PEQS limits.
- ⑥ NOC from local authorities will be taken for disposal of the wastewater into local waste streams.

#### **7.4.5 Public Health and Safety Hazards**

The proposed project is for the sake of handling hazardous and infectious waste. There will be infectious waste storage. The treatment facility could lead to major health and environmental impacts if not handled and supervised properly.

The workers who are in direct contact with the infectious waste could be affected if the personal safety measures are not ensured.

The health hazards for staff are by far the most significant potential risk associated with the facility operation.

Safety hazards in the facilities are generally associated with the handling of sharps (needles, cutters), gases, and other similar equipment. Open burning of hospital waste also poses safety risks for the staff carrying out this activity. These hazards include the risk of cuts, pricks, gas poisoning, burning, and other bodily injuries.

##### ***Measures and Mitigation***

In order to ensure a safe and healthy environment, the infectious hospital waste storage facility needs to carry out the following measures:

- ⑥ The infection control protocol <sup>4</sup> of MNCH program will be strictly implemented to minimize health risks for the staff and patients.

- ⊗ Proper management of hazardous waste can minimize the risks both within and outside healthcare facilities. The first priority is to segregate wastes, preferably at the point of generation, into reusable and non-reusable, infectious and noninfectious components.

Other important steps are the institution of a sharps management system, waste reduction, avoidance of infectious substances whenever possible. Ensuring worker safety, providing secure methods of waste collection and transportation, and installing safe treatment and disposal mechanisms.

- ⊗ Strict compliance with the procedures specified in the Punjab Hospital Waste Management Rules of 2014 (and other similar standards), in close coordination with the infection control protocol mentioned above.
- ⊗ Infectious Hospital waste will be incinerated and autoclaved on a daily basis, if not, the infectious hospital waste will not be stored for more than 24 hours.
- ⊗ The infectious waste storage facility will be marked properly, and unauthorized persons will not be allowed there.
- ⊗ While dealing with the storage facility, workers will wear personal protective equipment like a gas mask, gloves, safety shoes, etc.
- ⊗ Housekeeping around and inside the hospital waste treatment facility area will be ensured
- ⊗ Vaccination of the staff, particularly for Hepatitis A and B and tetanus.
- ⊗ It will be ensured that a reliable and safe drinking water source is available at the facility. Water will be periodically tested against the national standards for drinking water.
- ⊗ Thick/puncture resistant plastic bags to collect Hospital Waste and rigid/puncture-proof boxes to dispose of needles/other sharps will be used.
- ⊗ Accidental events will be reported and recorded to avoid future accidents

### **Residual Impacts**

There will be a moderate level of the residual impact of safety hazards associated with the operational activities.

The residual public health and nuisance issues will be quite negligible after the effective implementation of the mitigation measures.

### **7.4.6 Soil Contamination**

The soil may be contaminated as a consequence of hazardous and infectious waste (solid as well as liquid) and ash disposal at the project site. Improper wastewater disposal at the healthcare facility can also contaminate the soil.

The unmitigated impacts of hospital waste treatment facility operation on the soil of the area may be long term and irreversible.

### **Mitigation Measures**

- ⑥ All the infectious waste will be segregated and stored in separate rooms where the 4 - 8°C temperature will be maintained.
- ⑥ Fly ash and other incineration residuals will be disposed of at Ashpit.
- ⑥ Autoclaved waste will be disposed of in the designated disposal site by RWMC.
- ⑥ Oils and grease from moving machine parts and other sources will be handled as hazardous wastes.

### **Residual Impacts**

The residual impacts after the implementation of the above-mentioned mitigation measures will be negligible.

## **7.5 Positive Impacts of the Project (Potential Environment Enhancement Measures)**

The project will greatly enhance the environment as it will destroy hazardous and infectious waste produced near its vicinity.

### **7.5.1 Reduction of Waste**

Incineration process is one of the best hazardous waste management methods. Two of the primary advantages of incineration is that:

- ⑥ Waste volumes are reduced by an estimated of 80-95%.
- ⑥ The need for land and landfill space is greatly reduced. For urban areas, this can be especially important, as urban land is often at a premium.

### **7.5.2 Socio-Economical benefits**

Incineration is a practical method of disposal of waste that saves a lot of money on the transport of waste to landfills and thus also the carbon footprint that such transport leaves behind. The sheer reduction in the space required to dispose of the 10 percent of waste that it does produce relieves pressure on land, which in urban areas can constitute a big saving.

### **7.5.3 Business Opportunity**

With the startup of operation of hospital waste treatment facility, business opportunities in the area will be enhanced thus, boosting up the local economy.

The project being a private facility will be able to accept waste from other private facilities in the project area to the hospital waste treatment facility and will charge for the service. For this purpose, local transportation company and workers will be consulted, this way, the proposed project will be a good source of business opportunity in the area.

#### **7.5.4 Infection Control**

The installation of the hospital waste treatment facility is a very important step towards the infection control program which aims to control the infectious diseases caused by inappropriate disposal of infectious hospital waste. Hospitals are important sites for the generation of infectious waste. Healthcare waste includes infectious, chemical, expired pharmaceutical and radioactive items and sharps. These items can be pathogenic and environmentally adverse. They are referred to as infectious healthcare waste or hospital waste. Incinerator burns all the infectious hospital waste and autoclave disinfect the waste and hence reduces the spread of infectious diseases.

#### **7.5.5 Employment**

The operation of the hospital waste treatment facility will improve the employment opportunities in the project area. It is anticipated that the local community will get direct or indirect employment due to the project. Employment will have a positive impact on the local economy.

For the operation, supervision and maintenance of the hospital waste treatment facility, skilled staff is needed. In this way, the local community could get job opportunities.

## **Chapter 8. Environmental Management Plan**

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The objective of the Environmental Management Plan (EMP) is to address all the major environmental issues and provide framework for the implementation of the proposed mitigation measures during the construction and operational phases of the proposed project. The proper implementation of the EMP will ensure that all the adverse environmental impacts identified in the EIA 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. The implementation of EMP should be carefully coordinated with the design and construction program of the project to ensure that relevant mitigation measures are implemented at the appropriate stage and that adequate resources are properly allocated to achieve the desired results. This EMP has been prepared to satisfy the requirement of the Pakistan Initial Environmental Examination and Environmental Impact Assessment Review Procedures, 2000 revised in 2016 for proposed project.

For effective environmental management, the Client should assign the necessary responsibilities to Environmental personnel, which should be responsible for Environmental Monitoring of the proposed Project.

### **8.1 Objectives of EMP**

The EMP 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 EMP has been prepared with the objectives of:

- Defining roles and responsibilities of the project proponent for the implementation of EMP 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 by the EIA;

- Developing a monitoring mechanism and identifying requisite monitoring parameters to confirm effectiveness of the mitigation measures recommended in the EIA; and satisfy the regulatory framework of PEPA 1997 and its allied rules and regulation.
- Defining the requirements for communication within EPA and the proponent, documentation, training and monitoring, management and implementation of the mitigation measures.

EMP is prepared for all the identified environmental impacts during the installation and operation phases of this capacity building project. The EMP will be included in all bid documents of the Project and will become a part of the EPC (Engineering, Procurement and Construction) works contract. The strict implementation of the EMP and project management's strict enforcement of adequate construction practices and standards will greatly reduce the negative impacts of the Project.

The EMP contains a description of proposed mitigation actions along with:

- ⑥ Schedule for implementation and Environmental budget.
- ⑥ Environmental Management Team along with their Roles and responsibilities.
- ⑥ A proposed monitoring program to assess the performance or output of EMP.
- ⑥ Proposed EMP reporting and reviewing procedures
- ⑥ Any training needs to be required to ensure the implementation of EMP and Monitoring plans

## **8.2 Management Approach/ Institutional Capacity**

### **8.2.1 Pre-Construction and Construction Phase**

The organizational roles and responsibilities are summarized below:

#### **a) Vandcor-Spectrum Environmental Solutions**

The top management of the Owner / Vandcor-Spectrum (VS) Environmental Solutions will be ultimately responsible to ensure that the EMMP (Environmental Management and Monitoring Plan) is implemented. They will carry out verification checks to ensure that the contractors are effectively implementing their environmental and social requirements. For this purpose, VS Environmental Solutions will develop and maintain internal institutional capacity for environmental management.

#### **b) Site Engineer**

VS Environmental Solutions will engage a contractor to carry out civil works and installation of the incinerators. The site engineer of the contractor will carry out field activities as part of their contract agreement. The site engineer will be responsible for implementing various mitigation actions prescribed in the EIA report relevant to the contract. He will also be subject to certain liabilities under the environmental laws of Punjab/Pakistan.

### **c) EP&CCD Punjab**

The Environmental Protection and Climate Change Department, Government of Punjab, will periodically visit the project site to monitor the compliance of environmental protection measures detailed in the EIA report.

#### ***Organizational Structure and Responsibilities***

The organizational structure for the construction phase EMP is described as follows:

**Primary Responsibilities:** The primary responsibilities for the environmental performance of the project proponent, VS Environmental Solutions, will be assumed by their respective highest-ranking officers during the installation and operation phase.

The Project coordinator will be responsible for the compliance with the EMP of the project. The project coordinator will be responsible for monitoring and ensuring the implementation of the EMP and EIA of the project.

**Environmental Monitoring:** VS Environmental solutions will make necessary arrangements to monitor the key environmental data during the installation and operation phase.

These will include a quantity of water used, a record of waste produced, a record of waste disposal and project-related vehicular traffic. Emissions of the incinerators and generators

### **8.2.2 Operation Phase**

During the operational phase of the project, environmental management will become a routine function.

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### **a) Vandcor-Spectrum Environmental Solutions**

The overall responsibility of operation lies with Vandcor-Spectrum (VS) Environmental Solutions will also be responsible for supervising the installation , commissioning and operation.

#### **8.3 Legislation and Guidelines**

The EIA of VS Environmental Solutions waste management facility Facility has discussed provincial, national and international legislation and relevant guidelines. The VS Environmental Solutions will ensure that his staff and civil work contractor are aware of this legislation and guidelines before the start of the project activities.

The Punjab Environmental Protection Act, 1997 (Amended 2012) is the basic environmental legislation in Punjab. The act also requires that no person shall emit pollutants or noise in amount, concentration or level that exceeds the Punjab Environmental Quality Standards (PEQS). The PEQS will be followed throughout the construction and operational phases of the project. Moreover, the smog prevention Rules 2023 will also be considered for effective EMP.the administrative orders issued by the Director General EPA Punjab from time to time will also be considered e.g. uploading of monitoring reports on EPD website, installation of CCTV cameras, keeping 5 colored waste bins ets.

#### **8.4 Approvals**

Sustainable Environmental Solutions (SES) will obtain environmental approvals from the Environment Protection and Climate Change Department, Government of Punjab.

#### **8.5 Environmental Mitigation Matrix**

An Environmental Management Matrix has been developed, which is given in Exhibit 8-1.

This Environmental mitigation matrix provides details about potential environmental impacts, where the impact will happen, where the impact will occur, mitigation measures, responsibility and parameters for monitoring.

**Exhibit 8-1: Environmental Mitigation Matrix for VS Environmental Solutions Hospital Waste Treatment Facility**

Potential Environmental Impact	Impact Location	Impact time	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
<b>Construction and installation Phase</b>						

Potential Environmental Impact	Impact Location	Impact time	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
			<ul style="list-style-type: none"> <li>◆ Waste oils (if any) will be collected in drums and sold to the recycling contractor.</li> <li>◆ Solid waste will not be disposed of in the open, and on-site burning of solid waste will be not allowed.</li> <li>◆ Waste bins/containers of different colors will be placed at appropriate locations.</li> <li>◆ The recyclable waste from the project site (such as cardboard, drums, broken/used parts, etc.) will be used as appropriate or to be sold to a recycling contractor.</li> </ul>	VS environmental Solutions	Same	cleanliness

			◆			
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Potential Environmental Impact	Impact Location	Impact time	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
			<ul style="list-style-type: none"> <li>◆ The measures to enhance natural vegetation in the area will benefit the area's fauna as well.</li> <li>◆ The movement of construction machinery and equipment will be restricted to work areas only to avoid necessary disturbance of the wildlife.</li> </ul>			

Noise and Vibration	At the project site	Construction of campsite and buildings	<ul style="list-style-type: none"> <li>◆ Construction equipment and machinery will have exhaust mufflers (silencers) to minimize noise generation.</li> <li>◆ Noise construction activities will be carried out only during normal working hours.</li> <li>◆ It will be ensured that generators, vehicles and other potentially noisy equipment used are in good condition.</li> <li>◆ The use of pressure horns will not be allowed inside the site premises.</li> <li>◆ Nighttime traffic and construction activities will be avoided.</li> </ul>	Contractor	M/s VS Environmental Solutions.	Noise Monitoring
Health and Safety of the workforce	At the project site	Construction of campsite and buildings	<ul style="list-style-type: none"> <li>◆ All occupational and health and safety requirements for the workforce will be adhered to.</li> </ul>	Contractor	M/s VS Environmental Solutions.	Health and Safety Environment Report

Environmental Management Plan

Potential Environmental Impact	Impact Location	Impact time	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
Site Restoration	At the project site	Upon completion of installation activities	<ul style="list-style-type: none"> <li>◆ More plantation will be done.</li> </ul>	Contractor	M/s VS Environmental Solutions.	Plantation cover
Operational Phase						
Soil Contamination	At waste management facility	During Operation and maintenance period	<ul style="list-style-type: none"> <li>◆ Fly ash and other incineration residuals will not be disposed of on land but rather be disposed of in Ashpit</li> <li>◆ Oils and grease from moving machine parts and other sources will be handled as hazardous wastes in accordance with regulations of hazardous waste regulation.</li> </ul>	Operator	M/s VS Environmental Solutions.	Soil

Air Quality Deterioration (Stack Emissions)	At hospital waste treatment facility	During Operation and maintenance period	<ul style="list-style-type: none"> <li>◆ Duly trained staff of VS Environmental Solutions will operate the incinerator and autoclave in accordance with standard operating procedures</li> <li>◆ The temperature in the primary chamber of the incinerator will be kept around 600-800°C, and in the secondary chamber, should be 1200°C ± 50°C.</li> </ul>	NEMS	M/s VS Environmental Solutions.	Bi-annual Stake emission monitoring report
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Potential Environmental Impact	Impact Location	Impact time	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
			<ul style="list-style-type: none"> <li>◆ Regular and thorough cleaning of the incinerator, including ash removal is essential for efficient operation.</li> <li>◆ An accumulation of ash/unburnt material/incombustible matter will cause the excessive temperature to be generated and should, therefore, be avoided.</li> <li>◆ The incinerator will be cleaned, and all ash removed regularly. Free passage of air is essential for combustion as well as for the cooling process. Therefore, the removal of deposits from within as well as underneath the combustion chamber is critical.</li> </ul>			

Public Health and Safety hazards	At waste management facility	During Operation and maintenance period	<ul style="list-style-type: none"> <li>◆ The infection control protocol will be strictly implemented to minimize health risks for the staff and patients.</li> <li>◆ Proper management of hazardous and hospital waste can minimize the risks both within and outside healthcare facilities.</li> <li>◆ Strict compliance with the procedures specified in the Punjab Hospital Waste Management Rules of 2014 (and other</li> </ul>	operator	M/s VS Environmental Solutions.	Public Health and Safety Hazard
Potential Environmental Impact	Impact Location	Impact time	Mitigation Measures	Responsibility		Parameters for Monitoring
				Implementation	Supervision	
			<p>Similar standards), in close coordination with the infection control protocols mentioned above.</p> <ul style="list-style-type: none"> <li>◆ Infectious Hospital waste will be incinerated on a daily basis, if not, the infectious hospital waste (yellow bag) will not be stored for more than 24 hours</li> <li>◆ The infectious waste storage facility will be marked properly, and unauthorized personals will not be allowed there.</li> <li>◆ While dealing with the storage facility, workers will wear personal protective equipment like masks, gloves, safety shoes, etc.</li> </ul>			

			<ul style="list-style-type: none"><li>◆ Housekeeping around and inside the hospital waste treatment facility area will be ensured</li><li>◆ Vaccination of the staff, particularly for Hepatitis A and B and tetanus.</li><li>◆ Thick/puncture resistant plastic bags to collect Hospital Waste and rigid/puncture proof boxes to dispose of needles/other sharps will be used.</li></ul>		
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### 8.6 Environmental Monitoring Plan

Environmental monitoring is a vital component of an EMP. It is the mechanism through which the effectiveness of the EMP is gauged. The feedback provided by environmental monitoring is instrumental in identifying any problems and planning corrective actions.

Environmental Monitoring is normally undertaken during both the construction and operational phases of the project to ensure the effectiveness of the proposed mitigation measures.

In order to respond to unanticipated environmental concerns at an early stage and to determine the accuracy of impact, predictions are also required. Specific monitoring programs are outlined below as well as responsibilities for the collection and analysis of data and the reporting requirements.

The various purposes of the environmental monitoring plan are:

- ⊗ To evaluate the effectiveness of mitigation measures.
- ⊗ To respond to the unanticipated environmental impacts when the project is under implementation.
- ⊗ To make regulations and improve management and environmental controls based on the monitoring data. Environmental Protection Department, Punjab is entrusted with the overall responsibility of monitoring the environment in Punjab.

An Environmental Monitoring Plan for VS Environmental Solutions Hospital Waste Treatment Facility has been provided in **Exhibit 8-2**. The plan will be used as a management and monitoring tool for the implementation of the mitigation measures required by the EIA. The plan entails the required mitigation measures recommended in the EIA. **Exhibit 8-2: Environmental Monitoring Plan for VS Environmental Solutions Waste Management Facility**

Environmental Component	Project Phase	Parameters	Locations	Frequency	Standards
Construction Phase					
Air Quality	installation	SO <sub>2</sub> , NO, NO <sub>2</sub> , O <sub>3</sub> , SPM, PM <sub>10</sub> , PM <sub>2.5</sub> , Pb and CO	At one location in VS Environmental Solutions, the Project site	PM <sub>10</sub> , for continuous 8 hours, quarterly	PEQS
Noise Levels	Installation	dB (A)	At a central location in VS Environmental Solutions, the Project site	Twice in 8 hours at a selected site quarterly.	EPA Ambient Noise standards

Environmental Component	Project Phase	Parameters	Locations	Frequency	Standards	In
Operational Phase						

Plantation	Operation (First three years)	Visual inspection of plant species survival rate and status of maintenance	At sites where the plantation was carried out	(1) 2.5 years after plantation	75% survival rate	Pr C
Stack Emissions	Operation (First three years)	Particulate matter, Nitrogen Oxides expressed as NO <sub>2</sub> , HCL, Hg and its compounds, Total Dioxins and Furans	Incinerator Stack	Quarterly	PEQS	Pr M
Wastewater Quality	Operation (First three years)	As per PEQS for effluents	Effluent wastewater at point of disposal to the local waste stream	Quarterly	PEQS	Pr M

**Key:**

**dBA** =decibels (measured in the audible range)

**EPA** =Environmental Protection Authority

**PM<sup>10</sup>** =Particulate Matter smaller than about 10 micrometers

**ROW** = Right-of-Way

**PEQS** =Punjab Environmental Quality Standards

**SPM** =Suspended Particulate Matter

**TSS** =Total Suspended Solids

**USEPA** = United States Environmental Protection Agency

**WHO** =World Health Organization

**NEMS**

11/22/20

**Environmental Management Plan**

8-17

**Exhibit 8-3** shows the estimated cost for the EMP.

**Exhibit 8-3: Estimated Cost for the Implementation of Environmental Monitoring Plan for VS Environmental Solutions Waste Management Facility**

Environmental Monitoring Activities	Units/ No. of Samples per year	Unit specification	Cost (Rs)
<b>Installation and Operation Phase</b>			
Ambient air quality monitoring on quarterly basis	4	@ 50,000 per sample for 24 hr monitoring	200,000
Ambient water quality monitoring Quarterly basis on one location for 0.5 years	4	@ 50,000 per sample	200,000
Noise levels, quarterly basis on the boundary line of the project and in the nearest receptor population.	4	@ 10,000 per sample	40,000
Environment , Health and Safety Specialist/third-party environmental consultant visit	2 Visits per year @ 50,000		100,000
Biannual Stack Emission Monitoring quarterly basis for project life.	4	@ 60,000 per sample	240,000
Waste water testing on quarterly basis	4	25000/	100,000/
<b>Grand Total Rs.</b>			<b>880,000</b>

**Source:** Market rates survey from EPA certified Labs.

### 8.7 Reporting and Feedback Mechanism

The VS Environmental Solutions Contractor will prepare a 'Construction Management Plan' (CMP) demonstrating the manner in which they will comply with the requirements of mitigation measures proposed in the EMP of the EIA report. The CMP will form the part of the contract documents and will be used as monitoring tool for compliance. Violation of the compliance requirements will be treated as non-compliance leading to the corrections or otherwise imposing a penalty on the contractors.

VS Environmental Solutions Contractor, through the environmental specialist on its team, will prepare periodic status reports on the EMP implementation. Such reports will carry information on the main types of activities carried out within the reporting period, the status of any clearances/permits/licenses which are required for carrying out such activities, mitigation measures applied, and any environmental issues emerged in relations with suppliers, local authorities, affected communities. Environmental reports will be prepared on a bi-monthly basis during construction and quarterly during operation.

### **8.7.1 Meetings**

An effective mechanism to communicate and record environmental information during the Project is an essential requirement of an EMP.

Two kinds of environmental meetings will take place during the project:

- ☉ Kick-off meetings
- ☉ Fortnightly meetings

The purpose of the kick-off meeting will be to present the EMP to Project staff and discuss its implementation.

### **8.7.2 Change-Record Register**

A change-record register will be maintained at the site, in order to document any changes in EMP and procedures related to changes in the project design, construction plan or external environmental changes affecting the EMP. These changes will be handled through the change management mechanism discussed later in this section.

## **8.8 Change Management**

An environmental assessment of the proposed project has been made based on the project description available at the time the EIA was conducted. However, changes in the project design may be required when the project is implemented. This section provides the mechanism that will be put in place to manage changes that might affect the project's environmental impact.

Any change in the EMP, design or technology will be communicated to EPA. The EPA will review the change management statement and communicate if there are any concerns. If EPA agrees with the assessment of VS Environmental Solutions, it does not have to send a formal approval. Seven days after submission of the change management statement, the change will be implemented unless a communication to the contrary has been received from EPA, Punjab.

## 8.9 Environmental Training

Training programs are a necessary agenda that has to be implemented to implement the Environmental Management and Monitoring Plan effectively. The Environment, Health and Safety Officer will impart training to the contractor's staff. The key objective of the training program is to ensure that the requirement of EMP is clearly understood and followed throughout the project. The training shall cover the following areas:

- ⑥ Environmental sensitivity of the project operation.
- ⑥ EMP communication and documentation requirement.
- ⑥ Use of personal protective equipment's (PPEs)
- ⑥ Environmentally compliance through effective operation of the pollution control.
- ⑥ Regular maintenance of the bag filters and wet scrubber.
- ⑥ Vehicular safety.
- ⑥ Solid Waste segregation and Disposal
- ⑥ Maintenance of 5 color waste bins.

Operator will be primarily responsible for providing training to all project personnel. Framework for the environmental and social training program is being provided in Exhibit 8-4.

## 8.10 Frameworks for Key EMP-Related Plans

Frameworks of the key additional plans, based on the specifics of the Project that will need to be developed and utilized in conjunction to the EMP provided above, are as follows:

### 8.10.1 Solid Waste Management Plan

**Construction Phase:** the construction phase has already been completed, therefore, there will be minimum solid waste generation during the installation phase. Several solid waste bins will be placed at the construction site for the collection of solid waste.

The civil work contractor will be responsible for the disposal of solid waste generated by the project.

Empty wrappings, packing's, iron cuttings, etc. will be collected separately at the project site within an area marked as "Scrap Yard". After a suitable time frame, scrap will be sold to a recycling contractor.

The construction waste generated will be recycled to the extent possible. Open burning of solid waste will not be allowed.

**Operational Phase:** Two categories of solid waste will be generated by the waste management facility,

- ⑥ **Municipal Solid Waste:** The municipal solid waste generated will be dumped at the designated waste storage area from where the municipal committee will collect it.
- ⑥ **Ash residue:** The ash produced will be collected in ash bins, and it will be buried in the Ash pit.

### 8.10.2 HSE Management Plan

- ⑥ Health Safety and Environment (HSE) induction/orientation will be provided to all workforce at the project site.
- ⑥ Assembly point will be established for the gathering of workforce regarding daily HSE Toolbox Talk at the project site.
- ⑥ HSE Toolbox Meeting will be held by HSE Manager on a weekly basis.
- ⑥ Special education sessions will be conducted properly at the project site.
- ⑥ The daily walkthrough will be conducted at the project site.
- ⑥ All the Mandatory PPE's (Safety Helmet, Safety Jacket, Safety Shoes, Coverall, Full body Harness, Safety Goggles, Earplug, Earmuff, Dust mask/Special, Safety Gloves, Masks etc.).
- ⑥ Proper and safe scaffolding will be provided at the site for safe work at height.
- ⑥ Inspection and Tagging system will be maintained at the project site.
- ⑥ Safety signage will be provided at the project site.
- ⑥ Fire posts will be established at the project site at easy approach location.
- ⑥ HSE Signboard will be installed at the project site for emergency response.
- ⑥ Regular First Aid Center, along with all required medicines 24/7, will be available at the project site.

The civil work contractor will develop his HSE policy, roles and responsibilities of HSE

Manager and staff. It also provides information about HSE objectives, Personal Protective Equipment (PPE's) to be used at the site, first aid training and communication and documentation regarding HSE.

- ⑥ **First Aid Boxes:** First aid boxes will be provided at the construction sites to cope up the emergency situations. Usually, a typical first aid box mainly contains antibiotics, basic medicines, cotton, bandages, sunny plast, healing balms, pyodine, spirit, painkiller, etc.

- ⑥ **PPEs:** Site Engineer and HSE Manager will be responsible for providing PPEs to all workers.
- ⑥ **Safety Signs:** Relevant safety signboards will be displayed on the worksites to make aware / train workers about safety rules. Mainly safety signs include signs of speed limits, electric spark, etc.
- ⑥ **TBTs:** Tool Box Talks (TBTs) will be delivered on a regular basis and when a new team of workers start a new activity like shuttering, steel fixing, steel cutting, steel bending, scaffolding, concrete pouring, mechanical works, electrical works, etc. at sites to promote safety culture.
- ⑥ **Barricading:** The contractor will put up barricade tape at all the active work sites. Hard barricading (scaffolding pipes) will be used to cover exposed areas where excavation is more than 10 feet.
- ⑥ **Training:** Safety training will be delivered by the HSE Manager to achieve its objectives. Training will be conducted for capacity building of employees / workers / labour / sub-contractors to make them well effective to respond in any kind of emergency situation.

The breakup cost for the safety of workers is described in **Exhibit 8-5**.

### **8.10.3 Traffic Management and Construction Material Transportation Plan**

- ⑥ Sarwar shaheed road will be used for all kind of transportation to and from the waste management facility.
- ⑥ About 20 mini trucks are expected to be plying on this road during operation phase of the project.
- ⑥ No notable impact on the traffic congestion will be there due to these additional mini trucks.
- ⑥ 10 km/hr speed limited will be maintained at the project site.
- ⑥ All the light vehicles cars, jeep etc. are being parked in a designated area.
- ⑥ Speed breakers will be followed properly.
- ⑥ The experienced and license holders (drivers and operators) will be hired for transportation.
- ⑥ All the heavy machinery will be checked properly and inspected on a regular basis.
- ⑥ Speed limit signboards have been installed at the project site.
- ⑥ All the headlights, backlights, Indicator etc. of vehicles and machines will be checked and maintained regularly.
- ⑥ All the warning light, reverse back alarms will be maintained properly.

#### **8.10.4 Emergency Preparedness, Response and Site Evacuation Plan**

- ⑥ The contractor will always be ready for response in any kind of emergency at the project site.
- ⑥ Special assembly points will be established at the project site (offices and site).
- ⑥ The emergency siren will be installed at assembly points.
- ⑥ Contact numbers of emergency response team will be circulated at the project site.
- ⑥ Close coordination will be carried out with 1122 in the case of any serious injury/accident.
- ⑥ Close coordination will be carried out with all law enforcement agencies (police) in case of an aggressive mob of people in the shape of any kind of protest.
- ⑥ Emergency response drill will be carried out once in a month for provision of awareness to the workforce at the project site.
- ⑥ First Aid Box will be available at the project site around the clock.
- ⑥ Experienced and qualified paramedic staff will be available at First Aid Post at the site under the command of HSE Manager.
- ⑥ All the new entrants will be oriented by HSE Manager regarding the required awareness towards the infectious and risky situation and control.
- ⑥ The entire workforce will be provided with the all mandatory PPEs for the riskfree environment.
- ⑥ Special in-house training (TBT) will be conducted by the HSE Manager regarding the awareness towards any emergency condition and control.
- ⑥ Proper water sprinkling will be carried out at service road along with the project site for dust control to avoid any hazardous and risky situation which a cause of transport emergency can be.

#### **8.10.5 Fire Fighting Plan**

The construction site will be equipped with fire extinguishers as well as communication equipment for contacting the appropriate emergency response teams.

At all the project site, emergency alarms will be installed. Persons will be nominated to ring the emergency alarm in case of an emergency situation or any emergency risk.

All the workers will be trained and well communicated how to respond to the emergency alarm and reach the assembly point immediately. Workers will be trained to respond to an emergency alarm, as discussed below:

- ☞ If the alarm rings for 20 seconds, only once, then it is a less severe emergency;
- ☞ If it rings for 20 seconds thrice after intervals, then it is medium to a severe high emergency, but it can be much severe; and
- ☞ If it rings for 60 seconds or more continuously, then the emergency situation is most difficult so, everyone should respond to it immediately, evacuate the workplace and move towards the assembly point.

Proper evacuation routes will be designated, nominated and well communicated to all. All the workers will be trained to follow the particular evacuation routes and reach the assembly point in case of an emergency situation.

**8.10.6 Plantation Plan**

A proper plantation plan has been prepared keeping in view the native species of Potohar region of Rawalpindi.

The plantation plan recommends planting 100 mature plants having 4-5 feet height and 1.0 to 1.5 inches stem diameter at the VS Environmental Solutions.

The VS Environmental Solutions will ensure the provision of staff and budget for the implementation of the plantation plan.

The practice of plantation of mature plants will be an effective compensation for carbon sequestration against the expected damages to the environment during the operational phase. The plantation of recommended indigenous species will be carried out at a distance 8 feet having a distance of 8-10 feet among rows in case of multiple rows.

The plantation of recommended indigenous species will be carried out at a distance 8 feet having a distance of 8-10 feet among rows (in case of multiple rows).

The plantation plan consists of trees, shrubs and flowering plants which are recommended for VS Environmental Solutions.

**Trees (20 ft. and above):** A total of 10 trees comprising of shady, flowering, fruit trees have been recommended for plantation at VS Environmental Solutions.

**Exhibit 8-6: Recommended Trees for VS Environmental Solutions Waste Management Facility**

No	Botanical Name	Description	Estimated Cost	Unit
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1	Azadirachta indica	Commonly known as neem it has medicinal value	300
2	Bombax ceiba	A deciduous tree with a straight tall trunk	200
3	Cassia fistula	Known as the golden rain tree.	250
4	Eugenia jambolana	Commonly known as Jamun	250
5	Mangifera indica	A fruiting plant which can easily be grown in a semiarid climate	500
6	Moringa oleifera	Native to the Indian subcontinent is quite adaptable to the harsh climate	500
7	Psidium guajava	An evergreen shrub or small tree	200
8	Albizia lebbek	Siris tree is a very fast-growing deciduous tree with an open, large, spreading crown	150
9	Bauhinia variegata	Semi-deciduous tree to 15 m (50 ft) tall, with a spreading crown	150
10	Ficus religiosa	<i>F. religiosa</i> is a fast-growing, small tree	500

**Flowering Plants:** Flowering plants having positive psychological effects have been planted at VS Environmental Solutions and same will be continued to be added.

### Exhibit 8-7: Recommended Flowering Plants for VS Environmental Solutions Waste management Facility

No	Scientific Name	Description
1	Meri gold	An evergreen flowering vine
2	Petunia	An evergreen flowering vine
3	Pansy	An evergreen flowering vine
4	Calendula	An evergreen flowering vine
5	Nausturcium	An evergreen flowering vine
6	Rose	Perennial flowering plant

#### **Plantation Plan Cost**

A total number of 100 trees will be planted. The cost of plantation does not include equipment cost. The procurement of 100 trees will cost around Rs. 40,000.

#### **8.10.7 Restoration and Rehabilitation Plan**

The project is the capacity enhancement of the existing 150 kg/hour incinerator. Therefore no rehabilitation is involved. However, the following measures will be adopted for site restoration and rehabilitation:

- ☞ More local and indigenous plants will be planted for beatification of the site.

#### **8.10.8 Grievance Redress Mechanism**

Timely and effective redress of stakeholder grievances contributes to bringing sustainability to the operations of a project. In particular, it will help advocate the process of forming and strengthening relationships between project management and the stakeholder community groups and bridge any gaps to create a common understanding, providing Project management the 'social license' to operate in the area. The grievance redress mechanism developed for the Project will help achieve the objectives of sustainability and cooperation by dealing with the environmental and social issues of the Project.

The purpose of the Grievance Redress Mechanism is to ensure that complaints from Project affected communities and representatives of their interests are dealt with appropriately, with corrective actions being implemented where needed and the complainants were informed of the outcome. For this purpose, management of VS Environmental Solutions will establish a Grievance Redress Committee (GRC) to ensure grievances are treated without prejudice. The constitution of the GRC and its responsibilities can be defined in the Stakeholder Engagement Plan.

#### **8.10.9 Project Monitoring**

The proponent will make necessary arrangements to monitor the key environmental data during the installation and operational phases for the whole life

of the project. These will include the emission testing, waste water testing, quantity of water used, a record of waste produced, a record of waste disposal and project-related vehicular traffic, submission of monitoring reports to the EPA on quarterly basis.

The Project proponent and operator will monitor project activities while working in the project area. He will keep a record of all non-conformance observed and will be put before the management for rectification. The project consultant will also report any impacts anticipated from these non-confirmations along with his recommendations for further action.

#### **8.10.10 Equipment Maintenance Detail**

The incinerators and generators will be regularly maintained. Proper logbooks will be maintained in which record of the equipment, its working and inspection schedule will be noted.

#### **8.10.11 Quarterly Environmental Monitoring Report**

The VS Environmental solutions is already conducting quarterly environmental monitoring. The consultant or the proponent will prepare a Quarterly Environmental Monitoring Report of project activities carried out during the specified period waste management facility Project.

VS Environmental Solutions will submit the Quarterly Environmental Monitoring Report of the project to Environmental Protection Agency, Rawalpindi and Lahore, Government of Punjab.

#### **8.10.12 Post Project Monitoring**

The Director of VS Environmental Solutions or his representative shall prepare a brief post-project report describing the conduct of the actual operation, any changes from the operation for which approval was obtained, the degree to which the Recommendations of the EIA were adhered to, any damages to the environment and the mitigation or compensation provided and monitoring information of scientific or environmental interest that is not propriety in nature. This report should be submitted to the Environmental Protection Department, Government of Punjab in conformation to the conditions of the NOC issued by the EPA.

#### **8.11 Environmental Budget**

The cost required to implement the mitigation measures effectively is important for the sustainability of the project both in the construction and operational phases of the Project.

The cost of bag filters, wet scrubber, ash pit and water treatment and recycling unit has already been added to the project cost. The summary of the cost of monitoring environment and mitigation cost is shown in **Exhibit 8-8**.

#### **Exhibit 8-8: Summary of Environmental Budget**

<b>Environmental Monitoring Activities</b>	<b>Units/ No. of Samples per year</b>	<b>Unit specification</b>	<b>Cost (Rs)</b>
<b>Installation and Operation Phase</b>			
Ambient air quality monitoring on quarterly basis	4	@ 50,000 per sample for 24 hr monitoring	200,000
Ambient water quality monitoring Quarterly basis on one location for 0.5 years	4	@ 50,000 per sample	200,000
Noise levels, quarterly basis on the boundary line of the project and in the nearest receptor population.	4	@ 10,000 per sample	40,000
Environment , Health and Safety Specialist/third-party environmental consultant visit	2 Visits per year @ 50,000		100,000
Biannual Stack Emission Monitoring quarterly basis for project life.	4	@ 60,000 per sample	240,000
Waste water testing on quarterly basis	4	25000/	100,000/
<b>Grand Total Rs. Per year</b>			<b>880,000</b>

## Chapter 9. Conclusion and Recommendations

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### 9.1 Introduction

This chapter presents the assessment of the possible environmental impacts of capacity enhancement of Vandcor-Spectrum (VS) Environmental Solutions Waste management Facility. The addition of two 500 kg/hour capacity incinerators at the present project site will insert additional pressure of air pollutants in the local atmosphere. The study presents the purpose of the EIA as to the description of the site, the impact of the project during and after implementation, the mitigation measures and residual impacts.

The EIA also includes the justification and detailed description of the project, with an evaluation of the potential impacts and effects on the environment, including economic and social consequences, mitigation measures to be taken to mitigate the impact. This chapter describes the conclusion and recommendation of the EIA study of the project.

### 9.2 Conclusions

The major conclusions of the EIA are:

- ⑥ The objective of the project is to enhance the capacity of the existing waste incineration facility where hazardous and infectious waste is treated and incinerator.
- ⑥ The project consists of installation, commissioning and operation of two more incinerators with total capacity of 1150 kg/hr incineration and 400 litter capacity of autoclave unit.
- ⑥ VS Environmental Solutions waste management facility will be carried out by the trained operating staff of VS Environmental Solutions.
- ⑥ There will be a wastewater treatment plant. The water used for the operational purpose will be treated in the wastewater treatment facility. The wastewater will be reused on the wet scrubber or used for irrigation purpose.
- ⑥ No potential impacts during the construction phase are foreseen as the site is operative already and no land clearance is required.
- ⑥ The significant environmental management issues during operational phase include air pollution, sewage disposal, solid waste and noise pollutions and ash disposal.
- ⑥ The project operational activities can potentially affect the community of the area. These adverse impacts can be largely reduced by implementing the appropriate mitigation measures, which has been discussed in this report.

- ⑥ There will be some positive social and economic aspects of the project in form of employment and improvement in per capita income and alleviation of education and health status.
- ⑥ The mitigation measures have been identified for impacts expected during the different phases of the project.
- ⑥ The capacity building of the present waste incineration facility will improve the hospital waste apathetic situation in the Rawalpindi division. The hazardous and infectious waste which is not collected at present will be collected and incinerated. A survey indicated that while roughly 1,564 kg of infectious and hazardous waste is generated daily by hospitals in the area, only about half is properly incinerated whereas rest is gone to the junk yards.
- ⑥ Similarly industrial solid waste will also be collected and incinerated.
- ⑥ Based on the recommended mitigation measures in **chapter 7**, the impacts identified will be reduced with residual impacts having insignificant levels.

### 9.3 Recommendations

A plantation plan has been proposed in the EIA report, which will be developed and implemented for the hospital waste management facility Project.

Air quality monitoring should be done as proposed in this EIA report.

The operators and waste collectors working at the waste management facility site should wear proper PPEs and should be trained properly for their safety and proper operation of the incinerator and autoclave.

The combustion efficiency of the incinerators should be 100 percent as prescribed in the EPA standards for bio waste incineration.

Heat recovery system from incinerator and autoclave should be explored to reuse the heat energy.

Reuse of wastewater after treatment will be explored and applied to the extent possible.

On the basis of the overall impact assessment, more specifically, nature and magnitude of the residual environmental impacts identified during present EIA, it is concluded that Project, Capacity Enhancement of Vandcor-Spectrum (VS) Environmental Solutions Waste management Facility, is likely to cause environmental impacts mainly during its operational phase. However, these impacts can be mitigated by the implementation of proposed mitigation measures. VS Environmental Solutions management will ensure the effective implementation of mitigation measures.

There are no remaining issues that warrant further investigation. This EIA is considered adequate for the environmental and social justification of the project.

## Annexure 1: Glossary

<b>Air pollution</b>	Air is a composition of several gases, mostly nitrogen and oxygen and smaller amounts of water vapour, carbon dioxide, argon and other trace gases. Air pollution occurs when harmful chemicals and particles are emitted to the air – due to human activity or natural forces – at a concentration that interferes with human health or welfare or that harms the environment in other ways.
<b>Ambient air quality</b>	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.
<b>Anatomical Waste</b>	Anatomical waste is a subtype of pathological waste, materials that are recognizably human or animal body parts, such as an amputated limb.
<b>Archaeology</b>	The study of human history and prehistory through the excavation of sites and the analysis of artefacts and other physical remains.
<b>Biodiversity</b>	The variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable.
<b>Bye-law</b>	A rule made by a local authority to govern activities within the area it controls. Examples include bye-laws covering waste disposal, traffic or public events or signs.
<b>Carbon dioxide (CO<sub>2</sub>)</b>	A colourless gas that is naturally produced by animals and people in the exhaled air and the decay of plants.
<b>Carbon monoxide</b>	A highly poisonous, odourless, tasteless and colourless gas that is formed when carbon material burns without enough oxygen.
<b>Climate</b>	The pattern of weather in a particular region over a set period of time, usually 30 years.
<b>Cytotoxic &amp; Cytostatic Waste</b>	Cytotoxic and cytostatic waste includes medicines in tablet, liquid, cream or aerosol form. Cytotoxic and cytostatic medicines are medicines that are either toxic, carcinogenic, mutagenic or toxic for reproduction.

<b>Clinical Waste</b>	Clinical waste is the term used for waste generated from healthcare and similar activities that may pose a risk of infection, e.g. bandages, swabs.
<b>Conservation</b>	Preserving or protecting animals and resources such as minerals, water and plants through planned action (such as breeding endangered species) or non-action (such as not letting taps run unnecessarily).
<b>Deforestation</b>	The reduction of trees in a wood or forest due to natural forces or human activity such as burning or logging.
<b>Effluent</b>	Liquid wastes such as sewage and liquid waste from industries.

<b>Energy efficiency</b>	Actions to save fuels, for example, better building design, changing production processes, developing better transport policies, using better road vehicles and using insulation and double glazing in homes.
<b>EIA</b>	An environmental impact assessment (EIA) is an analytical process that systematically examines the possible environmental consequences of the implementation of projects, programs and policies.
<b>EMP</b>	An environmental management plan (EMP) is a sitespecific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.
<b>Fauna</b>	The animals of a particular region, habitat, or geological period.
<b>Flora</b>	The plants of a particular region, habitat, or geological period.
<b>Habitat</b>	The area occupied by a community or species (a group of animals or plants), such as a forest floor, desert or seashore.
<b>Initial Environmental Examination</b>	Initial environmental examinations describe the environmental condition of a project, including potential impact, formulation of mitigation measures and preparation of institutional requirements and environmental monitoring.
<b>Landfill</b>	A site that is specially designed to dispose of waste and operates with a license granted by the Environmental Protection Agency (EPA).
<b>Medical Waste</b>	Medical waste is any kind of waste that contains infectious material. E.g. anything that is soaked in blood, any waste produced in the patient's room.
<b>Offensive/Hygiene Waste</b>	Any waste that is not infectious and does not contain pharmaceutical or chemical substances and is likely to cause offence to the senses is an offensive waste.
<b>PEQS</b>	The Punjab Environmental Quality Standards (PEQS) are quality standards to regulate the air emissions and effluents of industry and other big polluters.

<b>Pyrolytic Combustion</b>	Pyrolysis is the thermal decomposition of materials at elevated temperatures in an inert atmosphere. Pyrolysis is considered as the first step in the combustion process and extreme pyrolysis leaves mostly carbon as the residue, is called carbonization.
<b>Noise Pollution</b>	Noises that disturb the environment and people's ability to enjoy it, for example, continually sounding house alarms, loud music, air conditioning or other electrical units and aircraft or motor engines.
<b>Seismology</b>	The branch of science concerned with earthquakes and related phenomena.
<b>Topography</b>	The arrangement of the natural and artificial physical features of an area.

## **Annexure 2: Brochure of Incinerator along with emission control system and its specs**

### **BIO-MEDICAL WASTE INCINERATOR PLANT**

This incinerator is modular package type unit with primary, secondary chamber and is designed to give a gas residence time of 02 seconds at a minimum of 1050°C within the combustion zone in which oxidizing conditions prevail.

A specially designed Educator system is incorporated with the outlet for decreasing of flue gases temperature, which is conforming to strict pollution control norms. The Incinerators totally covert the waste into sterile ash without any odor. The unit is three chambers, semi-automatic type machine.

The combined chamber casing is rectangular and constructed from mild steel plate (braced and stiffened externally).

The outer shell is heavy gauge mild steel sheet. The incinerator is internally lined with block insulation plus high quality low iron content refractory. The floor is easy to clean and uses the forced air system “beneath the flame” to guarantee complete combustion. High temperature refractory is used throughout.

#### **PRINCIPAL OF OPERATION OF INCINERATOR**

This is a batch load unit. Waste is manually loaded into the unit via the charge door. Machine controls are semiautomatic. Burners start and stop using push buttons. The burners can be controlled with digital temperature controllers. The incinerator is designed to allow adjustments of both blowers and burners.

There are digital temperature controllers indicating the temperature of chambers. The temperature of chambers can control by these digital controller.

## CHAMBERS

Primary chamber is sized to sufficient residence time for complete decomposition of the waste. Internally the casing forming the primary, secondary and third chambers is lined with good quality castable refractory and firebrick suitable for temperature upto 1400°C, backed by thermal insulation to give combined thickness of 200 mm. The three chamber design provides maximum decomposition of flue gases. There is separate small door for secondary & third chamber for cleaning

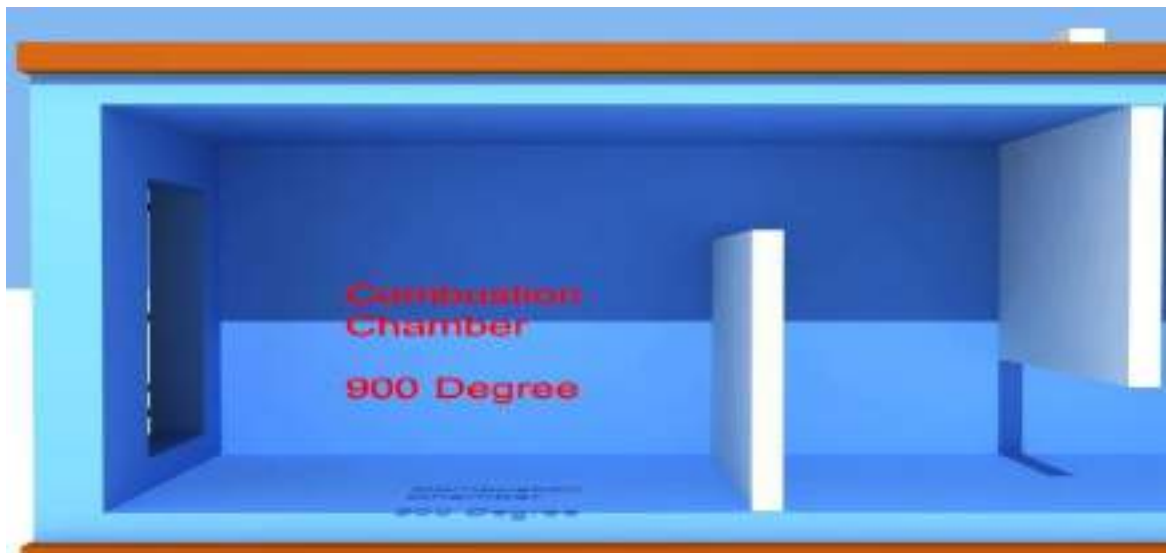
### PRIMARY CHAMBER

Primary chamber is sized to sufficient residence time for complete decomposition of the waste, total heat release will not exceed 25,000 btu/cu. Ft/hr(220,000kcal/m<sup>3</sup>h), hearth loading will not exceed 20 kg/per /hr/ft<sup>2</sup>, for general biomedical waste.

### SECONDARY CHAMBER

The incinerator will provide a minimum secondary chamber retention time of 2 sec retry at mix burning rate. The retention time is calculated at 800 to 1100 °C and will be accommodated within the confines of the incinerator. The incinerator's secondary chamber is thermally designed for 1400°C.







## BURNERS

There are three burners in incinerator. Two burner are located in primary chamber, second is located in the secondary chamber chamber. All the burners are fully automatic, and can be operated by a single push button. Burners are consisting of a blower, a motor with overload protection, and electric spark ignition device, and a flame sensing rod.

Temperature controllers, each having for independently adjustable set points control the burners. The temperature controller sensor is Chormel/ Alumel (Type K) thermocouple.

The high and low set points are interlocked such that the ignition burners will fire until the primary chamber temperature reaches 850°C. The burner then switches off and remains off until the temperature falls to 750oC.

The high and low set points are interlocked such that the afterburners will fire until the secondary chamber temperature reaches 1150° C. the burners then switch off and remain off until the temperature fall to 950oC.

The operation of each burner is monitored by its own automatic start-up programmer and flame detector. If the flame is not detected while the burner is firing the programmer will shutdown the burner and lock out red lockout lamps on programmer and the control panel will light.



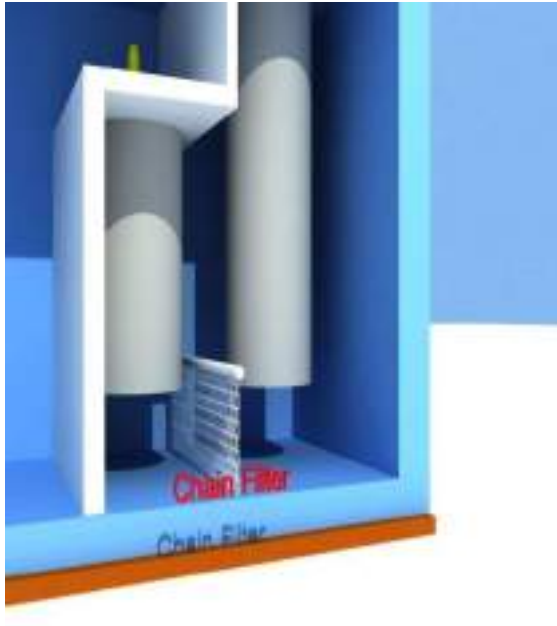
#### AIR SUPPLY

The chambers are provided by direct drive centrifugal fans. Primary air is injected at low level into the base of the firebed through jets located along each side of the chamber. Removable caps gives access to the jets so that they can be easily cleared of any obstruction by manually rodding through. The blower is equipped with air control valve; use to control the excess air inlet in chamber. The excess air provides oxygen which helps in burning



#### FLUE GAS WASHER

Gasses from the retention chamber pass through the gas washing system, gases are drenched via gas washer sprays removing particulate from gas stream. It consist on stainless steel Colum, full cone spray nozzle, drain pipe.



### Technical Data

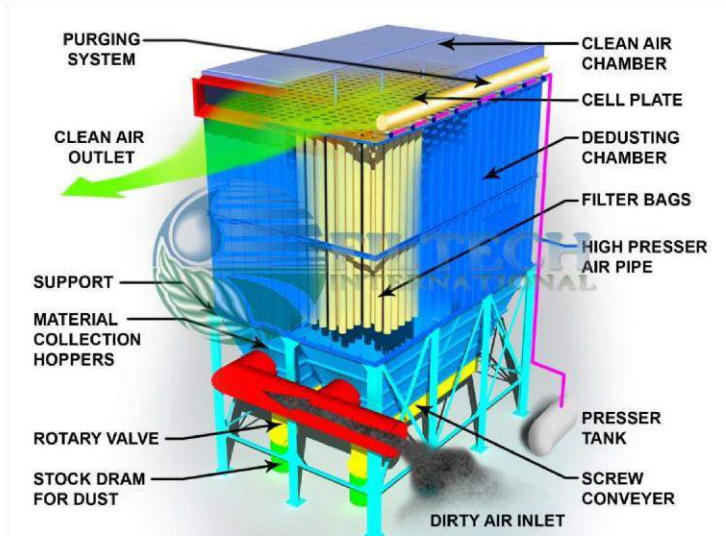
Burning capacity	500 kg/hr
Number of burners	3 or 4 no.
Incinerator type	Batch type
Incinerator design	Controlled air
Fuel to be used	Natural Gas
Loading system	Manual /batch type
Warm up time	45 min's
Type of paint	Heat resistant enamel paint
Chamber plate thickness	6 mm
Chimney plate thickness	5 mm
Thermal insulation	100mm
Refractory thickness	100mm
Electricity	3 phase 440V

Composition of thermal insulator	Calcium silicate slab
Composition of refractory	High Alumna Cast able 46% AL <sub>2</sub> O <sub>3</sub>
Number of blowers	2 no.
Temperature controller	3 no of digital temperature controller
Thermocouple	3 no.
Chimney height	8 meters or as per requirement
Oxygen quantity in the flu gas	6%
Primary chamber temperature	600-800°C
Retention Chamber temperature	800-1100°C

**Pollution Control System & Bag house filtration /Extraction is generally comprises of Dust extracting, Bag filter & Ducting. We generally design the system based Steel industry Machines. Following are the description for the equipment's to be used in the system**

**bag house:**

The bag house is essentially a system containing a filter fabric of some kind which removes dust and particulate from a gas stream. The cleaned gas then can be vented to the atmosphere; the dust may be a product such as material dust, carbon black, fumes from furnace, fly ash from a boiler burning coal. Bag filters are among the oldest and most widely applied particulate emission control devices. The clean air emerges from one side of the medium while the dust is collected on to bottom. The pulsejet mechanism of compressed air facilities are continuous cyclic cleaning of bag dust cake.



**ID Fan:**

These are employed for air containing dust or particles, fibers, flakes and having higher temperature than ambient. Usually offered in single inlet styled fans are moderately efficient and useful for dust collection, drafting and exhaust/pollution control duties. Impellers are radial tipped or backward inclined bladed type having flat or airfoil designs, with closed or open constructions. The p-v characteristic is flatter and blowers are designed for long hard duties.

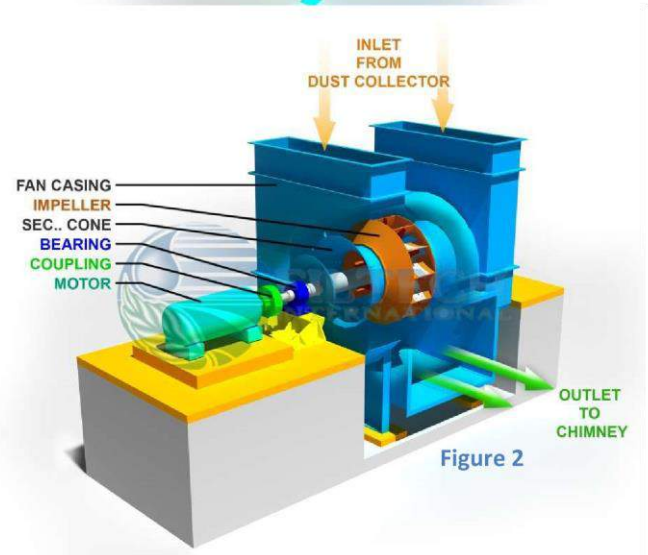


Figure 2

**1. TECHNICAL SPECIFICATION OF SYSTEM**

	<b>Particulars</b>	<b>Unit</b>	
1	Bag filter Type	-	PULSE JET
2	Type of cleaning	-	Online
3	Application	-	bag house filter for incinerator
4	Type of dust & Aprox.Avg. Size	-	Powder Dust Particles 5 $\mu$
5	Location of Bag filter	-	Near Incinerator emission
7	Actual Inlet gas temperature (Min./Max)	Deg C	50-140
8	Max. Allowed Inlet gas temperature	Deg C	140
9	Moisture content in gas max.	%	5%
10	Outlet dust emission	mg/Nm <sup>3</sup>	Less than 100
11	No. of bags	Nos.	80
12	Total filtering area	m <sup>2</sup>	95
13	No. of Inlet(s)	Nos.	1
14	No. of Outlet(s)	Nos.	1
15	Pressure drop across the Bag Filter	mm wg	200 Max
16	Casing design pressure	mm wg	400
17	Casing design temperature	Deg.C.	280
18	<b>Bag fabric specifications</b>		
	Material		Polyester Needle felt 450 GSM
	Sp. Weight	g/m <sup>2</sup>	450 GSM
	Thickness	mm	1.6 mm
	Operating Temperature	Deg C	Up to 130
	Surge Temperature	Deg C	170
	Collection efficiency		99% over 3 Micron
19	<b>Mechanical Shaking Cleaning details</b>		
	No. of Vibrator shaking Motors	Nos.	2
	Shaking Spring	Nos.	20
	Sequential controller		Digital – 220 V AC
	No. of Pulse stations in Timer	No.	5
	No. of Bags to be cleaned per Valve	No.	5

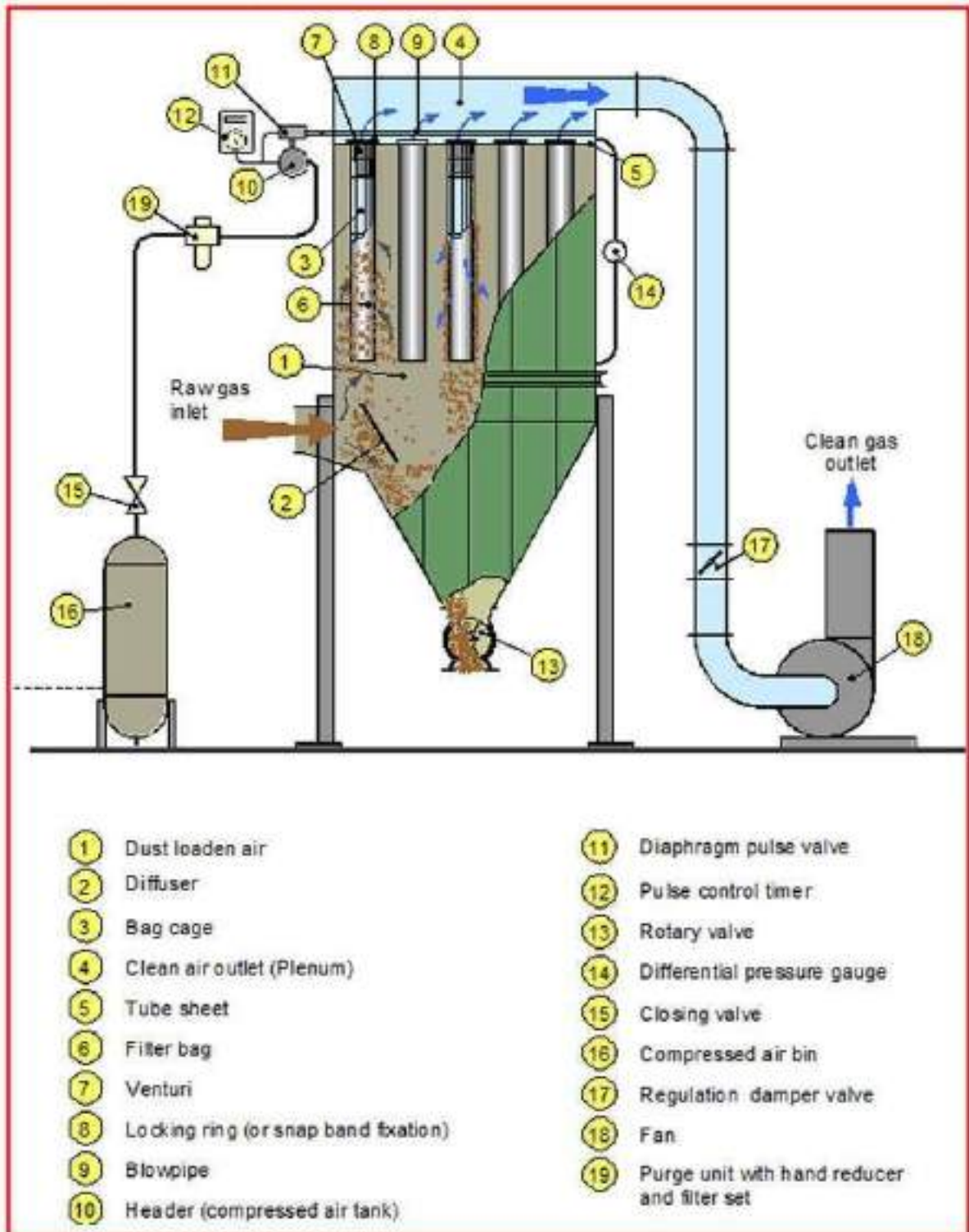
**2. TECHNICAL SPECIFICATION FOR I.D FAN**

SN	Particulars	Unit	
----	-------------	------	--

2	Operating temperature	°C	150
4	Model		I.D. Fan
5	Drive type		Direct Couple
6	Fan type		Centrifugal Fan
7	Fan speed	Rpm	1460-2800 RPM
8	Wheel Dia		
	Recommended Motor	HP/rpm	10/1460

--	--	--	--	--	--

Mechanical elements



No	Institution Name	No	Institution Name
<b>Military Institution</b>			
1	Fazaia Medical College PAF Complex Islamabad	2	PAF Hospital Islamabad
3	CMH DI KHAN	4	CMH OKARA
5	CMH Multan	6	FC Hospital Quetta
7	CMH Lahore	8	HIT Hospital Taxila
9	PAF Hospital Mianwali	10	PAF Hospital Faisal Base Karachi
11	PAF Hospital Shorkot	12	PAF Hospital Shahbaz Jaccobabad
13	PNS Shifa -Karachi	14	PAF Sargodha
15	PAF Hospital Peshwar	16	CMH Abbotabad
<b>Islamabad / Rawalpindi Region</b>			
1	NESCOM Hospital Islamabad	2	Shifa Int'l Hospital Islamabad (250 & 100 kg /hr machines)
3	Quaid e Azam International Hospital Rawalpindi	4	Rawal Institute of Health sciences Rawalpindi
5	KRL Hospital Islamabad	6	National Development Complex (NDC) Islamabad
7	Pakistan Atomic Energy Commission (PAEC) Islamabad	8	Directorate General Immigration & Passport Islamabad
9	HIT Texila	10	AERO Hospital AWC
11	National Institute of Health	12	Federal Govt. Poly Clinic Islamabad
<b>Country Wide /Internationally</b>			
7	MSF Haungu	8	Kundz Afghanistan
9	Khost Afganistan	10	Civil Hospital Sangarh
11	Save The Children Manglore Sawat	12	Hospital Save The Children Deolai Sawat

13	Sughra Shafi Medical complex Narowal	14	DHQ Faisalabad
15	Nishtar Hospital Multan	16	National Hospital Faisalabad
17	City Hospital Multan	18	Rehman Medical Institute Peshawar
19	Save The Children Khazana Sawat	20	MSF Dargai

No	Institution Name	No	Institution Name
21	Save the children Shorkot	22	Save the children Jacobabad
23	FC Hospital Quetta	24	MSF Timergrah
25	Complex Hospital Swabi	26	
27	Rehman Complex New Block 03 unit	28	Heavy Industry Texila
29	Save The Children Ouch Lower Dir	30	DHQ Hospital Tando Allah Yar
31	DHQ Hospital Attock	32	DHQ Hospital M B Din
33	DHQ Hospital Muzafargarh	34	DHQ Hospital Mianwali
35	DHQ Hospital Bahawalnagar	36	DHQ Hospital Sheikhpura
37	DHQ Hospital DG Khan	38	DHQ Hospital Sawat
39	DHQ Hospital Layyah	40	DHQ Hospital Mardan
41	DHQ Hospital Okara	42	DHQ Hospital Kohat
43	DHQ Hospital Khaniwal	44	DHQ Hospital Dir (upper)
45	DHQ Hospital Narowal	46	DHQ Hospital DI Khan
47	DHQ Hospital Tobataksing	48	DHQ Hospital Bannu
49	DHQ Hospital Jhang	50	DHQ Hospital Abbotabad
51	DHQ Hospital Khushab	52	DHQ Hospital Sawabi
53	SZH Rahimyar Khan	54	BMC Complex Quetta
55	DHQ Hospital Jehlum	56	Sandeman Hospital Quetta

57	DHQ Hospital Chakwal	58	DHQ Hospital Hub
59	DHQ Hospital Hafizabad	60	DHQ Hospital Loralai
61	DHQ Hospital Lodharan	62	DHQ Hospital Sibi
63	DHQ Hospital Turbat	64	DHQ Hospital Khuzdar
65	Civil Hospital Sukker	66	AHQ Hospital Landikotal, Khyber Agency
67	Civil Hospital Khairpur	68	AHQ Hospital Parachinar, Khyber Agency
69	Civil Hospital Dadu	70	DHQ Hospital (AIMS) Muzaffarabad
71	Civil Hospital Badin	72	DHQ Hospital Mirpur
73	THQ Hospital Kotri	74	DHQ Hospital Sakardu
75	Civil Hospital Mitti, Tarparker	76	DHQ Hospital Gilgit
77	Fazl-e-Rabi Hospital Rabwa	78	JPMC Karachi
79	Dr. Zia Uddin Hospital Karachi	80	Fatima Medical Center Multan
<b>No</b>	<b>Institution Name</b>	<b>No</b>	<b>Institution Name</b>
81	CMH Lahore	82	CMH DI KHAN
83	P.T.A. Sludge Incinerator, Sindh	84	Fauji Fertilizer Company (FFC), Mirpur Mathilo.
85	United Nations (for foreign aid missions)	86	Vetenary Research Institute (VRI), Lahore.
87	Ahmad Shah Baba Hospital Afghanistan	88	Helmand Afghanistan
89	Rangers Hospital Lahore	90	CMH D.I KHAN
91	PAF Hospital faisal Base Karachi	92	PAF Shorkot Hospital
93	Naibullah Khan Hospital Logar Afghanistan	94	DINO
95	Jinnah Hospital Kabul Afghanistan	96	Nishtar Kidney Hospital Jalalabad Afghanistan

97	PAEC Hospital Qutbal	98	National Forensic Science Authority Islamabad
99	LINAR	100	DINAR
101	MSF Chaman	102	MSF Dera Murad Jamali

### **Annexure 3: Stack Emission Report of Incinerator**



## Water Environment Laboratories & Consultancy Services (WELCOS)

EPN Certified PNAC Accredited (2009)C 11023 2015, ISO 9001:2015, ISO 14001:2015, ISO45001:2018 Certified

### STACK EMISSION MONITORING REPORT

Reference No. WELCOS-2020-ME-06 Date: 29 January, 2020

Industry Name: VS Environmental Solutions (Pvt) Ltd  
 Address: N-433 Jinnah Road Rawalpindi

Monitoring Station: Stack Emission Source: Sintering  
 Fuel: L.P.G. / Natural Gas Capacity: 150 kg  
 Monitoring Date: 23 January, 2020

Monitoring Parameters			
No.	Pollution Source	Units	PEQS Limits
1	Carbon Monoxide (CO)	mg/Nm <sup>3</sup>	400
2	Carbon Dioxide (CO <sub>2</sub> )	%	NGVS
3	Oxygen (O <sub>2</sub> )	%	NGVS
4	Oxides of Nitrogen (NOx)	mg/Nm <sup>3</sup>	400
5	Oxides of Sulphur (SO <sub>2</sub> )	mg/Nm <sup>3</sup>	5000
6	Oxides of Nitrogen (NO <sub>x</sub> )	mg/Nm <sup>3</sup>	5000
7	Sulphur Dioxide (SO <sub>2</sub> )	mg/Nm <sup>3</sup>	5000
8	Smoke	%	40
9	Hydrogen Sulphide (H <sub>2</sub> S)	mg/Nm <sup>3</sup>	10
10	Hydrogen Sulphide (H <sub>2</sub> S)	mg/Nm <sup>3</sup>	400
11	Hydrogen Sulphide (H <sub>2</sub> S)	mg/Nm <sup>3</sup>	100
12	Chlorine (Cl <sub>2</sub> )	mg/Nm <sup>3</sup>	100
13	Lead (Pb)	mg/Nm <sup>3</sup>	100
14	Mercury (Hg)	mg/Nm <sup>3</sup>	10
15	Cadmium (Cd)	mg/Nm <sup>3</sup>	10
16	Arsenic (As)	mg/Nm <sup>3</sup>	10
17	Copper (Cu)	mg/Nm <sup>3</sup>	10
18	Particulate Matter (TSP)	mg/Nm <sup>3</sup>	1000

NO<sub>x</sub> Limits as per PEQS: Gas Fired 400, Oil Fired 400, Coal Fired 1200

Abbreviations:  
 PEQS: Punjab Environmental Quality standards  
 mg/Nm<sup>3</sup>: Milligram Normal Meter Cubic  
 NGVS: No Guidelines Value Set

Terms and Conditions:

- Report cannot be used regarding compliance of any complaint, EPC or any other court case.
- This report should be reproduced as a whole and not in parts.
- This responsibility of the ethical use of the results reported in this report lies with the client.
- Only calibrated instruments were used for analysis.

Prepared By: 

Reviewed By:   
 Asim Ehsan

Approved By: 







Water Environment Laboratories & Consultancy Services (WELCOS)

info@welcos.com.pk

### Annexure 4: Waste Water Analysis Report.



#### Test Report of Waste Water Sample

Reference No. WEL/COE/2023/09/001-2 Date: 03 October, 2023

Address: VS Environmental Solutions (Pvt) Ltd  
K-113 Jhaland Road Bahawalpur


Sample Identification: Waste water (Cholera)

Sample Collected/Provided: WELCOS Representative

Sample Received Date: 24 September, 2023 Analysis Start Date: 24 September, 2023

Analysis Completion Date: 03 October, 2023 Grab/Composite: Grab

Lab Environmental Conditions: Temperature: 22 ± 3 °C Humidity: 25-70% RH





No.	Parameters	Unit	Std. Value	Result	Test Method Used	Remarks
<b>Field Analysis</b>						
1.	pH @27°C	-	6.9	7.7	APHA 4500 H <sup>+</sup> B	Complies
2.	Temperature	°C	N.S	31	APHA-2550	-
3.	Chlorine	mg/l	1.0	BDL	APHA 4500 Cl B & G	Complies
<b>Lab Analysis</b>						
4.	BOD <sub>5</sub>	mg/l	80	28	APHA-5210	Complies
5.	COD	mg/l	150	81	APHA-5220	Complies
6.	Oil and Grease	mg/l	10	1.2	APHA-5520-B	Complies
7.	TDS	mg/l	3500	2160	APHA 2540 C	Complies
8.	TSS	mg/l	200	112	APHA 2140 D	Complies
9.	Phenolic Compounds (as Phenol)	mg/l	0.1	BDL	APHA-5530-C & D (USEPA method 420.1)	Complies
10.	Cyanide (as CN <sup>-</sup> ) nitro	mg/l	1.0	BDL	APHA-4500-CN B & E	Complies
11.	Anionic Detergents	mg/l	20	1.2	APHA-5540-C	Complies
12.	Chloride	mg/l	1000	600	APHA 4500 Cl B	Complies
13.	Fluoride	mg/l	10	1.88	APHA 4500 F D	Complies
14.	Iron	mg/l	8	0.46	APHA 2500 Fe B, APHA 3111 B	Complies
15.	Cadmium	mg/l	0.1	0.07	APHA-3113 B, APHA 3111 B	Complies
16.	Manganese	mg/l	1.5	0.15	APHA-3113 B, APHA 3111 B	Complies
17.	Zinc	mg/l	5	BDL	APHA-3113 B, APHA 3111 B	Complies
18.	Arsenic	mg/l	1	0.037	APHA 3114 B	Complies
19.	Copper	mg/l	1	BDL	APHA-3113 B, APHA 3111 B	Complies
20.	Lead	mg/l	0.5	BDL	APHA-3113 B, APHA 3111 B	Complies
21.	Nickel	mg/l	1	BDL	APHA-3113 B, APHA 3111 B	Complies
22.	Chromium	mg/l	1	0.18	APHA-3113 B, APHA 3111 B	Complies
23.	Sulphate (SO <sub>4</sub> <sup>2-</sup> )	mg/l	600	460	APHA-4500 SO <sub>4</sub> <sup>2-</sup> E	Complies

PMAQ  
ISO 17025  
2017  
ACCREDITED

EPA  
PUNJAB  
CERTIFIED

ISO  
9001:2015  
ISO  
14001:2015  
ISO  
45001:2018








Environment Laboratories & Consultancy Services (WELCOS)
info@welcos.com.pk

Parameters	Units	PEQS	Result	Test Method Used	Remarks
25. Sulphide (S <sup>2-</sup> )	mg/l	1.0	0.8	APHA-4500 S <sup>2-</sup> F	Complies
26. Ammonia (NH <sub>3</sub> )	mg/l	40	1.2	APHA-4500 NH <sub>3</sub> -B&C	Complies
27. Mercury	mg/l	0.01	BDL	APHA 3114 B	Complies
28. Selenium	mg/l	0.5	BDL	APHA 3114 B	Complies
29. Silver	mg/l	1.0	BDL	APHA-3113 B	Complies
30. Barium	mg/l	1.5	BDL	APHA 3113 B	Complies
31. Boron	mg/l	6.0	BDL	APHA 3113 B	Complies
31. Total Toxic metals	mg/l	2.0	0.427	APHA-3113 B, APHA 3111 B Calculation	Complies


**Abbreviations:**  
 PEQS Punjab Environmental Quality Standards  
 APHA American Public Health Association  
 BDL Below Detectable Limit

**Terms and Conditions:**

- Analyte was conducted on the request of customer for his own PEQS/WHO/WHO compliance.
- This report should be produced as a whole and not in parts.
- The sample is retained for 15 days after the receipt date of report from the laboratory.
- There is no retention time for Microbiological based samples. In case of retaining requirements from client, sample will be collected again.
- The necessity of re-examination will be submitted on customer's request, where available. The assessment of conformity, if provided in report, is based on detection rate of sample compliance or rejection.
- The test report cannot be used as evidence against any non-compliance SMC/Report issued by EPA official Laboratory.
- The validity (expiry) period of the test report is for non-positive actions such as baseline study, EIA/EE, self-monitoring, reporting, issue conditions of EIA/EE etc. While the report is not valid for any court case, EPC, compliance regarding the operational status approvals, punitive actions such as Stop production & control Status, compliance cases, etc.
- This responsibility of the ethical use of the results reported is also report lies with the client.
- Only calibrated instruments were used for analysis.

Prepared By:  Reviewed By:  Approved By: 



Report No: \_\_\_\_\_



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 ISO 17025  
 2017  
 ACCREDITED

EPA  
 PUNJAB  
 CERTIFIED

ISO  
 9001:2015  
 14001:2015  
 ISO  
 45001:2018

# Annexure 5: Ambient Air and noise Report



## PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.

(Environmental Laboratories Division)  
ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +92-42-35441444 Cell: 0303-4442334

PGG/IMS/FF/063 Rev.#03 Rev date: 15-06-25

EPA Certified

**Report Limitation:** "This report is not valid for any Court Cases, Environmental Protection Orders, Compliance Reports for Operational Phase Approvals, or any regulatory action under Punjab Environmental Protection (Smog Prevention and Control) Rules, 2023, etc."

### TEST REPORT

Ref #: PGC/LAB/2026-385/AA

Issue date: 31-Jan-26

**Name of Industry/Client:** Vandoor Spectrums (VS) Environmental Solutions For Hazardous And Non-Hazardous Waste  
**Site Location:** Sanghori, Rawalpindi  
**Nature of Monitoring:** Ambient Air  
**Monitoring By:** Pak Green Laboratories  
**Monitoring Instrument:** AQMS  
**Monitoring Point:** Main Gate  
**Monitoring Duration:** 24 hours  
**Monitoring Date:** 30-Jan-26 to 31-Jan-26

Results:

Parameters	CO	NO	NO <sub>2</sub>	SO <sub>2</sub>
	mg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>
Methodology	Non-Dispersive Infrared Absorption (NDIR)	Reduced Pressure Chemiluminescence (CLD)	Reduced Pressure Chemiluminescence (CLD)	UV Fluorescence (UVF)
Avg. Results	2.07	9.61	32.84	40.27
PEQS for Ambient Air	5 8-Hrs	40 24-Hrs	80 24-Hrs	120 24-Hrs

End of Report

PEQS: Punjab Environmental Quality Standards

Remarks: All parameters are in compliance with the PEQS Limits.

Terms & Conditions:

- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client.
- The report is not valid for any negotiations.
- Dually calibrated instruments were used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge
	 Muhammad Raza Ullah	



Page 1 of 1



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www.pakgreen.pk



EPA Certified

# PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.

(Environmental Laboratories Division)

ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Head Office: 46-M, Gulberg III, Lahore-Pakistan, Ph: +92-42-35441444 Cell: 0303-4442334

PGG/IMS/FF/063 Rev.#03 Rev date: 16-06-25

*Report Limitation: "This report is not valid for any Court Cases, Environmental Protection Orders, Compliance Reports for Operational Phase Approvals, or any regulatory action under Punjab Environmental Protection (Soag Prevention and Control) Rules, 2023, etc."*

## TEST REPORT

Ref #: PGG/LAB/2026-386/NL

Issue date: 31-Jan-26

Name of Industry/Client:

Vandor Spectrums (VS) Environmental Solutions For Hazardous And Non-Hazardous Waste

Site Location:

Sanghvi, Rawalpindi

Nature of Monitoring:

Noise Level

Monitoring By:

Pak Green Laboratories

Monitoring Location:

Main Gate

Monitoring Instrument:

Noise Meter Landtek SL-5868P

Monitoring Date:

30-Jan-26

Results:

Sr. No.	Locations	Equivalent Noise Level dB (A) Day Time
1.	Point-01: East side	60.5
2.	Point-02: West side	57.0
3.	Point-03: North side	59.4
4.	Point-04: South side	61.7
PEQS (Day Time Commercial Area)		65 dB (A)

.....End of Report.....

PEQS: Punjab Environmental Quality Standards

dB (A) Leq: Time weighted average of the level of sound in decibel on scale A, which is relatable to human hearing

Remarks: Noise level at all points are in compliance with the PEQS limit.

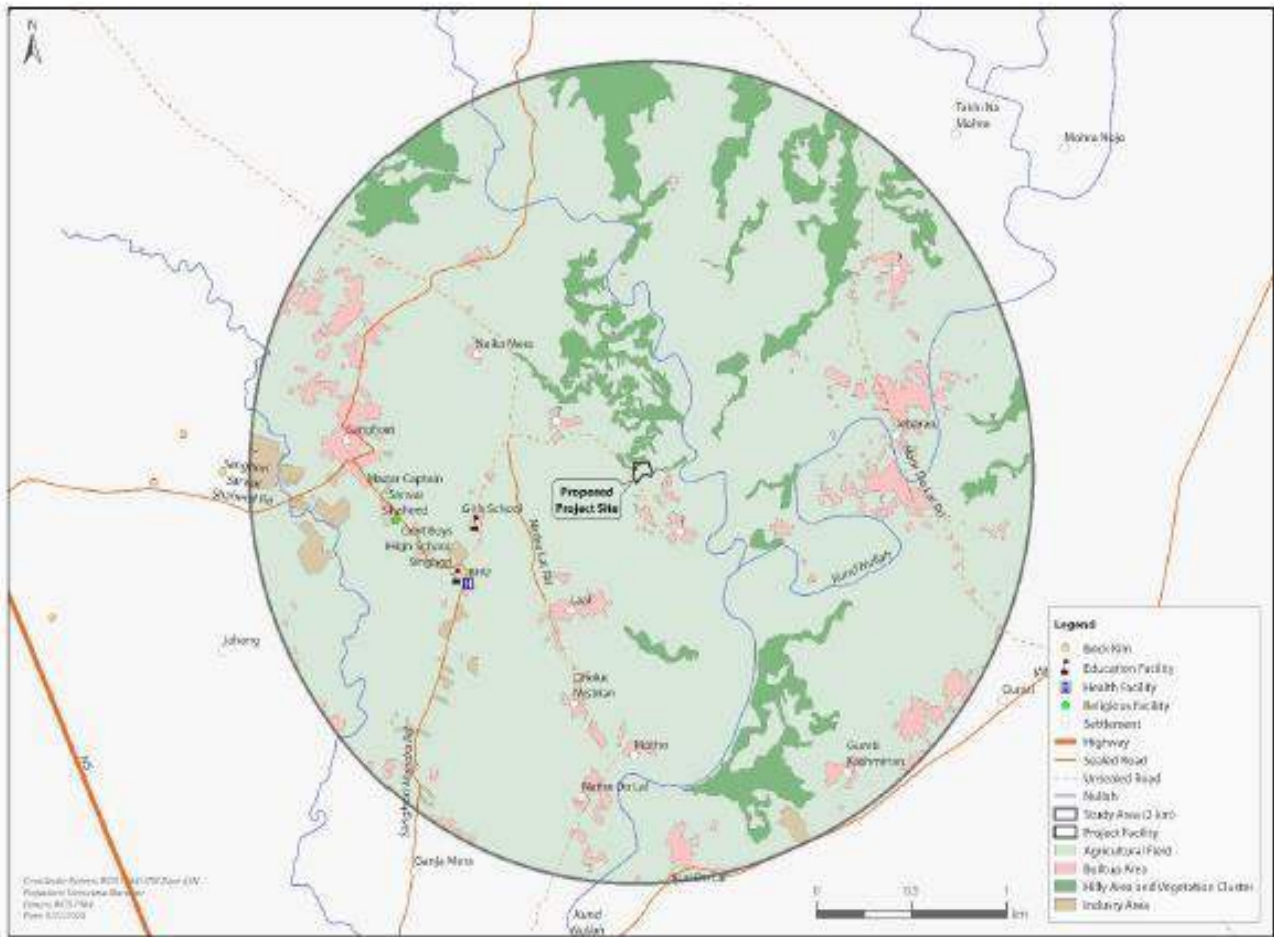
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- The report is not valid for any negotiations.
- Dually calibrated instrument was used during monitoring.

Field Analyst	Chief Analyst	Laboratory Incharge
	Mahmood Raza Ullah	Mian Iftikhar

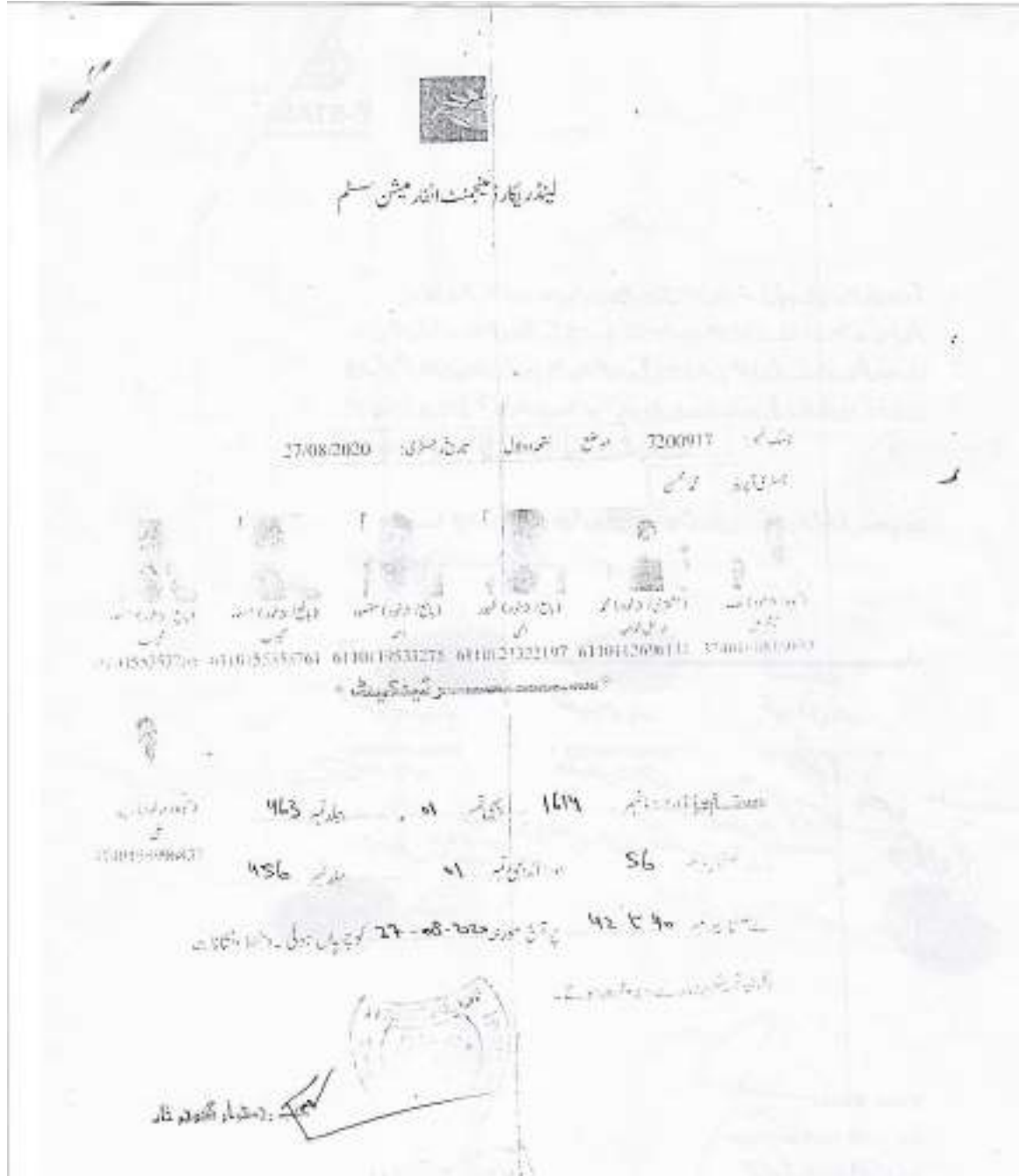


Exhibit 1: Study area of the Project



Background Information Document

## Annexure 06: Land Document







E-STAM  
COMPLIATION SHEET

صفحہ نمبر 2

ماہانگہ مسعود محبوب، مقصود احمد، ظہور الہی پسران محبوب خان ساکنان مکان نمبر 107  
نقارہ 55 NIH ملی نمبر 5 قسملہ شیخ اسلام آباد کے رہائشی و کفیل ہیں۔

یہ کہ من ظہور ان مالکان 06 بلڈنگ اراضی تعدادی 9 کنال 17 مرلے (نو کنال سترہ مرلے)  
بتعمیل از کمیونٹی نمبر 151/147 کھیتی نمبر 2445243، قلعہ 1 (خسرہ نمبر 142 من) تعدادی 43 کنال 13  
مرلے جس میں حصہ مسعود محبوب 95/2619 بقدر 1 کنال 11 مرلے 181 فٹ، حصہ مقصود احمد 197/2619 بقدر 3  
مرلے 14 کنال، حصہ ظہور الہی 197/2619 بقدر 3 کنال 5 مرلے 182 فٹ، حصہ مسعود محبوب 34/873  
بقدر 1 کنال 14 مرلے، جملہ حصص 197/873 بقدر 9 کنال 17 مرلے (نو کنال سترہ مرلے) و باغیچہ  
موتج محمد دولال خٹیل کو بر خان ضلع راولپنڈی ہے، جیسا کہ نقل رجسٹر حقداران زمین موتج مذکور برائے سال  
2019-20 بذریعہ فرا آئی ڈی نمبر 0012980084 مورخہ 10 اگست 2020ء بمطابق یہ عہد نامہ اراضی  
پر دستاویز نان مندرجہ ذیل سے واضح اور حیاں ہے۔

یہ کہ اراضی مذکورہ بالا اس وقت ہر قسم کے نقص قانونی پر سواغذہ و خدمات و تازعات سے پاک مزایا و مہرا  
ہے اور اراضی مذکورہ کی بابت کسی بھی عدالت سے کوئی حکم اتقائی جاری شدہ نہ ہے اسلیئے اراضی مذکورہ بالا کو بذریعہ  
تجربہ، بان رائسٹر کرنے میں کوئی امر مانع نہ ہے اور من ظہور ان بحیثیت مالکان اراضی مذکورہ بالا تعلق کرنے کا قانونی  
حق رکھتے ہیں۔

اب من ظہور ان نے اراضی مذکورہ بالا بدست و بحق مسمی

محمد ارسل خواجہ ولد صدق حمید خواجہ ساکن مکان نمبر 277 سڑک نمبر 6 بکٹر 813-14 اسلام آباد  
(شناختی نمبر 1-1269651-81101)، بیوش رقم مبلغ 42,00,000 روپے (چالیس لاکھ روپے) میں تعلق  
باقضد کر کے قبضہ و دخل اراضی مذکورہ موقع پر حوالے مشتری مذکورہ کیا ہے۔ یہ کہ من ظہور ان نے درج نامہ اراضی مشتری  
ذکورہ کو وہاں حافیہ کمر وصول کر لیے ہیں اس غرض ہائی کوئی رقم بذمہ مشتری نہ ہے اور آج سے مشتری مذکورہ مالک و کفیل  
ارضی مذکورہ من ظہور ان تصور ہوگا۔

17

ظہور الہی پسران  
61101-2172219-7

مقصود احمد ہاگہ  
61101-1953327-5  
مقصود احمد

مسعود محبوب  
61101-5530370-1  
2



## **Annexure 07: NOC for Wastewater Disposal**

No: 1074/UC

Office of the Union Council

Kalyam Awan, Tehsil Gujar Khan

Distt Rawalpindi

Dated: 10th November, 2020

To,

The Director,

VS Environmental Solutions (PVT) Ltd,

Subject: **Issuance of NOC for Wastewater Disposal at VS Environmental Solutions (PVT) Ltd** (Moza Sarayeen near Sanghori Sarwar Shaheed Rawalpindi).

"This refers to your application/letter no 9729/LA dated: 28th October, 2020.

It is intimated that the UC Kalyam Awan Tehsil Gujar Khan, District Rawalpindi has no objection to the disposal of waste water at the proposed site for VS Environmental Solutions (PVT) Ltd to seasonal drain after proper treatment".

And, sponsor will provide water supply, wastewater treatment system and disposal arrangements at their own for their site.



Chairman

Union Council Kalyam Awan

Tehsil Gujar Khan

Distt Rawalpindi



**OFFICE OF THE  
CHIEF OFFICER  
Tehsil Council, Gujar Khan**

No. 210 JCO/TC/GK

Dated 11 / 11 / 2020

To

The Director,  
VS Environmental Solutions (PVT) Ltd.

Subject: **ISSUANCE OF NOC FOR WASTEWATER DISPOAL AT VS ENVIRONMENTAL SOLUTIONS (PVT) LTD.**

This refers to your application/letter submitted by Muhammad Aarsal Khawaja Director, VS Environmental Solutions (PVT) Ltd dated 10<sup>th</sup> of November 2020.

It is intimated that the Tehsil Council office has no objection to the disposal of wastewater at the proposed site for VS Environmental Solutions (PVT) Ltd, Mouza Natha Dolal, near Village Sarayeen, Sanghori Sarwar Shaheed, Rawalpindi to seasonal Drain after proper treatment.

And, project proponent/sponsor will provide water supply, wastewater treatment system and disposal arrangement at their own for their site.

  
**Chief Officer**  
Tehsil Council, Gujar Khan  
Gujar Khan