# ALPHA ENGINEERING

## Installation of Induction Furnace

### PLOT NO. 61, STREET S3, RCCI INDUSTRIAL ESTATE
### RAWAT, DISTRICT RAWALPINDI

# Environmental Impact Assessment (EIA) Report

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# EXECUTIVE SUMMARY

# EXECUTIVE SUMMARY

## I. Title and Location of Project

The title of the project is "Installation of Induction Furnace by M/S Alpha Engineering". The project site is located at Plot No. 61, Street S3, RCCI Industrial Estate Rawat, District Rawalpindi.

## II. Name of the Proponent

**Name:** Umar Ahmad Chugtai

**Address:** Gulriaz Housing Scheme Phase-V, House No. 279, Street No.3, Rawalpindi

## III. Name of Organization Preparing the Report

Integrated Environment Consultants

**Head Office:** 218, Street No. 5 Upper Mall Scheme Lahore

**Phone**: (042)-37897273

**Email**: inenvconsultantants@yahoo.com

**Peshawar Office:** Zaye Apartments, Warsak Road, Peshawar

## IV. A Brief Outline of the Proposal

Proposed project involves the installation of Induction Furnace by M/S Alpha Engineering at Plot No. 61, Street S3, RCCI Industrial Estate Rawat, District Rawalpindi with total area of 2 Kanal. M/S Alpha Engineering will conduct business with best practices for the production of ferrous and non-ferrous scrap molds. The production capacity of furnace will be 300 kg/batch.

A brief outline of project is given below:

| **BRIEF OUTLINE OF THE PROJECT** | |
|---|---|
| Land Available | 2 Kanal |
| Project Estimated Cost | 11 Million Rupees |
| Raw Material for Alloys Casting | ▪ Ferrous Scrap<br>Heavy Melting Steel (HMS 1 & HMS 2)<br>Shredded Scrap (ISRI 210/211)<br>PNS (Plate and Structural Scrap)<br>Rebar & Cutting Ends<br>Cast Iron Scrap & Pig Iron<br>▪ Non-Ferrous Scrap<br>Aluminum Scrap (Tense, Tabor, Wire/Taint) |

| | |
|---|---|
| | Copper & Brass Scrap (Millberry, Honey/Label) |
| Capacity of the Project | 300 Kg/Batch |

In compliance with the legal requirement of Section-12 of Punjab Environment Protection Act-2012, the proponent is required to submit the Environmental Impact Assessment (EIA) report before the commencement of the proposed project, therefore, Environmental Impact Assessment (EIA) report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab, Lahore.

## V. The Major Impacts

The potential impacts and their magnitude from the stationary & alloying furnace of alloying casting project and associated facilities on the natural resources and environment of the site and vicinity are summarized in table 0-1:

**Table 0-1: Impact Characterization (Unmitigated)**

| Project Phase | Impact Category | Nature | Duration | Geo-Extent | Reversibility | Likelihood | Consequence Severity |
|---|---|---|---|---|---|---|---|
| **Construction** | Air Quality (Dust/Emissions) | D | ST | LO | RE | LK | MN |
| | Noise and Vibration | D | ST | LO | RE | CE | MO |
| | Surface/Ground Water Quality | ID | LT | LO | IR | PO | MO |
| | Solid Waste Generation | D | ST | LO | RE | CE | MN |
| | Traffic Congestion | D/ID | ST | LO | RE | PO | MN |
| | Occupational Health & Safety | D | ST/LT | LO | RE/IR | CE | MU |
| **Operational** | Water Consumption/Availability | D | LT | LA | RE | PO | MN |
| | Employment Generation | D | LT | LO/LA | IR | CE | MU |
| | Infrastructure Development | D/ID | LT | LO/LA | RE/IR | CE | MO |
| | Public Health & Nuisance | D | ST/LT | LO | RE/IR | LK | MN |
| | Waste Management Efficiency | D | LT | LO | RE | CE | MO |

D: Direct: ID: Indirect CE: Certain; LK: Likely LT: Long Term; ST: Short Term PO: Possibly; MN: Minor MJ: Major; MT: Medium Term MO: Moderate; LO: Local LA: Large; SV: Severe RE: Reversible; IR: Irreversible

## VI. Recommendations for Mitigation Measures

Table given below shows the project impacts; related with construction and operational phase of the project.

**Table 0-2: Impacts and their Mitigation Measures**

| Impacts | Magnitude | Recommendation Measure | Responsible Authority |
|---|---|---|---|
| **Construction Phase** | | | |
| **Air Pollution**<br>Dust generation from site and Gases emissions from vehicles | Minor | • Sprinkling of water on regular basis<br>• Periodic maintenance and management of all the construction machinery and vehicles | Contractor |
| **Solid waste**<br>Construction waste and domestic waste from worker camps | Minor | • Conduct separate collection of construction and domestic waste to promote recycling and re-use<br>• Dispose non-recyclable and hazardous waste material properly according to waste management rules. | Contractor |
| **Water Quality**<br>• Wastewater from camp site<br>• Leakage of oil and chemical materials from construction activity | Minor | • Use of spill prevention trays and impermeable sheets to avoid contamination of the groundwater<br>• Oil storage tank will be place for provision of safety measure regarding the contamination of soil or underground water<br>• Septic tanks will be constructed with cemented wall to prevent the groundwater contamination. | Contractor |
| **Noise**<br>• Noise caused by construction machinery<br>• vehicles used for mobilization of construction equipment and workers | Minor | • Control noise through control of working hours and selection of less noisy equipment.<br>• Proper maintenance of vehicles and construction equipment | Contractor |
| **Operational Phase** | | | |
| **Air Pollution**<br>• Emission from Induction furnace Vehicular emissions<br>• Exhaust gas from stacks<br>• Gases emissions from | Minor | • Quality control over charging of furnace and automated systems on thermal processes.<br>• Installation of cyclone bag house dust collector.<br>• Proper ventilation system will be | EHS officer of Project Proponent |

| Impacts | Magnitude | Recommendation Measure | Responsible Authority |
|---|---|---|---|
| Generator | | provided. Installation of latest Flue gas analyzer.<br>• Flue to air heat exchanger will be installed<br>• Use of low emission vehicles<br>• Periodic maintenance of the generator and will be fitted with appropriate exhaust systems and devices | |
| **Solid waste**<br>• Sludge from wastewater treatment<br>• Sewage and garbage from workers | Minor | • Testing system for Solid Waste Slag will be made in which there will be a "lined" slag pit designed to dispose of the solid waste<br>• Integrated waste management will be carried out by applying, in order of preference, waste avoidance, reuse, recycling and disposal.<br>• Solid Waste Spectrophotometer analyzer will be installed for the SW analysis.<br>• Paper and paper carton box will be recycled<br>• Systematic collection and protected storage of waste<br>• Waste disposal at appropriate and designated site | EHS officer of Project Proponent |
| **Water Quality**<br>• Industrial process/ Cooling water<br>• Rainwater drainage | Minor | • As the most of wastewater generated is of domestic in nature from staff facilities area.<br>• Water usage at slag and crushing facility will be recycled after filling the system<br>• Preventative Maintenance and Monitoring Program<br>• Installation of Septic Tank so any wastewater produced complies with wastewater standards of PEQS<br>• An emergency spill response kit will be housed on site. | EHS officer of Project Proponent |
| **Noise**<br>• Noise and vibration from Equipment's and generators | Minor | • Control noise through control of working hours and selection of less noisy equipment.<br>• Installation of low noise/ low | EHS officer of Project Proponent |

| Impacts | Magnitude | Recommendation Measure | Responsible Authority |
|---|---|---|---|
| | | vibration type equipment<br>• Proper maintenance of equipment's | |
| **Occupational Health & Safety**<br>• Occupational health and safety issues are specific to alloys manufacturing activities | Minor | • Identification of major safety and health problems arising from alloys casting activities;<br>• Inform and train workers entering and working in the confined space of the hazards, protective measures and emergency rescue procedures | EHS officer of Project Proponent |

## VII. Proposed Monitoring

The monitoring program is designed to ensure that the requirements of the EPA are met. Monitoring Program (MP) provides important information that allows for more effective planning and an adaptive response based on the assessment of the effectiveness of mitigation measures. The monitoring of various parameters will help to determine the extent to which project construction/operation activities will cause environmental disturbance.

**Table 0-3: Project Proposed Monitoring Plan during Construction**

| | **Monitoring Parameter** | **Monitoring Location** | **Monitoring Schedule** | **Monitoring Parameter** | **Remarks** |
|---|---|---|---|---|---|
| **Construction Stage** | Emission | • Construction vehicle<br>• Machinery<br>• Generator | | | All selected locations will be checked for smoke emissions by the project management or authorized person. |
| | Noise | • Construction vehicle<br>• Machinery<br>• Generators<br>• Welding work | | | Construction vehicles / machinery / generators will be checked regularly for noise level by the contractor during construction phase. |
| | Water | • Ground water<br>• Wastewater | | | Ground and Wastewater sample will be collected and tested. |
| | Solid Waste | • Worker camp<br>• Construction site | | | Waste will be collected and disposed-off in environment friendly manner. |
| | Health & Safety | • Construction site | | | Easily access to PPES by workers and provision of safety measures to all labor force. |

**Table 0-4: Project Proposed Monitoring Plan during Operations**

| | **Monitoring Parameter** | **Monitoring Location** | **Monitoring Schedule** | **Monitoring Method** | **Remarks** |
|---|---|---|---|---|---|
| **Operational Stage** | Security | • Plant area | | | Security arrangement will be made. |
| | Emissions | • Furnace<br>• Generators | | | On-site monitoring from stacks of machineries and generators |
| | Water Quality | • Ground water<br>• Wastewater | | | Collected samples of ground and surface water will be tested in laboratory. |
| | Noise | • Plant area<br>• Parking area | | | All selected locations will be checked for noise level by the project management or authorized person. |
| | Solid Waste | • Worker camp<br>• Furnace site<br>• Raw material storage site | | | Recycling and environment friendly disposal will be endorsed. |
| | Waste Water | • Final discharge point | | | As described by SMART |
| | Health & Safety | • All plant area | | | Implementation of safety plans. |
| | Firefighting Arrangements | • Plant area<br>• Parking | | | Easy and timely access to fire extinguisher. |
| | Tree Plantation | • Green belt development | | | Maximum plantation will be done. |

| Monitoring Schedule | Regular | Monthly | Quarterly | Tri-annual | Semiannual | Annual |
|---|---|---|---|---|---|---|
| | | | | | | |

| Monitoring Method | On-Site | Off-Site |
|---|---|---|
| | | |

# INTRODUCTION

# 1 INTRODUCTION

M/S Alpha Engineering intends to establish an energy-efficient ferrous and non-ferrous recycling facility within the Rawalpindi Chamber of Commerce & Industry (RCCI) Industrial Estate, Rawat, Rawalpindi. Aluminum and secondary metal recycling represent a sustainable approach to metal manufacturing, offering significant energy savings and reducing reliance on primary ore extraction. By utilizing recycled scrap material, secondary metal processing produces up to 95% fewer emissions compared to primary production.

To align with modern industrial performance standards, economic feasibility, and environmental stewardship, M/S Alpha Engineering proposes the installation of a state-of-the-art Induction Furnace and Automatic Ingot Caster unit. The facility is designed to meet rising market demand for high-grade, standardized metal ingots and billets for domestic engineering, civil construction, and manufacturing sectors.

In compliance with the legal requirement of Section-12 of Punjab Environment Protection Act-2012, the proponent is required to submit the Environmental Impact Assessment (EIA) report before the commencement of the proposed project, therefore, Environmental Impact Assessment (EIA) report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab, Lahore.

## 1.1 Purpose of Report

Environmental Impact Assessment (EIA) report is being submitted to the Environmental Protection Agency (EPA), Government of the Punjab, Lahore, in compliance with the legal requirement for the Punjab Environmental Protection Act 2012, Section-12 for obtaining the Environmental Approval (EA) for the installation of Induction Furnace by M/S Alpha Engineering at Plot No. 61, Street S3, RCCI Industrial Estate Rawat, District Rawalpindi. The other relevant regulations and guidelines considered while preparing this EIA report include:

1. Policy and procedures for filing, review and approval of environmental assessments.
2. Guidelines for the preparation and review of environmental reports.
3. Guidelines for public participation.
4. Guidelines for sensitive and critical areas.
5. Detailed sectoral guidelines.

Different environmental aspects like social, physical, biological and other related features of the project both during construction and its regular occupancy are highlighted in this EIA report. The necessary measures to be adopted to mitigate negative environmental impacts on any segment of the environment in and around are also described. All the important project related information is also provided as desired by the Guidelines for the Preparation of IEE/EIA reports-1997 (Amended 2012), based on which present report has been prepared. This report will also help the

decision makers, EPA Punjab, in the present case, to take a judicious decision before issuing the desired Environmental Approval (EA)/No Objection Certificate (NOC).

## 1.2 Identification of Project and Proponent

The proposed project is the installation of Induction Furnace by M/S Alpha Engineering" for the production of ferrous and non ferrous scrop molds at Plot No. 61, Street S3, RCCI Industrial Estate Rawat, District Rawalpindi.

**Name:** Umar Ahmad Chugtai

**Address:** Gulriaz Housing Scheme Phase-V, House No. 279, Street No.3, Rawalpindi

## 1.3 Details of Consultant

Integrated Environment Consultants

**Head Office:** 218, Street No. 5 Upper Mall Scheme Lahore.

Tel: + 92 (042) 37897273

Email: inenvconsultantants@yahoo.com

## 1.4 Brief Description of Nature Size and Location of Project

Proposed project involves the installation Induction furnace by M/S Alpha Engineering at Plot No. 61, Street S3, RCCI Industrial Estate Rawat, District Rawalpindi with total area of 2 Kanal. M/S Alpha Engineering will conduct business with best practices for the production of ferrous and non ferrous scrap molds/ingots. The production capacity of furnace will be 300 kg/ batch to meet the demand of market.

# SCREENING OF THE PROJECT

# 2 SCREENING OF PROJECT

According to the Punjab Environmental Protection Agency (review of IEE and EIA) regulations, 2022: Section - 4 Projects requiring an EIA

> **"A proponent of a project falling in any of the categories listed in Schedule II shall file an EIA with the Agency, and the provisions of Section 12 shall apply to such project."**

In accordance with the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2022, the project for installation of induction furnace falls in Schedule –II, **Section-B:** Manufacturing and processing, **Sub-section 18**- "Steel Furnaces" for which Environmental Impact Assessment (EIA) report is required for Environmental Approval.

Therefore, to fulfill the legal requirements of the Section-12 of the Punjab Environment Protection Act (amended 2012) the client is required to submit the EIA report in the Environmental Protection Agency, Government of the Punjab, Lahore to obtain the required Environmental Approval (EA).

# SCOPING OF THE PROJECT

# 3 SCOPING OF PROJECT

## 3.1 Spatial and Temporal Boundaries of Environmental Assessment

Spatial boundaries for project related to the environmental effects and cumulative effects for Valued Environmental Components. It depends on the Project Development Area and Local and Regional Assessment Area.

The proposed project site has existed in industry zone where all facilities are available. The Google coordinates of the project are as followings:

33°31'05.2"N 73°14'29.4"E

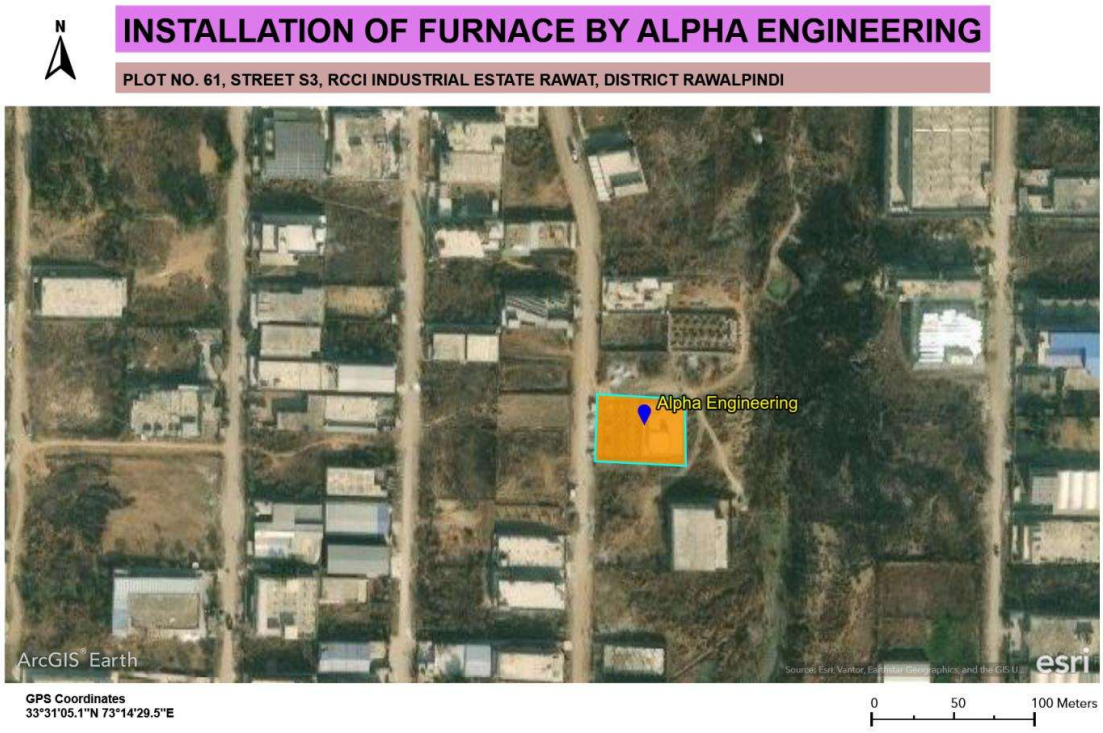



**Figure 3-1: Location of Proposed Project Site**

Temporal boundaries based on timings and duration of project activity that will happen during construction and operational phase. Construction will be done in an environmental friendly manner that will not harm any existing boundaries and surroundings of project area. Ladders, walkways, safety grills, staircases and platforms will be constructed. In addition one lockable room near the plant site will be allocating for keeping tools and tackles along with security arrangements. While during operational phase all quality test and flow measurement by processing will be done. For Air, Water and Solid waste management measures will be adopted to achieve Punjab Environmental Quality Standards (PEQS). Safety roads, access roads / approaches will be maintained. Maximum plantation will be done.

## 3.2 Important Issues and Concerns Raised During Consultation

The regular survey and background studies were conducted to identify the stakeholders. People of surroundings were gathered which are likely to be affected, focus group meetings were conducted by the representatives. They were all briefed about the project whereabouts in the nontechnical and understandable way. Certain issues and suggestion about the project that is included and raised by the locals were filed and recorded.

The consultation with the government officials, welfare organizations was conducted in the formal way which includes the technical approaches to the project and the verdict of the affected or local community was also kept in view.

## 3.3 Significant Impacts and Factors to be Considered

Following impacts are considered to be significant and proper mitigation and maintenance plan of these are made

- Increase risk of air pollution
- Noise propagation within the work zone
- Impacts on workers during furnace Operations
- Incidents of equipments
- Impact on quality of water body
- Solid waste production

# CONSIDERATION OF ALTERNATIVES

# 4 CONSIDERATION OF ALTERNATIVES

## 4.1 Site Alternatives their Selection and Rejection Criteria

Proposed project is Installation of Induction Furnace by M/S Alpha Engineering at Plot No. 61, Street S3, RCCI Industrial Estate Rawat, District Rawalpindi. The land is already owned by the project proponent and considered suitable both in terms of environment and physical constraints. As the site is located within industry zone thus there is no restriction regarding the project activities. This project is installation of aluminum and metal alloys casting unit.

**No Project Option:**

No project option is not a good option for the non-management of ferrous and non-ferrous wastes which are producing greatly. Recycling of residues into the useable form to meet the market demand is highly environment friendly way as compared to put stress on natural resources.

**A New Site or Third Party Services:**

By keeping the economical and feasible factor in mind selected site is all mean suitable because it is located within the industry zone and already owned by proponent. If new site or third party services will be taken than the cost of project will enhance and environmental impacts from emissions during the process will boost up.

## 4.2 Design / technology alternatives, their selection and rejection criteria

### 4.2.1 Technologies Alternatives and their Selection Criteria

There are three primary furnace technologies used as alternatives to induction melting:

| Furnace Type | Best Use Case | Key Advantage |
|---|---|---|
| **Induction Furnace** | Clean scrap, small-to-medium batches and high-purity ingots. | Electromagnetic stirring ensures chemical homogeneity. |
| **Reverberatory Furnace** | Large-scale operations, diverse scrap types, high volume. | High capacity and lowest operating cost per ton. |
| **Rotary Furnace** | Low-grade scrap, dross recovery, highly contaminated materials. | Rotating action improves heat transfer for contaminated loads. |
| **Tower (Shaft) Furnace** | Clean, bulky scrap requiring high energy efficiency. | Uses exhaust gases to preheat scrap, reaching up to 77% efficiency. |

### 4.2.2 Selection Criteria

The following factors determine which technology is the most suitable for a specific plant:

i- **Scrap Type and Grade:** Clean profiles or extrusions are ideal for induction furnaces. However, if you are processing "class 3" scrap (painted, oily, or mixed with plastics), a rotary furnace or a reverberatory furnace with a de-coating system is required.

ii- **Metal Recovery Rate:** Induction furnaces offer low oxidation losses (<1%) compared to gas-fired reverberatory furnaces (15-39% efficiency with higher oxidation).

iii- **Energy Availability:** Induction furnaces are selected when electricity is preferred or when localized melting is required to avoid the emissions associated with fossil fuels.

iv- **Product Quality:** If the goal is high-end castings (e.g., aerospace or automotive parts), induction melting is the standard because it prevents hydrogen porosity and dross inclusions.

### 4.2.3 Rejection Criteria

A technology is typically rejected based on these specific reasons: .

i- **Emission Constraints:** Gas-fired reverberatory furnaces may be rejected in urban areas or regions with strict $CO_2$ and NOx limits unless expensive fume treatment systems are installed.

ii- **Scale Requirements:** Crucible and small induction furnaces are rejected for industrial-scale secondary smelting (e.g., 50+ tons per day) due to limited batch capacity.

iii- **Thermal Efficiency:** Standard gas-fired furnaces without heat exchangers are often rejected today because they waste significant energy; modern alternatives like Tower furnaces or Multi-chamber systems are preferred for their heat recovery.

## 4.3 Environmental Alternatives, their Selection and Rejection Criteria

The major aim of ferrous and non-ferrous scrap is to remove as much of the metal waste as possible before that affect environment as it is non-biodegradable. As if the metal waste are not recycle the solid waste management practices will not be more effective for its ultimate disposal and great stress on the natural resources will arise. The aluminum alloys casting not only be recycled to make effective ferrous management practices, but also has the potential to produce various other benefits. It has the potential to reduce a waste production, to produce automotive spare parts, and the potential reduce the stress on natural resources so that they remained available for future generations as described by the pillars of sustainability through the process.

Below is a more detailed explanation of the benefits of aluminum alloys from the scrap:

### 4.3.1 Waste Reduction

Through the processing of ferrous the amount of waste that is usually released into the environment is reduced thus improving environment's health. By doing so, in turn reduces the health risks associated with environmental pollution, and reduces the solid waste production rate. Metal waste management also reduces the amount of money spent by a management on environmental rehabilitation projects required to battle pollution.

### 4.3.2 Automotive Parts Production

Aluminum also compete in similar markets for the automotive and aerospace industry. Aluminum is a well-rounded metal with a luminous finish that caters to a diverse market including various commercial and household goods. Modern commercial transport planes consist of 80% aluminum—found mostly in their airframes, especially for fuselages and wings. Aluminum is used extensively in the space industry for shuttles and structures at the international space station. Aluminum alloys are also used in construction to provide strong frames that can handle the significant weight of large glass panes.

Car makers are under more pressure to reduce the carbon footprint of their vehicles. Lightweight aluminum frames, body panels, and engines help this cause by improving the fuel economy. There are also other environmental benefits, as nearly 90% of automotive aluminum scrap is collected for recycling.

**In summary**, the combination of these benefits along with beneficial products productions makes alloys casting a sustainable short and long-term solution to the world's resource management crisis, which will only increase as the world population increases. This will cause the production of large amounts of aluminum and metal alloys products, thus helping battle mineral scarcity for future generations and make ease in difficulty of metal waste management.

## 4.4 Economic Alternatives, their Selection and Rejection

Managing metal waste is directly linked to the sustainable management of the entire mineral and metallurgical cycle. Inadequate, non-degradable waste management pollutes surrounding terrestrial and aquatic environments—vital natural capital for local communities. Therefore, discharging untreated metal scrap or failing to recover secondary metals involves significant economic, environmental, and social costs.

Metal waste processing yields substantial economic benefits by avoiding the high capital, energy, and environmental costs associated with primary mining and ore extraction. Consequently, the cost of "no action" equates to lost benefits—specifically, missed opportunities to recover valuable ferrous and non-ferrous alloys.

When metal scrap is discarded rather than recycled, economic value is lost. The benefits of processing ferrous (steel, iron) and non-ferrous (aluminum, copper, brass) scrap into standardized ingots and molds are divided into two main categories:

1. **Market Benefits:** Easily quantifiable financial returns derived from converting low-cost scrap into high-value engineering inputs (ingots, billets, and continuous cast molds). Re-melting scrap requires up to 95% less energy than primary metal production, drastically lowering operational fuel and power expenses while providing local foundries and rolling mills with affordable raw materials.
2. **Non-Market Benefits:** Environmental and public health improvements—such as reduced greenhouse gas emissions, minimized landfill usage, and reduced heavy metal leaching into soil and groundwater. While difficult to quantify in direct monetary terms due to the absence of active market prices, these benefits represent significant long-term socio-economic gains. Non-market benefits are incorporated qualitatively into this analysis rather than artificially conflated into monetary metrics.

Recycling both ferrous and non-ferrous scrap yields major economic and resource efficiency advantages. Ferrous scrap (such as heavy melting steel, plate and structural steel, and cast iron) serves as an indispensable feedstock for civil construction rebars, structural beams, and industrial castings. Non-ferrous scrap (such as aluminum, copper, and brass) remains critical for lightweight automotive parts, electrical infrastructure, aerospace applications, and consumer manufacturing.

To maximize these economic and environmental benefits, the proponent will deploy an energy-efficient induction furnace combined with an automated ingot/mold casting line. This setup minimizes melting losses, reduces slag generation, and optimizes recovery rates—ensuring sustainable industrial growth while adhering to environmental compliance standards.

# DESCRIPTION OF THE PROJECT

# 5 DESCRIPTION OF THE PROJECT

## 5.1 General

This chapter provides a simplified description of the Alpha Engineering, involves Installation of induction furnace and its salient features, its location, its components and its various phases. Also covered in this chapter are the inputs (water, fuel, electricity, materials, etc.) and discharges (wastes, emissions, disposals, etc.) associated with construction and operation phases of the project. This proposal is a part of construction phase in project cycle.

## 5.2 Objective of Project

The primary objective of this project is to establish an energy-efficient industrial facility for processing and recycling abundantly available ferrous (such as heavy melting steel, plate and structural scrap, and cast iron) and non-ferrous (such as aluminum, copper, and brass) scrap into high-grade ingots and custom mold castings.

## 5.3 Location of Project

The project site is located at Plot No. 61, Street S3, RCCI Industrial Estate Rawat, District Rawalpindi. The area has already been declared as “Industry Zone” by the competent authorities. The total area of the proposed project site is 2 Kanal. No population exists in close vicinity of proposed unit.

### 5.3.1 Google Coordinates are:

33°31'05.2"N 73°14'29.4"E

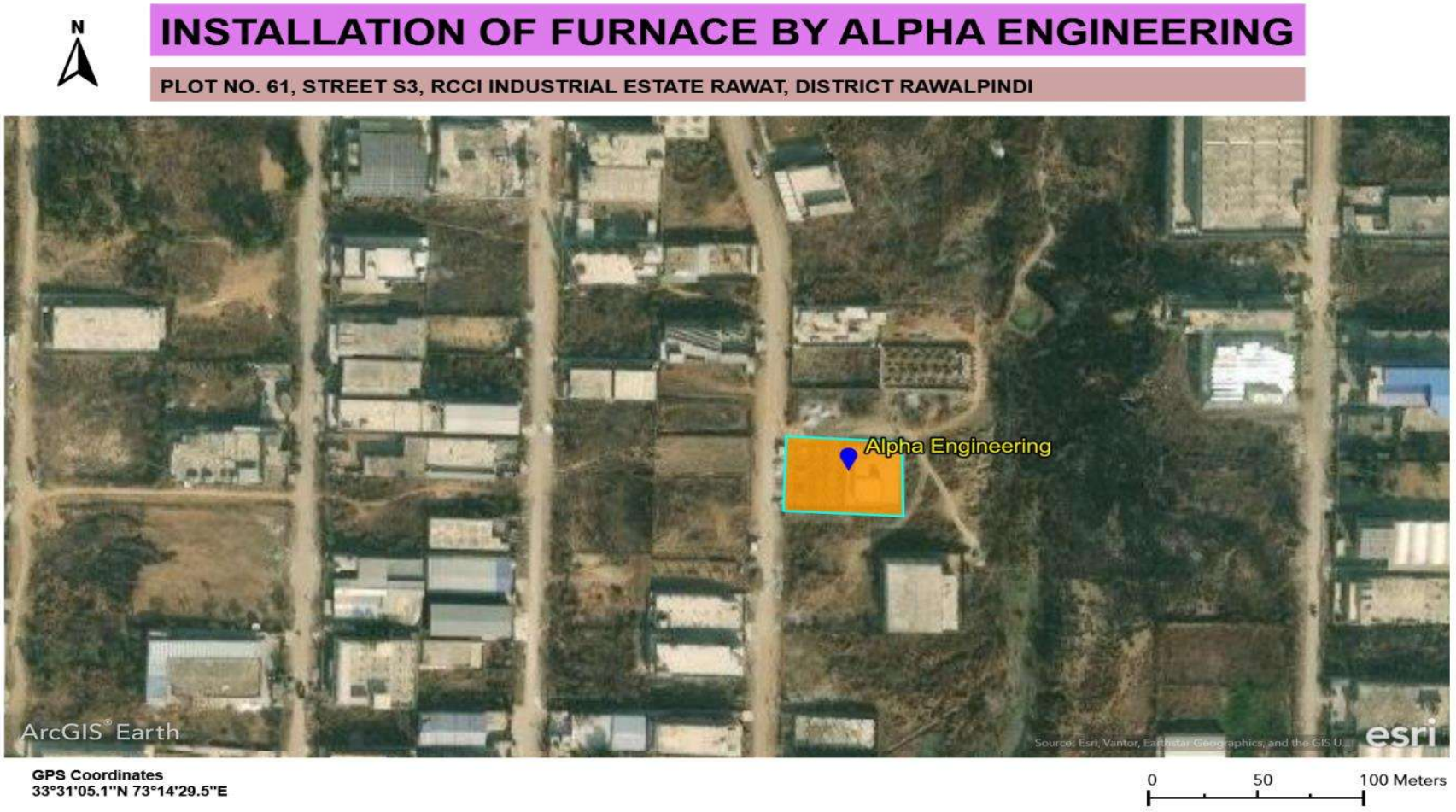



**Figure 5-1: Location of the proposed Site**

## 5.4 Land Use

Currently the proposed land is open land and already owned by the proponent. Total area of land is approximately 2 Kanal

## 5.5 Vegetation Features on the Site

The project site and its vicinity are of industrial plots; however, no species of significant ecological importance exist at or near the project site.

## 5.6 Road Access

The project is accessible from approx 200 Feet front through link road to RCCI Rawat Road. All the access roads are paved and are in good conditions.

## 5.7 Cost and Magnitude of Operation

Project management intends to install induction furnace by M/S Alpha Engineering. The capacity of proposed project is 300 kg/ Batch. Total estimated cost for the project is 11 Million Rupees. This cost will be invested on infrastructure development, Management of the environment, setup cost and material purchasing.

## 5.8 Schedule of Implementation

It is planned that the following schedule of project implementation will be adhered to. This is subject to the conditions that everything goes according to planning and no serious bottlenecks are encountered. The implementation stages of the project activity include:

**1st Stage**

The stage –1 comprises the onsite contouring studies and soil investigations.

**2nd Stage**

The stage –2 comprises the following task:

i- Lying of foundations excavation and commencement of erection work.

ii- Start of civil, electrical and mechanical work.

iii- Development of basic infrastructure.

iv- Fitting of instrumentation.

**3rd Stage**

The stage –3 comprises the following task:

i- Plant/ Equipment erection completion.

ii- Completion of the basic infrastructures water supply system, electricity supply etc.

**4th Stage**

The last stage will be Commencement of operation.

## 5.9 Energy

The present sanctioned power load of the project is 500KW supplied by IESCO. In order to meet the emergency as well as critical power requirements during WAPDA shut down the project also proposes to install 350 KVA Diesel Generator for standby. And in future company will also install renewable source of power generation of 100KW through Solar energy.

## 5.10 Availability of Water

Adequate quantity of underground water is available to meet even all the project requirements. The quality of water is also satisfactory. This factor also supports the decision regarding sitting of the project at the existing site. However, the water for all project activities will be withdrawn from the underground water through bore at the project site.

The water requirements for the construction phase of the project are estimated as 600 gallons per day during the peak hours of construction. During operation phase 2000 LPD water will be utilized in washrooms and 10000 liters of water will be required initially for cooling of ingots/ molds which will also be recycled after filling the system initially.

## 5.11 Description of Project Process

### 5.11.1 Raw Materials

#### 5.11.1.1 Ferrous Scrap (Steel & Iron Billets/Ingots)

**Heavy Melting Steel (HMS 1 & HMS 2):**

- **HMS 1:** Clean industrial scrap with a minimum thickness of 1/4 inch (6 mm), including structural steel, cut rail pieces, truck frames, heavy machinery parts, and thick plate cut-offs. Ideal for induction furnaces due to high bulk density and low melt loss.
- **HMS 2:** Slightly lighter steel scrap (minimum 1/8 inch / 3 mm thickness), such as auto body parts, light structural steel, and galvanized pipe sections.

**Shredded Scrap (ISRI 210/211):**

- Fragmented steel derived from recycled vehicles, household appliances, and light iron. It is magnet-separated to ensure high purity and offers uniform feeding into the crucible.

**PNS (Plate and Structural Scrap):**

- Cut steel plates, I-beams, channels, and angles. PNS provides high packing density inside a 500 kg crucible, ensuring efficient heat transfer and faster tap-to-tap times.

**Rebar & Cutting Ends:**

- Clean crop ends from steel rolling mills and construction rebar trimmings.

**Cast Iron Scrap & Pig Iron:**

- Broken machinery blocks, flywheels, and virgin cold-pig iron used in small proportions to balance the carbon level in the melt bath prior to chemistry adjustment.

### 5.11.1.2 Non-Ferrous Scrap (Aluminum, Copper, Brass Ingots)

**Aluminum Scrap:**

- **Tense:** Cast aluminum scrap (engine blocks, auto castings).
- **Tabor:** Clean mixed old sheet aluminum.
- **Wire/Taint:** Clean aluminum wire and cable ends.

**Copper & Brass Scrap:**

- **Millberry:** Clean, unalloyed copper wire.
- **Honey/Label:** Yellow brass solids and castings used for producing brass ingots.




**Figure 5-2: Raw Material (Scrap)**

### 5.11.2 Description of Induction Furnace System

The induction furnace operates on the principle of electromagnetic induction (Faraday's Law and Joule Heating). It utilizes a high-frequency or medium-frequency alternating magnetic field to generate localized eddy currents inside solid metal scrap, rapidly heating and melting the charge without direct flame contact or combustion gases. This electro-thermal process provides high thermal efficiency, low melt oxidation, and precise metallurgical control for both ferrous and non-ferrous scrap recovery.

#### 5.11.2.1 Power Supply & Control Panel Box:

- Converts incoming three-phase AC mains voltage into high-frequency AC power via solid-state silicon-controlled rectifiers (SCR) and inverters.
- Features operational control panels, digital frequency meters, current/voltage regulators, and safety trip interlocks (such as temperature, cooling water flow, and electrical earth-leakage sensors).
- Connected to the furnace crucible via heavy-duty copper bus bars housed inside covered underground utility trenches.

#### 5.11.2.2 Furnace Crucible & Tilting Frame:

- **Electromagnetic Induction Coil:** Constructed from high-conductivity, heavy-walled rectangular copper tubing that carries high-frequency electrical current and internal cooling water.



**Figure 5-3: Induction Furnace**

#### 5.11.2.3 Refractory Lining:

- Ferrous Scrap Melting: Silica or neutral (alumina-spinel) monolithic ramming mass to withstand high melting temperatures (up to 1650°C).
- Non-Ferrous Scrap Melting: High-density graphite or silicon carbide crucibles/linings optimized for non-ferrous metals (such as aluminum, copper, and brass) to prevent melt contamination.
- **Hydraulic Tilting Mechanism:** Dual hydraulic cylinders smoothly tilt the furnace body forward up to 95% to pour molten metal into ladle systems or automated ingot casting lines.



**Figure 5-4: Automatic Ingot Molding**

#### 5.11.2.4 Closed-Loop Water Cooling System:

- Circulates demineralized/softened water through cooling towers, heat exchangers, and internal copper induction coils to prevent overheating and insulation breakdown during continuous operation.

#### 5.11.2.5 Integrated Exhaust & Fume Extraction System:

- **Suction Hood:** Mounted over the furnace mouth to capture smoke, dust, and metal oxides during charging, slagging, and tapping operations.
- **Pre-Separation Unit:** Exhaust air passes through a spark arrester and cyclone separator to knock down large incandescent sparks and coarse heavy dust particles.
- **Baghouse Filter Station:** High-efficiency fabric filter station (utilizing multi-bag filter arrays) captures fine particulate matter (PM) prior to clean air discharge through an industrial blower and stack.

### 5.11.3 Technical Specifications & Operational Parameters

| Parameter | Specifications |
|---|---|
| **Furnace Capacity** | 300 kg per batch (scalable based on production requirements) |
| **Rated Power Input** | 350 kW to 750 kW medium-frequency power unit |
| **Operating Temperature** | 600°C – 800°C (Aluminum/Brass); 1450°C – 1650°C (Steel/Iron) |
| **Power Consumption** | ~500–550 kWh/ton (Ferrous); ~450–500 kWh/ton (Non-Ferrous) |
| **Air Pollution Controls** | Cyclone separator, spark arrester, filter station (72+ filter bags) |

### 5.11.4 Operational Workflow for Scrap Melting

1. **Scrap Sorting & Preparation:**

- Ferrous scrap (HMS 1/2, PNS, rebar cut-offs) and non-ferrous scrap (aluminum castings, copper wire) are sorted, dried, and sized to avoid bridging inside the crucible.

2. **Charging:**

- Dense, clean scrap is loaded into the crucible using overhead cranes or charging buckets.

3. **Electromagnetic Induction & Melting:**

- High-frequency power creates intense electromagnetic fields, inducing eddy currents directly inside the metal charge to rapidly melt the scrap.
- Natural electromagnetic stirring ensures uniform temperature distribution and homogeneous chemical composition throughout the melt.

4. **Slag Removal & Chemistry Adjustment:**

- Impurities float to the surface as slag, which is skimmed off manually using slagging tools. Ferro-alloys or fluxes are added to adjust carbon, manganese, or aluminum content.

5. **Tapping & Ingot Casting:**

- Liquid metal is tapped into a heated pouring ladle and poured into an automatic ingot caster or billet molds.

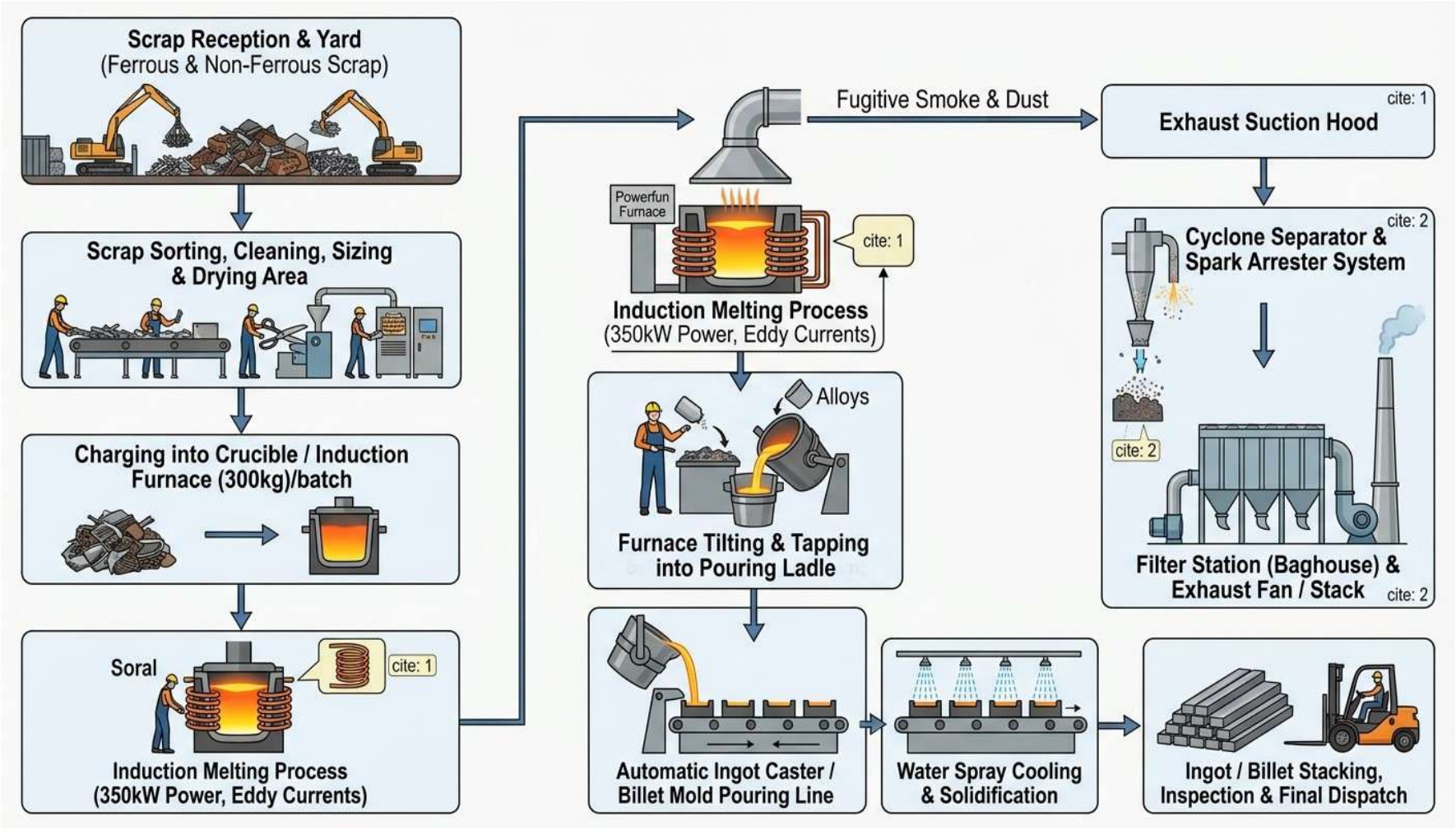



**Figure 5-5: Process Flow Diagram of Proposed Project**

### 5.11.5 Machinery in the Operational Phase

No sophisticated machinery will be used in the Operational Phase of the project. The types of machinery used for alloys manufacturing are:

- Scrap Preparation/ Conditioning Equipment
- Production Equipment
- Auxiliary Equipment

### 5.11.6 Construction Materials

The construction materials include cement, sand, crush, bricks, steel bars, paints, piping materials, electrical materials and finishing materials.

## 5.12 Restoration/Rehabilitation at the End of Project Life

There will be no any matter of rehabilitation as the proposed site is already owned by the project proponent and located within industry zone. There will not be any let regarding safety factors as applicable from time to time for such unit on all accounts. However, at the end of the life of the unit, it will be duly dismantled with special precautions to avoid/minimize pollution and at the same time taking all safety precautions to protect human life and property around the project site. Debris or any other wastes resulting from demolishing will be disposed off in environmentally sustainable fashion. The materials capable of recycling/reuse will be either sold in the market or to be reused for other suitable purposes. While dismantling all Government rules and regulations as applicable to such activities will be strictly adhered to. During entire construction period, necessary precautions will be taken to ensure that no damage is done to the basic infrastructures like sewer system, power transmission lines roads, private or public property and daily human life as well. Safety measures as desired under the code of demolition will be adopted to avoid any harm to humans, property around, or the environment in the project area. Dust to be generated will be minimized by constant sprinkling of water. After completion; all construction matrix, debris and garbage will be removed off immediately from the site within the minimum possible time under safe conditions. Any minor spillover of these materials will be cleared adequately. The land, if and where pitted will be adequately leveled. On the whole, the project site and the area in its near vicinity will be made neat and clean.

# DESCRIPTION OF ENVIRONMENT

# 6 DESCRIPTION OF THE ENVIRONMENT

## 6.1 General

This section covers a comprehensive description of the project area, including environmental attributes which are expected to be affected by the project, as well as those which are not expected to be directly affected by the construction and operation of the project. The existing environmental conditions around the proposed project have been considered with respect to physical, biological and socio-economic aspects. A site visit was conducted to survey the field area and to collect environmental data on physical, biological and socio-economic parameters. Further, consultations were held with the public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project.

## 6.2 Physical Environment

### 6.2.1 Topography

Rawalpindi, located in the northern region of Pakistan, exhibits a diverse topography characterized by rolling plains, undulating hills, and flat lowlands. The city lies on the Pothohar Plateau, a region known for its rugged terrain and limestone formations. To the north, the Margalla Hills provide a scenic backdrop, contributing to the area's varied elevation. Numerous streams and nullahs, such as the Leh Nullah, traverse the city, shaping its landscape and influencing urban planning. The elevation of Rawalpindi varies, with the city center situated at around 488 meters above sea level. This geographical diversity supports a mix of urban and semi-urban environments, with green spaces and agricultural lands interspersed with densely populated areas.

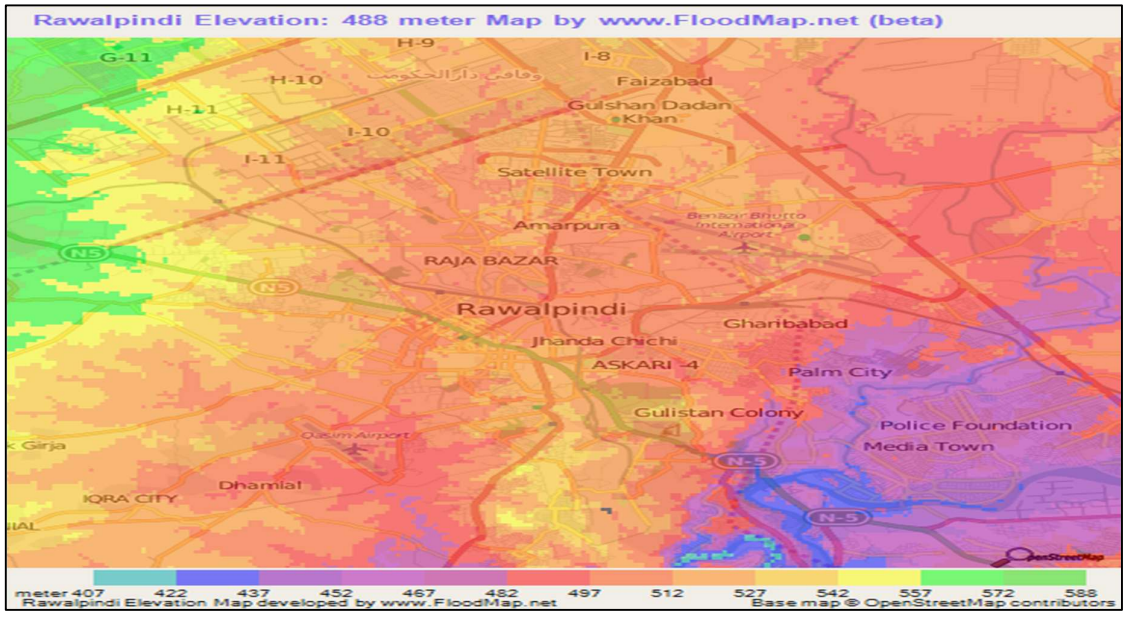



**Figure 6-1: Topography of Rawalpindi**

### 6.2.2 Soils

The soils of Rawalpindi are primarily derived from the weathering of the Pothohar Plateau's parent rock materials, resulting in a diverse soil profile. The region predominantly features loamy and clayey soils, which are fertile and suitable for agriculture, especially in the peripheral rural areas. These soils often exhibit good water retention properties but can become compact and less permeable, affecting drainage. In some areas, especially where urban development has intensified, soil degradation and erosion are evident due to construction activities and deforestation. The presence of alluvial soils along the streams and nullahs adds to the diversity, providing a mix of fertile grounds for cultivation and areas prone to seasonal waterlogging. Overall, the soils of Rawalpindi support a range of vegetation, from agricultural crops to urban greenery, contributing to the city's mixed land use.

### 6.2.3 Climate and Meteorology

Rawalpindi experiences a humid subtropical climate characterized by hot summers, a monsoon season, and mild winters. Summers, from May to September, can be intense, with temperatures often exceeding 40°C (104°F). The monsoon season, occurring from July to September, brings significant rainfall, which can lead to short-term flooding in some areas. Winters, from December to February, are relatively mild, with temperatures ranging from 5°C to 18°C (41°F to 64°F), occasionally dropping lower during cold spells. Spring and autumn serve as transitional periods with moderate temperatures and lower humidity. The city experiences a distinct seasonal pattern, with the variability in precipitation and temperature influencing agricultural activities and water resource management in the region.

**Table 6-1: Average Temperature and Rainy Days of Rawalpindi**

| Month | Lowest Temperature | Highest Temperature | Average Precipitation Days |
|---|---|---|---|
| | °C | °C | Days |
| **January** | 17 | 6 | 4 |
| **February** | 20 | 8 | 5 |
| **March** | 25 | 13 | 7 |
| **April** | 30 | 17 | 6 |
| **May** | 36 | 22 | 7 |
| **June** | 39 | 26 | 7 |
| **July** | 36 | 27 | 15 |
| **August** | 34 | 26 | 13 |
| **September** | 34 | 23 | 7 |
| **October** | 31 | 18 | 3 |

| Month | Lowest Temperature | Highest Temperature | Average Precipitation Days |
|---|---|---|---|
| | °C | °C | Days |
| November | 24 | 12 | 2 |
| December | 20 | 8 | 2 |

### 6.2.4 Climate

The climate in Rawalpindi, Pakistan, is characterized by short, hot, humid, and rainy summers, along with short, cold, and mostly clear winters. Throughout the year, temperatures generally range from 39°F to 101°F, with rare instances of temperatures falling below 34°F or exceeding 108°F.

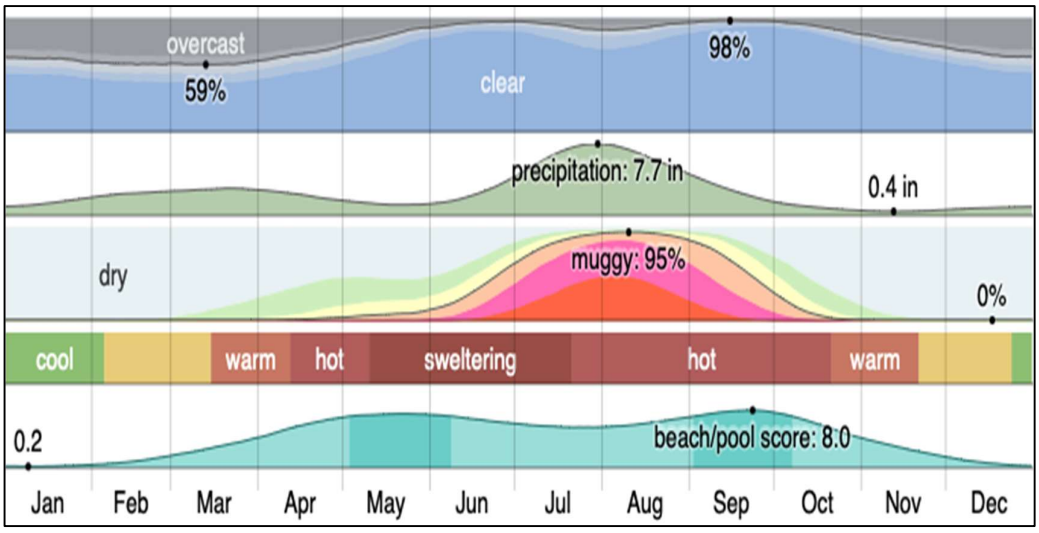



**Figure 6-2: Average Climate Change in Rawalpindi**

#### 6.2.4.1 Average Temperature

The hot season in Rawalpindi spans 2-3 months, from May 4 to July 31, with average daily high temperatures exceeding 93°F. June is the hottest month, with an average high of 100°F and a low of 76°F.The cool season lasts for 2.9 months, from December 4 to February 28, with average daily high temperatures below 71°F. January is the coldest month, with an average low of 40°F and a high of 63°F.

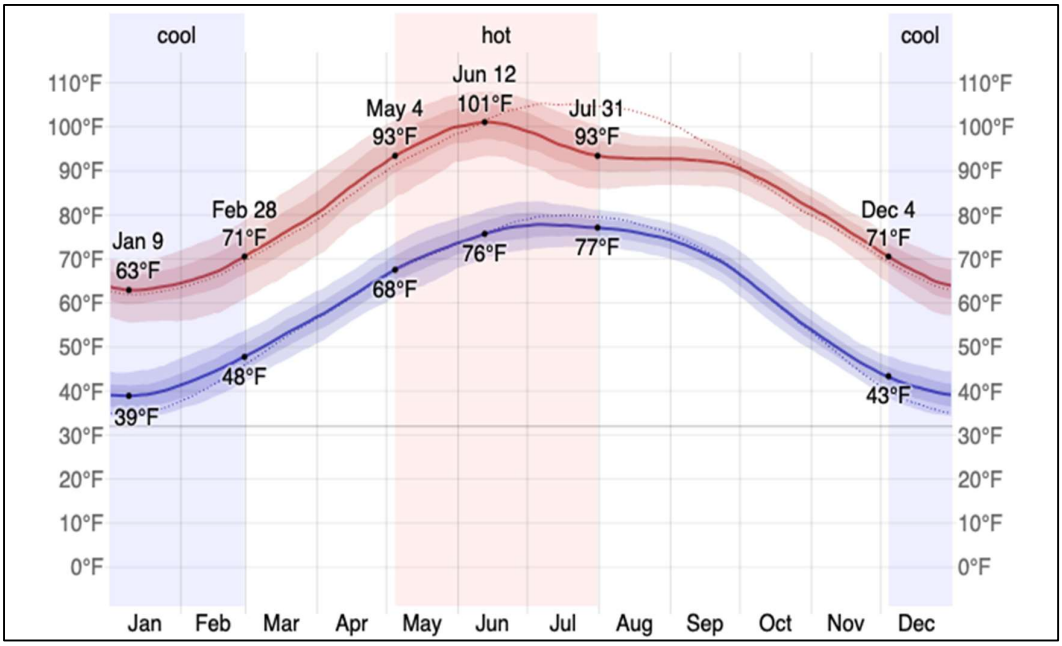



**Figure 6-3: Average Temperature of Rawalpindi**

### 6.2.4.2 Average Precipitation

The wet day in Rawalpindi is defined as one with at least 0.04 inches of liquid or liquid-equivalent precipitation. The likelihood of wet days fluctuates significantly throughout the year. The wetter season spans 2.5 months, from June 23 to September 9, with a daily chance of precipitation exceeding 30%. July is the wettest month, averaging 15.3 days with at least 0.04 inches of rainfall. The drier season lasts 9.5 months, from September 9 to June 23. November has the fewest wet days, averaging only 1.6 days with measurable precipitation. Precipitation in Rawalpindi primarily falls as rain rather than snow. July has the highest number of rainy days, averaging 15.3 days of rainfall. The probability of rain alone peaks at 55% on July 27, making it the most common form of precipitation throughout the year.

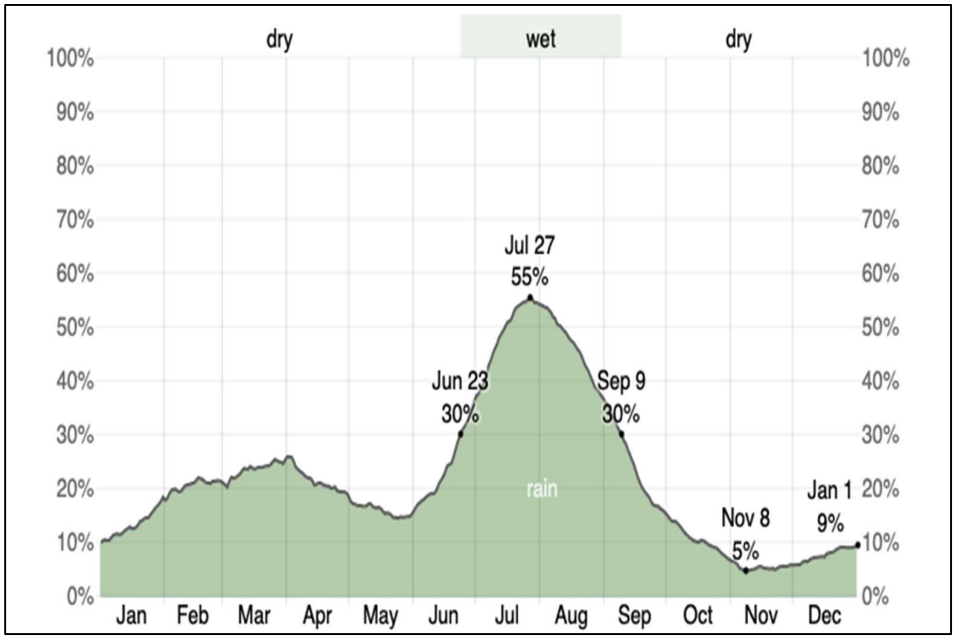



**Figure 6-4: Average Precipitation in Rawalpindi**

### 6.2.4.3 Average Rainfall

Rawalpindi experiences significant seasonal fluctuations in rainfall. Rain occurs year-round, but July is the wettest month, receiving an average of 6.7 inches of rainfall. In contrast, November is the driest month, with an average rainfall of just 0.5 inches.

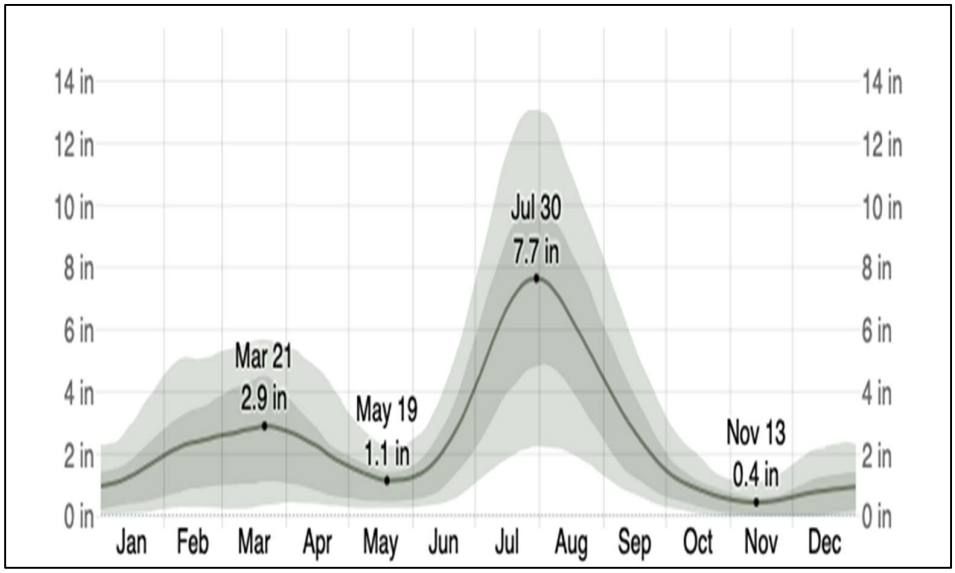



**Figure 6-5: Average Rainfall in Rawalpindi**

### 6.2.4.4 Humidity

Humidity comfort levels in Rawalpindi are determined by the dew point, which affects how moisture evaporates from the skin and influences the perception of

humidity. Lower dew points create a drier feel, while higher dew points result in more humid conditions. Unlike temperature, which fluctuates significantly between day and night, dew points change more gradually, meaning muggy days are usually followed by muggy nights. Rawalpindi experiences significant seasonal variation in humidity. The muggier period lasts for 3.7 months, from June 12 to October 3, during which the humidity level is classified as muggy, oppressive, or miserable at least 24% of the time. August is the most humid month, with an average of 28.9 muggy or worse days.

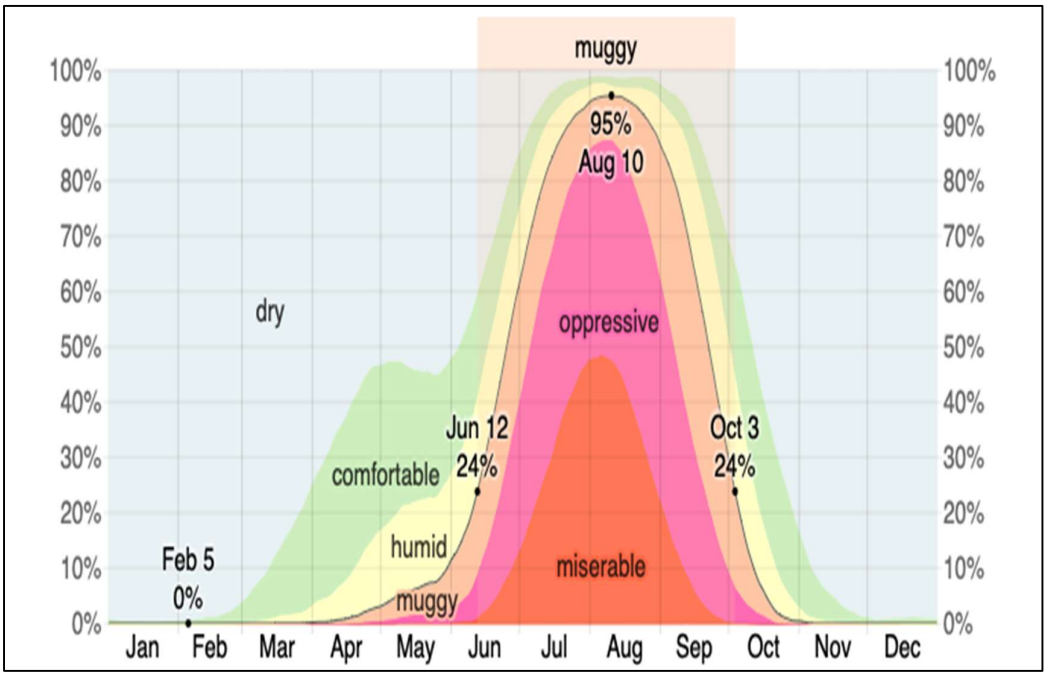



**Figure 6-6: Humidity Comforts Level in Rawalpindi**

### 6.2.5 Surface and Ground Water

Rawalpindi's water resources include both surface and groundwater, which are vital for the city's domestic, agricultural, and industrial needs.

In Rawalpindi, surface water primarily comes from rivers, streams, and reservoirs, with the Rawal Dam being a significant source. The dam, located on the Korang River, supplies water to both Rawalpindi and the neighboring Islamabad. Numerous smaller streams and nullahs, such as Leh Nullah, traverse the city, playing a crucial role in drainage and water management but also posing flood risks during the monsoon season.

Groundwater in Rawalpindi is extracted through wells and boreholes, serving as a critical supplement to surface water, especially during dry periods. The aquifers in the region vary in depth and yield, with groundwater levels fluctuating due to seasonal variations and increasing demand. Over-extraction has led to a decline in groundwater levels in some areas, raising concerns about long-term sustainability. Water quality issues, including contamination from industrial discharge and untreated sewage,

further complicate the management of both surface and groundwater resources. Effective water management strategies are essential to ensure the availability and quality of water for Rawalpindi's growing population.



**Figure 6-7: Rawal Dam**

## 6.3 Seismology

Rawalpindi, situated near the geologically active region of the Himalayan foothills, is prone to seismic activity. The city lies within a seismically active zone due to the tectonic interactions between the Indian and Eurasian plates. This region has experienced significant earthquakes in the past, including the notable 2005 Kashmir earthquake, which had widespread effects across northern Pakistan. The seismicity of the area necessitates stringent building codes and construction practices to mitigate earthquake risks. The presence of faults and the potential for seismic events require continuous monitoring and preparedness strategies to safeguard the population and infrastructure. Overall, while not as frequently affected as some other regions, Rawalpindi remains vulnerable to seismic hazards due to its geographical and geological context.

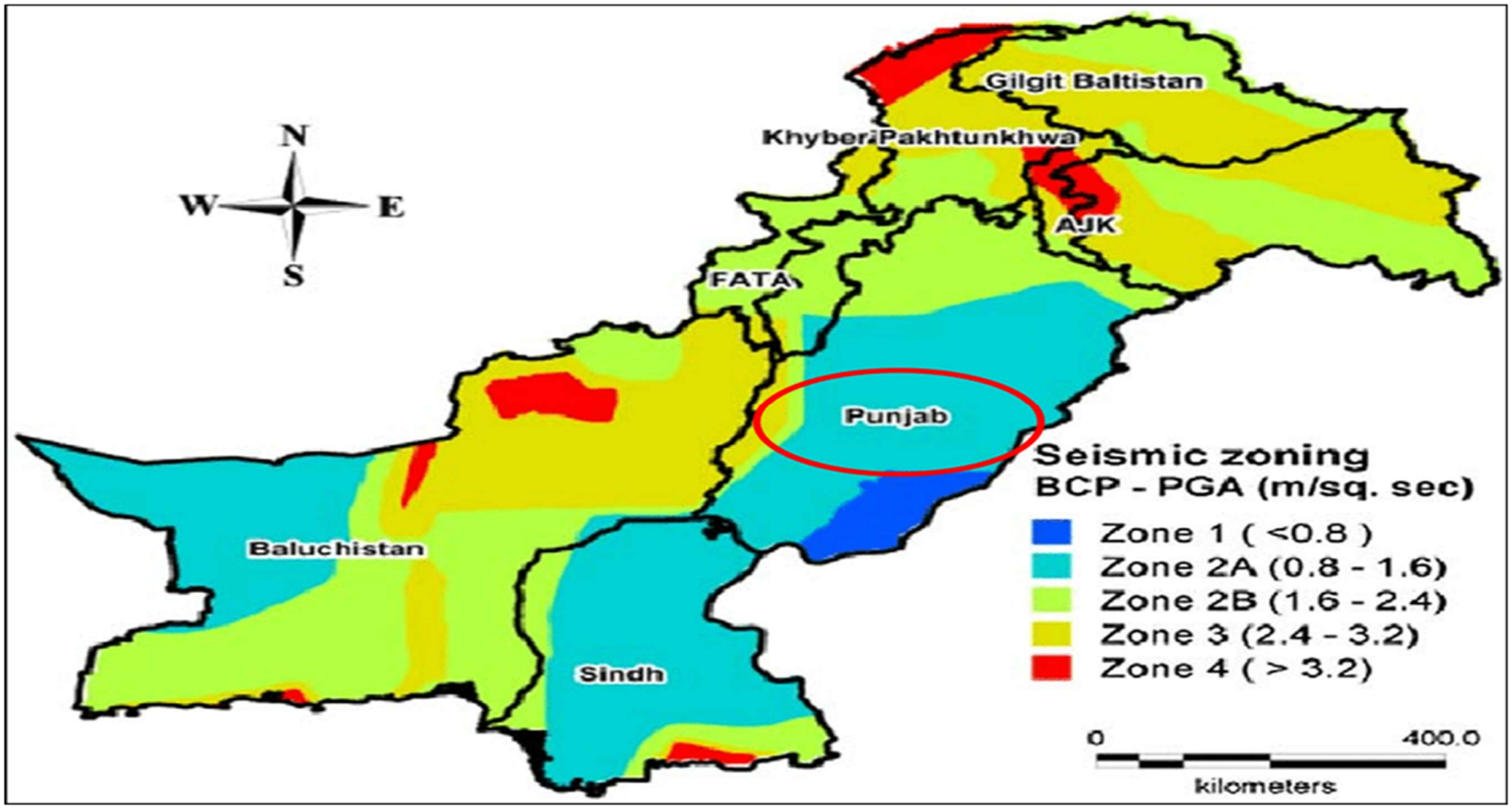



**Figure 6-8: Seismic Zones of Pakistan**

## 6.4 Ecological Resources

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

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

### 6.4.1 Flora

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

**Table 6-2: Flora of the Project Area**

| Sr. No. | Common Name | Scientific Name |
|---|---|---|
| 1. | Shisham | *Dalbergia sissoo* |
| 2. | Keekar | *Acacia arabica* |
| 3. | Siris | *Albizzia lebbeck* |
| 4. | Ber | *Ziziphus jujuba* |
| 5. | Guava | *Psidium guajava* |
| 6. | Citrus | *Citrus spp.* |

### 6.4.2 Fauna

Rawalpindi, nestled in the foothills of the Himalayas, boasts a diverse fauna.

**Table 6-3: Fauna of Rawalpindi**

| **Mammals** | |
|---|---|
| Wild Boar | *Sus scrofa* |
| Pangolin | *Manis crassicaudata* |
| Indian Hare | *Lepus nigricollis* |
| Indian Porcupine | *Hystrix indica* |
| **Birds** | |
| Monal | *Lophophorus impejanus* |

| | |
|---|---|
| Himalayan Griffon | *Gyps himalayensis* |
| Common Kingfisher | *Alcedo atthis* |
| Golden-eared Bulbul | *Pycnonotus leucogenys* |










### 6.4.3 Water Bodies

Rawalpindi, while not directly bordering any major rivers, does have a couple of notable bodies of water that play a role in the city's ecosystem and recreation.

Rawal Lake: This artificial lake is a popular spot for boating, fishing, and picnicking. It's located near the Margalla Hills and serves as a source of drinking water for the city.



**Figure 6-9: Rawal Lake**

Nullah Lai: Nullah Lai is more of a seasonal stream or ravine that runs through Rawalpindi. During the monsoon season, it can carry a large amount of water, but for most of the year, it's a dry channel. Unfortunately, Nullah Lai suffers from pollution due to wastewater.

The Soan River, which flows into the Indus River further south, is another source of water for the Rawalpindi Islamabad area, but it's not located within the city limits itself. This river flows at a distance of 1.7km from the project site (Figure 6-6).

### 6.4.4 Endangered Species

The endangered plant in Pakistan is the Elm i.e., Ulmus wallichiana which is not found here. No endangered species exist in the project area.

## 6.5 Socio-Economic Environment

### 6.5.1 History

Rawalpindi's history stretches back centuries, showcasing a rich tapestry of rulers and influences. Archaeological evidence suggests that during the Indus Valley Civilization (3300-1300 BCE), the Rawalpindi district was an agricultural region with forests. In the Vedic Period (1500-500 BCE), Indo-Aryan tribes arrived from Central Asia and settled in the Punjab region, including the Rawalpindi area. The city witnessed the march of Alexander the Great's army in 326 BCE. During the medieval period, Rawalpindi saw various rulers, including Sultan Mahmud of Ghazni, who destroyed an earlier settlement on the site in the 11th century, and the Gakhar tribe, who re-established the town in the 15th century, naming it Rawal. The city's importance fluctuated during the Mughal era and declined as Mughal power weakened. In the 18th century, Sikh leader Sardar Milkha Singh revitalized Rawalpindi by inviting

traders and establishing a thriving marketplace. Under British rule (1849-1947), following the annexation after the Sikh defeat in the First Anglo-Sikh War, Rawalpindi was transformed into a major military garrison town, establishing the largest cantonment in British India and significantly boosting its population and infrastructure. The construction of railways in the 1880s further enhanced its connectivity. Post-independence, Rawalpindi served as Pakistan's capital from 1959 to 1969 and remains a significant military center. Today, Rawalpindi and Islamabad are known as twin cities due to their close proximity and economic ties.

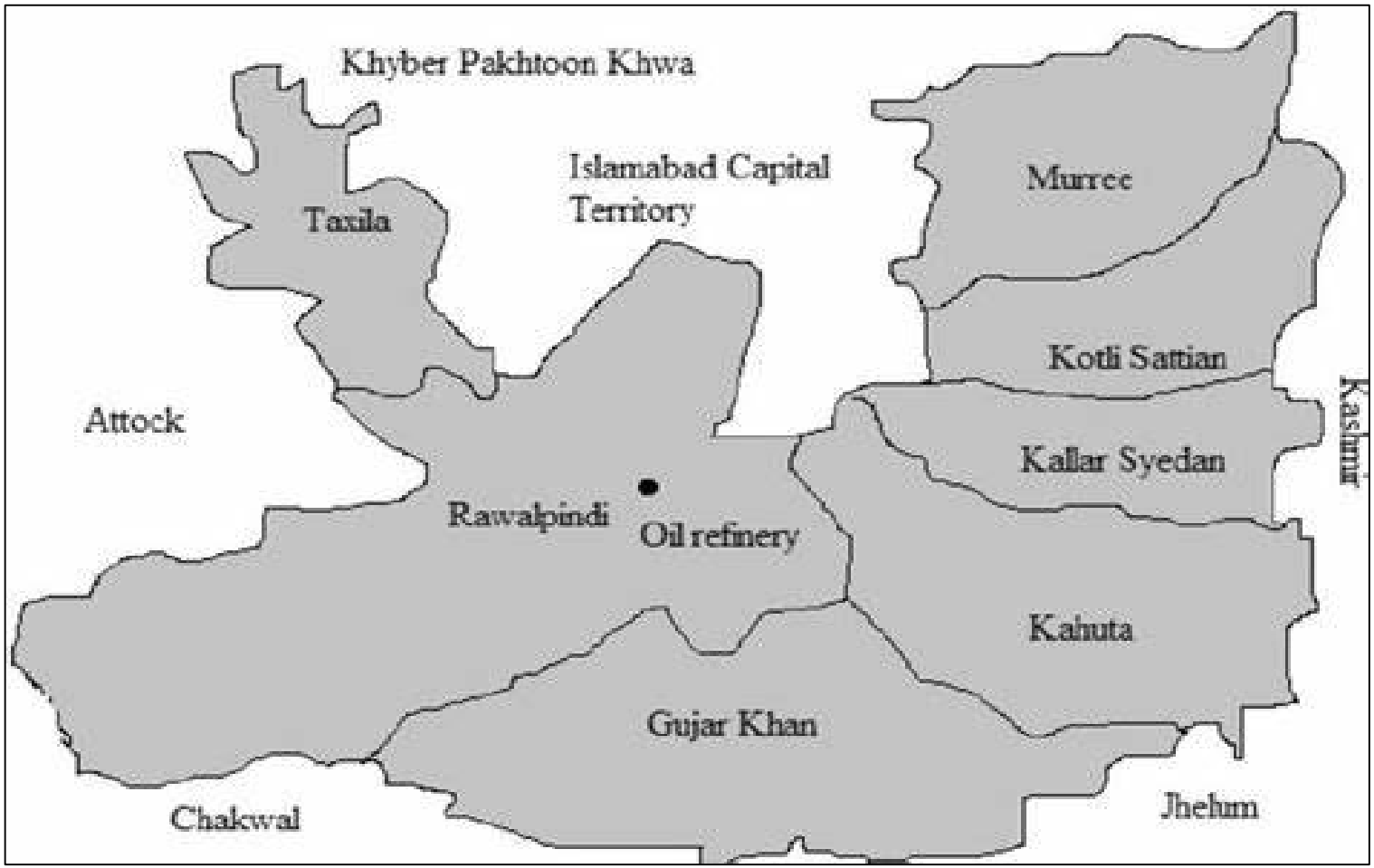



**Figure 6-10: District Map of Rawalpindi**

### 6.5.2 Political Set Up

Rawalpindi's political setup operates within Pakistan's broader administrative and political systems. The city is part of the Rawalpindi District, managed by a district government, and has its own municipal corporation responsible for urban management and public services. It is divided into Union Councils, each represented by elected members addressing local issues. At the provincial level, Rawalpindi is represented in the Punjab Provincial Assembly, with several Members of the Provincial Assembly (MPAs) elected from the city's constituencies. Nationally, Rawalpindi is represented in Pakistan's National Assembly by several Members of the National Assembly (MNAs) and is indirectly represented in the Senate through senators elected by the Punjab Provincial Assembly. Major political parties, including Pakistan Tehreek-e-Insaf (PTI), Pakistan Muslim League (Nawaz) (PML-N), and Pakistan People Party (PPP), have a significant presence in the city, influencing both local and national elections. Additionally, Rawalpindi's notable military presence, being home to the Pakistan Army's General Headquarters (GHQ), intersects with local politics, especially in security and defense-related areas.

### 6.5.3 Economic Activities

The project area is primarily agricultural, making agriculture the main economic activity in the region. The local economy relies heavily on farming and related activities, which provide livelihoods for the residents of nearby settlements. The introduction of the project in this predominantly industrial zone may impact the local agricultural practices and economy.

Rawalpindi is a bustling economic hub with diverse economic activities contributing to its growth and development. The city's economy is driven by a combination of trade, industry, and services. As a major commercial center, Rawalpindi hosts numerous markets and shopping areas, including the renowned Raja Bazaar, where a wide range of goods, from textiles to electronics, are traded. The industrial sector is also significant, with numerous small and medium-sized enterprises engaged in manufacturing, particularly in textiles, leather, and food processing. Rawalpindi's strategic location, adjacent to the capital city of Islamabad, enhances its economic prospects, facilitating trade and business connectivity. Additionally, the presence of the Pakistan Army's General Headquarters (GHQ) and other military installations contributes to economic stability and growth, with a substantial portion of the population employed in defense-related services. The city's transportation infrastructure, including its railway station and proximity to major highways, further supports commercial activities and logistics. Overall, Rawalpindi's vibrant economy is characterized by a mix of traditional markets, industrial production, and service-oriented businesses, making it a vital economic center in the region.

## 6.6 Quality of Life Values

### 6.6.1 Demographic Survey

As of the most recent estimates, Rawalpindi's population is approximately 2.4 million people. This population figure reflects the city's status as one of Pakistan's major urban centers, with a high population density and continuous growth due to migration from rural areas and other regions. The city's demographic composition includes a variety of ethnic groups, predominantly Punjabis, but also significant numbers of Pathans, Muhajirs, and smaller communities of Kashmiris and others. Rawalpindi's growing population contributes to its dynamic economy, cultural diversity, and the demand for enhanced infrastructure and public services.

Rawalpindi Urban Area Population History

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1950 | 233,000 | 1951 | 240,000 | 1952 | 249,000 | 1953 | 258,000 | 1954 | 268,000 |
| 1955 | 278,000 | 1956 | 288,000 | 1957 | 299,000 | 1958 | 310,000 | 1959 | 321,000 |
| 1960 | 333,000 | 1961 | 347,000 | 1962 | 366,000 | 1963 | 385,000 | 1964 | 405,000 |
| 1965 | 426,000 | 1966 | 448,000 | 1967 | 472,000 | 1968 | 496,000 | 1969 | 522,000 |
| 1970 | 550,000 | 1971 | 579,000 | 1972 | 609,000 | 1973 | 630,000 | 1974 | 650,000 |
| 1975 | 670,000 | 1976 | 690,000 | 1977 | 711,000 | 1978 | 733,000 | 1979 | 756,000 |
| 1980 | 779,000 | 1981 | 804,000 | 1982 | 831,000 | 1983 | 860,000 | 1984 | 889,000 |
| 1985 | 919,000 | 1986 | 951,000 | 1987 | 983,000 | 1988 | 1,017,000 | 1989 | 1,051,000 |
| 1990 | 1,087,000 | 1991 | 1,124,000 | 1992 | 1,163,000 | 1993 | 1,202,000 | 1994 | 1,243,000 |
| 1995 | 1,286,000 | 1996 | 1,330,000 | 1997 | 1,375,000 | 1998 | 1,416,000 | 1999 | 1,446,000 |
| 2000 | 1,477,000 | 2001 | 1,508,000 | 2002 | 1,540,000 | 2003 | 1,573,000 | 2004 | 1,606,000 |
| 2005 | 1,641,000 | 2006 | 1,675,000 | 2007 | 1,711,000 | 2008 | 1,747,000 | 2009 | 1,784,000 |
| 2010 | 1,822,000 | 2011 | 1,861,000 | 2012 | 1,901,000 | 2013 | 1,941,000 | 2014 | 1,982,000 |
| 2015 | 2,024,000 | 2016 | 2,067,000 | 2017 | 2,111,000 | 2018 | 2,156,000 | 2019 | 2,196,000 |
| 2020 | 2,237,000 | 2021 | 2,281,000 | 2022 | 2,327,000 | 2023 | 2,377,000 | 2024 | 2,430,000 |

**Figure 6-11: Population of Rawalpindi**

### 6.6.2 Religion

Over 99% of the population in Rawalpindi District identifies as Muslim, reflecting the city's strong Islamic heritage and cultural influence. Minority religions include Christianity, which is practiced by around 2% of the population, and Hinduism along with other religions, which together account for less than 1% of the population.

### 6.6.3 Languages

Rawalpindi boasts a multilingual landscape, reflecting its diverse population. The majority of residents, roughly 67%, speak Punjabi as their first language, with several dialects, including Pothohari, Pahari, and Majhi (Standard Punjabi), prevalent in the city. Urdu, the national language of Pakistan, is widely understood and spoken, particularly in official settings and among the educated elite, with around 10.64% of the population listing it as their first language according to the 2017 census. Additionally, smaller minorities speak Pashto, Hindko, and Kashmiri, with 11.51% speaking Pashto and 3.25% speaking Hindko as their first languages. This linguistic diversity enhances Rawalpindi's cultural richness and facilitates communication and integration among its various ethnic groups.

### 6.6.4 Cultural and Social Status

Rawalpindi's cultural and social status is a blend of traditional and modern influences, reflecting its rich history and dynamic urban environment. The city is known for its vibrant cultural scene, with numerous festivals, fairs, and events that celebrate its heritage. Traditional Punjabi customs and practices are prevalent, including music, dance, and cuisine, which play a significant role in daily life. The city also showcases a mix of architectural styles, from historic Mughal-era buildings to contemporary structures.

Socially, Rawalpindi is characterized by a strong sense of community and family values. Extended families often live together, and social gatherings are frequent. The influence of Islam is deeply embedded in the social fabric, guiding daily routines, celebrations, and community interactions. Educational institutions, from schools to universities, are abundant, reflecting the population's emphasis on education and professional development.

The city's economic activities have led to a diverse social landscape, where traditional artisans and traders coexist with modern professionals and entrepreneurs. This economic diversity is mirrored in the social stratification, with a range of income levels and living standards. Despite this, there is a noticeable sense of unity and cooperation among the city's residents, driven by a shared cultural identity and communal ties.

### 6.6.5 Institutions

The project area is situated in an agricultural region, which is characterized by its focus on farming and rural activities. Consequently, there are no prominent educational institutes in the vicinity. The area's development is primarily centered

around agriculture, resulting in a limited presence of educational facilities and institutions that cater to academic needs.

However, Rawalpindi is home to a wide array of educational institutions, ranging from primary schools to universities, catering to the educational needs of its diverse population. The city's educational landscape includes both public and private institutions, offering a variety of programs and curricula.

- Pir Mehr Ali Shah Arid Agriculture University
- Fatima Jinnah Women University
- Rawalpindi Medical University
- National University of Medical Sciences (NUMS)
- Government Postgraduate College Asghar Mall
- Army Public Schools and Colleges System
- Beaconhouse School System
- The City School
- Roots Millennium Schools

### 6.6.6 Health Facilities

The project area, being predominantly agricultural, lacks prominent health institutes. Due to its rural nature, the region does not have well-established medical facilities or healthcare centers that are typically found in more urbanized areas. This limited access to advanced healthcare services underscores the need for careful planning and consideration of health and safety measures for any developments in the area.

However, Rawalpindi in general is well-equipped with a variety of health facilities that cater to the medical needs of its residents. The city has a mix of public and private hospitals, clinics, and specialized medical centers, providing comprehensive healthcare services.

- Holy Family Hospital
- Benazir Bhutto Hospital
- District Headquarters (DHQ) Hospital
- Rawalpindi Institute of Cardiology




Pakistan Institute of Medical Sciences (PIMS) – Rawalpindi Branch

**Figure 6-12: PIMS Rawalpindi**

## 6.7 Archeological Sites

There are no archaeological sites in Rawalpindi near our project area. The project's location has been thoroughly assessed and verified to ensure that no historically or culturally significant sites are present. This ensures that the development will not impact any heritage sites, allowing for smooth progress while respecting the region's historical preservation standards

## 6.8 Site Suitability

Based on the biological, physical, and social data of the project area, it has been concluded that RCCI Rawat, District Rawalpindi is the most suitable place for the installation of induction furnace unit. The assessment indicates that the location meets all necessary environmental and safety criteria, with minimal impact on local ecosystems. The physical infrastructure, including road connectivity and proximity to key markets, supports efficient logistics and operations. Socially, the local community has shown support for the project, and the area's demographic and economic profile align well with the requirements for a successful operation of project.

# IMPACTS ASSESSMENT

# 7 IMPACT ASSESSMENT

## 7.1 Problems and its Occurence

On the basis of the findings of the EIA, it is concluded that the project will not pose any adverse impact on the local population and the environment. A proper management plan has be prepared in case of any accident like;

- Any health hazard to workers/other persons during construction or operation phase.

As mention above that the project will not pose any adverse impacts to the environment. An assessment of impact during construction and operation phase is given in table 7.1, which indicates the impact and their magnitude

## 7.2 Ways of Achieving Mitigation Measures

### 7.2.1 Changing in Planning and Design

No such change is required in the planning and design of the project as it does not have any significant impact.

### 7.2.2 Improved Monitoring and Management Practices

There shall be a suitable program of monitoring and maintenance. There will be proper firefighting and health and safety plan. Any improvement in monitoring and management practices shall be addressed to concerned authorities.

### 7.2.3 Compensation in Money Terms

There is no compensation in money terms as the land is already owned by the Project Proponent. Land documents are submitted for the same.

### 7.2.4 Replacement, Relocation and Rehabilitation

There will be no any matter of replacement, relocation and rehabilitation as the proposed site is already owned by the project proponent and located within the industry zone. There will not be any let regarding safety factors as applicable from time to time for such buildings on all accounts.

**Table 7-1: Anticipated Impacts and their magnitude of the Project**

| Environmental Components / Components/ Activities | Physical Environment | | | | | | | | | | | | Biological Environment | | | | | | | Social Environment | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Agricultural Lands | Soil (Erosion/Stability) | Aluminum Recycling | Cultural/Religious Properties | Infrastructure | Mineral Resources | Downstream River Flows | Flooding | Surface water quality | Groundwater quality | Air quality | Noise | Aquatic Ecosystem | Wetland Ecosystem | Terrestrial Ecosystem | Endangered Species | Natural Flora | Wildlife | Disease Vectors | Public Health/Safety | Land Use | Communication System | Employment | Community Stability | Cultural and Religious Value |
| **Construction Phase** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Construction Camp site | NA | LA | O | O | O | O | NA | NA | O | LA | LA | LA | O | O | O | O | O | O | LA | O | LA | O | LB | O | O |
| Digging and excavation activities | NA | LA | O | O | O | O | NA | NA | O | O | LA | LA | O | O | O | O | O | O | O | O | O | O | LB | O | O |
| E&M of Equipment's | NA | LA | O | O | O | O | NA | NA | O | O | LA | LA | O | O | O | O | O | O | O | LA | O | O | MB | O | O |
| Vehicular Movement | NA | LA | O | O | O | O | NA | NA | O | LA | LA | MA | O | O | O | O | O | O | O | LA | LA | O | O | LA | O |

| Environmental Components / Components/ Activities | Physical Environment | | | | | | | | | | | | Biological Environment | | | | | | | Social Environment | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Agricultural Lands | Soil (Erosion/Stability) | Aluminum Recycling | Cultural/Religious Properties | Infrastructure | Mineral Resources | Downstream River Flows | Flooding | Surface water quality | Groundwater quality | Air quality | Noise | Aquatic Ecosystem | Wetland Ecosystem | Terrestrial Ecosystem | Endangered Species | Natural Flora | Wildlife | Disease Vectors | Public Health/Safety | Land Use | Communication System | Employment | Community Stability | Cultural and Religious Value |
| Machinery and Equipment's work | NA | LA | O | O | O | NA | NA | NA | O | O | LA | MA | O | O | O | O | O | O | O | LA | LA | O | LB LA | | O |
| **Operation Phase** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solid Waste | NA | LA | O | O | O | NA | NA | NA | O | LA | O | O | O | O | O | O | O | O | O | LA | O | O | O | O | O |
| Fire Fighting Arrangement | NA | O | O | O | O | NA | NA | NA | O | O | O | O | O | O | O | O | O | O | O | HB | O | LB | LB | MB | O |
| Health and safety | NA | O | O | O | O | NA | NA | NA | O | O | O | O | O | O | O | O | O | O | O | HB | O | LB | LB | MB | O |
| Waste water | NA | LA | O | O | O | NA | NA | NA | O | LA | O | O | O | O | O | O | O | O | O | LA | O | O | O | O | O |

LA: Low Adverse MA: Medium Adverse HA: High Adverse NA: Not Applicable O: None or Insignificant
LB: Low Beneficial MB: Medium Beneficial HB: High Beneficial ND: Not Determinable

## 7.3 Characteristics of Impacts

**Figure 7-1: Impact Characterization**

| Impact | Nature | Duration | Geo-Extent | Reversibility | Likelihood | Consequence Severity/Utility |
|---|---|---|---|---|---|---|
| **Physical Impact** | | | | | | |
| Air Quality | D | ST | LO | RE | LK | MN |
| Ground Water | ID | LT | LO | IR | PO | MO |
| Water consumption and water availability | D | ST | LA | RE | PO | MN |
| **Biological Impacts** | | | | | | |
| Natural Vegetation | D | LT | LO | RE | PO | MO |
| Wildlife | D | LT | LO | IR | PO | MO |
| **Social and Socio economic Impacts** | | | | | | |
| Traffic Congestion | D/ID | ST | LO | RE | PO | MN |
| Noise and Vibration | D | LT | LO | RE | CE | MO |
| Safety Hazards | D | ST/LT | LO | RE/IR | CE | MU |
| Employment | D | LT | LO/LA | RE/IR | CE | MU |
| Infrastructure | D/ID | LT | LO/LA | RE/IR | CE | MO |
| Public Health and Nuisance | D | ST/LT | LO | RE/IR | LK | MN |

D: Direct ID: Indirect
CE: Certain LK: Likely
LT: Long Term ST: Short Term
PO: Possibly MN: Minor
MJ: Major MT: Medium Term
MO: Moderate LO: Local
LA: Large SV: Severe
RE: Reversible IR: Irreversible

# SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

# 8 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

## 8.1 Environmental Problems due to Installation at Present Location of Project

Environmental problems related to location of the project are mostly in the areas of physical setting, socioeconomic setting, ecological setting and special areas. Field survey revealed that the impacts of the project due to its location are mostly insignificant in nature.

## 8.2 Project Design Related Environmental Problems

The design unit has sought to minimize any environmental potential impacts by ensuring that the project should be in according to the environmental standards. Local aesthetic value is another issue to be considered during project design.

## 8.3 Environmental Problems Associated with Construction

The construction will also sometimes go round the clock, therefore, during all construction activities the followings will be the major pollutants/wastes or project related pollution aspects:

- Soil erosion
- Particulate matter/dust and gaseous emissions from construction machinery and vehicles transporting materials.
- Noise from construction machinery and vehicles transporting materials
- Garbage as construction waste including clay, sand, crush stones, paper, plastic, wood pieces, aluminum and other metals as scarp, wires, rags, ropes etc
- Dust during raw materials unloading and its use in construction
- Sewage and solid wastes from construction camp
- Some social impacts due to accumulation of workers may arise
- Some problems to utilities infrastructure of the area may occur especially due to labor negligence

A number of machinery and equipment is in operation for the construction of building, which includes:

- Excavators
- Truck
- Transport vehicles
- Concrete mixers
- Vibrators
- Welding plants

- Generators etc.

Most of these are using diesel engines that generate noise and exhaust emissions. The possibility of exhaust emissions increases when old vehicles/plants are utilized for the execution purposes. Generally, the above activity is generating particulate- matter ($PM_{10}$), smoke, dust, CO and NOx in the ambient air, which is deteriorating the air quality and resulting in adverse impacts on human health, fauna and flora. The movement of heavy machinery and vehicles on the dirt tracks is also causing fugitive dust emissions.

Due to the movement of vehicles, noise and vibration will be increased and residents of the nearby settlements will be affected.

Source of air pollution for this project activities are unpaved roads. Dust plumes behind vehicles moving along unpaved roads represent a typical occurrence, since as the vehicle travels over an unpaved road, the force of the wheels on the road surface causes pulverization of the surface material. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake (behind the vehicle) continues to act on the road surface after the vehicle has passed. As an approximation, fugitive dust (dust generated from unpaved roads is termed "fugitive dust" because it is not discharged into the atmosphere in a confined-flow stream) from unpaved roads can be considered to average about 75 lb per vehicle-mile of travel. This dust would be a problem for the surrounding communities.

## 8.4 Mitigation Measures of Impacts on Air and Noise

- Tuning of vehicles should be made mandatory to reduce the emissions of NOx, SOx, CO and $PM_{10}$.
- Emissions from the batching plants should be controlled with appropriate control equipment (such as fabric filters or cyclone separators).
- Equipment and vehicles powered with diesel should be well maintained to minimize particulate emissions.
- Trucks carrying, sand, and aggregate and other materials should be kept covered during transportation of materials and during storage at site, with tarpaulin.
- For the construction machinery generating noise level in excess of that prescribed in PEQS, Contractor will make arrangements to bring the noise level within applicable limits (including proper tuning of vehicles and mufflers/silencers).
- Movements of the trucks and other construction machinery causing high noise levels must be restricted at night time to avoid disturbance to the nearby locality. Truck drivers should be instructed not to play loud music at night and stop use of horn.
- It is suggested that noise barriers should be installed at construction site during the construction phase of the project.

- The fugitive dust emission will be a problem for the nearby communities which will be mitigated by sprinkling of water.

## 8.5 Environmental Problems during Project Operation

Environmental problems relating to gaseous emissions, PM and noise (from stand by generator) during operation of the unit on regular basis will be of minor significance as they will be operate during the power shut down only stack emissions produced in response of metals recycling process will be mitigate by flue to air heat exchanger, baghouse dust collector and ID fans.after proper treatment and to meet the limit of PEQS stack will be relesed in air.

### 8.5.1 Duct & Bends

Ducts and Bends are required to convey flue gases from point of suction to final top of the chimney and connect various equipments. All bends and reducers are aerodynamically designed and have provision for manhole cleaning mechanism.

### 8.5.2 Stack (Chimney)

The generated gases are passed to atmosphere after treatment through stack of height 80 feet.

The solid waste in the form of waste scrap, iron etc, will be produced in that immediately will be sold to local vendors after solid waste spectrophotometer analyzer.

### 8.5.3 Air Emissions

All the release into the environment will be made after passing it through the cyclone, flue to air heat exchanger, bag house dust collector (dry type) and ID fans for removal of dust particles and release of flue gas into the environment. Completely automated and state of the art. Dust will be collected automatically in Flue Storage Silos through automated conveying system. Flue will be recycled.

## 8.6 Potential Environmental Enhancement Measures

As described above the worth mentioning wastes will be sewage and solid waste in the plant in the form of waste iron/metls etc of the project. In order to enhance environment the following equipments will be insttalled:

### 8.6.1 Air Pollution Control System

#### 8.6.1.1 Working Principle

- Air Blower (Induced Draft Fan) creates negative system pressure
- Fume Hood collects polluted gas
- Collected gas is forced into Gravity Chamber #1 where most of heavy dust particles are collected

- Gravity Chamber #2 collects remaining heavy dust particles
- Cyclone creates air vortex to collect medium dust particles
- Fine dust particles are collected in the Bag house having appropriate filter media
- Bag house media is periodically cleaned by blowing compressed air in reverse
- Clean, pollution free gas is discharged into the atmosphere by Air Stack

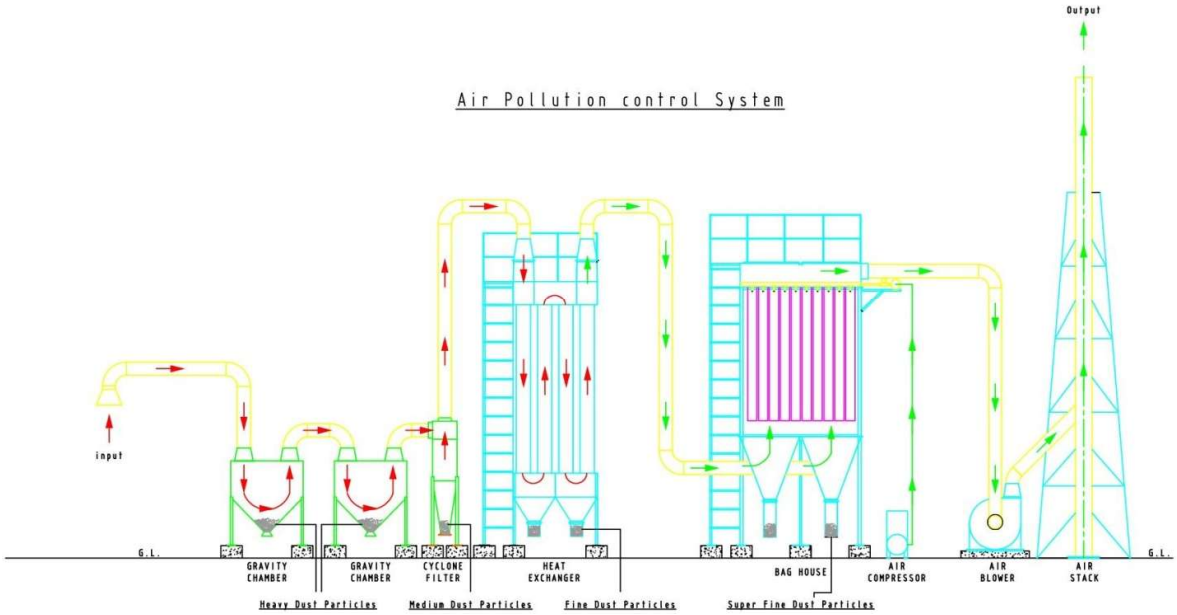



**Figure 8-1: Air Pollution Control System**

### 8.6.2 Water Management

- Rain water disposal will be done through adequate system to be provided at all levels of the building.
- Sewage will be discharged to the main sewerage system; after its treatment as recommended in this EIA report; and also getting the permission from the competent authority.
- A tentative summary flow sheet (sketch) of the effluent treatment process is following.

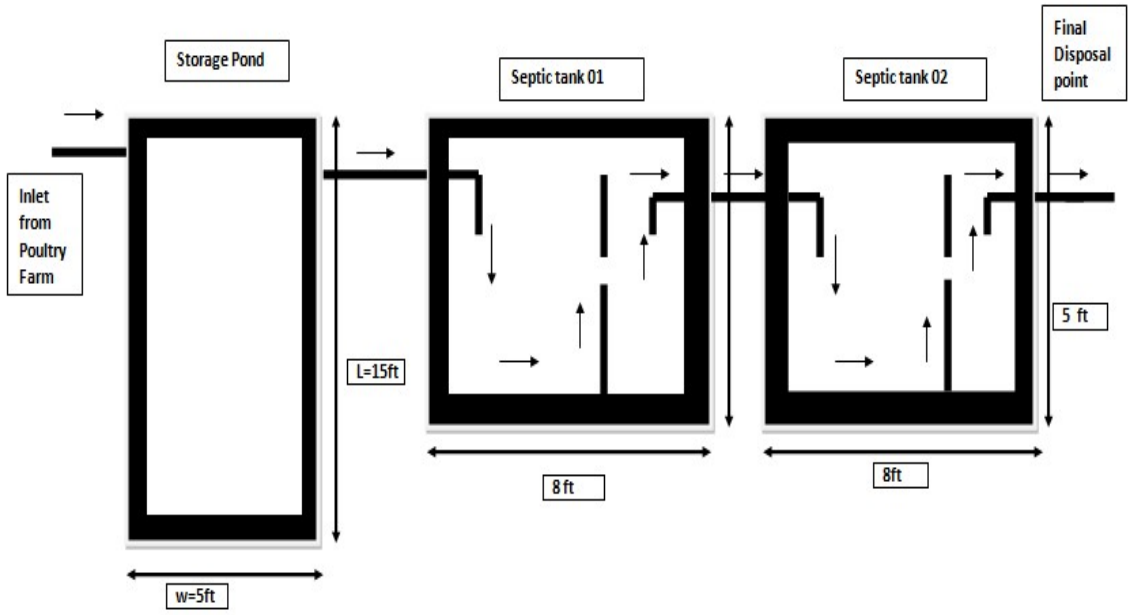



**Figure 8-2: Septic Tank**

Electricity made available by 450kW from WAPDA, 350kVA Diesel Generator for Standby and 100kW Solar (in future) installation will be done.

- Adequate fire-fighting system will be maintained at all times and the required quantity of water will always be kept in storage.
- Visual impact of the building and its surroundings has also been taken into consideration.
- The land use will be done in an away that it will not create any threat to the privacy of the adjoining buildings.
- Electricity will be used from WAPDA; however, available stand by generator will also be used whenever there is casual power shut down. In the first place the generator is to be housed in double built containment/ housing, therefore, its noise will be curtailed well within the limits of the Punjab Environmental Quality Standards (PEQS). Secondly, due to short durations of its running will produce gaseous emissions or PM in negligible amount.

In order to assess the existing environmental status of the project area, on site environmental monitoring for the ambient air quality regarding gaseous emissions including Sulphur Dioxide ($SO_2$), Nitrogen Oxides (NOx) and Carbon Monoxide (CO), Particulate Matter and noise pollution was carried out. So also quality of the civil water supply was determined through laboratory testing of the water sample collected from underground water supply system.

## 8.7 Impacts on Socio-Economic Environment

The project has no negative socio-economic impacts rather it has positive impacts on the local community.

# ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

# 9 ENVIRONMENTAL MANAGEMENT AND MONIRTORING PROGRAM

## 9.1 Environmental Management Plan (EMP)

The EMP will facilitate proponents the proponents to address the adverse environmental impacts of the project, enhance project benefits and introduce standards of good environmental practices.

### 9.1.1 Objectives of EMP

The EMP aims to ensure that:

- Site activities are well managed
- All environmental safeguards are carried out correctly
- Coordination is made with other trades
- Adverse impacts on environment are minimized
- The biodiversity of the site is conserved or enhanced
- All relevant legislation is complied with prescribed procedures/standards
- The project is monitored for environmental impacts

### 9.1.2 Structure of EMP

The structure of the EMP will:

- Describe that how it fits into the overall planning process for the project
- Detail the activities that are to be carried out
- Identify the impacts of activities may have on environment
- Propose environmental control methods to be used to prevent or minimize those environmental impacts
- Assign responsibility for each control measure to specific staff members
- Identify key monitoring parameters and schedule of monitoring of these parameters
- Identify training requirements at various stages of the development of the project
- Identify the resources required to implement the EMP and outline relevant expenses arrangements

## 9.2 Project Implementataion Institutional Requirements

The following organizations would be involved in the implementation of the proposed EMP;

- M/S Alpha Engineering as the proponents of the project and owners of the EMP during construction and operation of the project.
- Project Contractor, as the executor of the EMP during construction stage of the project.
- Supervisory Consultant, as monitor of the execution of the EMP during construction stage.
- Environmental Protection Agency (EPA), Punjab, as Government Department to review and monitor the implementation of remedial and mitigation measures as given in EIA.

## 9.3 Environmental Management Team along with their Roles and Responsibilities

In light of M/S Alpha Engineering unit shall consist of the following members from the industry.

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

**Table 9-1: Members of Environmental Management Team**

| Sr. # | Env. Management Team | Roles | Responsibilities |
|---|---|---|---|
| a) | Project Manager | Supervisor. | – To plan, disseminate, implement and continuously develop the environmental management system according to the policy.<br>– To monitor and assess the implementation of the committees' environmental management system. |
| b) | Health and Safety Officer | Member | The role typically involves preparing health and safety strategies and developing policies; carrying out risk assessments; liaising with regulatory authorities to ensure compliance with mandatory regulations; investigating accidents on sites and producing subsequent reports and recommendations; and carrying out site inspections to check policies and procedures are being properly implemented. |
| c) | Process Control | Member | Optimize processes and implement quality |

| Sr. # | Env. Management Team | Roles | Responsibilities |
|---|---|---|---|
| | Engineer | | control systems in the industry. They design, test, and oversee the implementation of new processes. They are often employed at manufacturing/processing plants that process chemicals, metals, and other materials. |
| d) | Head of the Audit department | Member | Developing testing methodologies to evaluate the adequacy of controls. Documenting the results of the evaluations. Developing recommendations and reports based on audits and presenting these ideas to senior management. |
| e) | Other Industry members as the Superintendent may designate. | Member | Oversee day-to-day field activities.<br>Supervise the activities of subcontractors and subordinate staff. |

In Alpha Engineering where the posts describe above do not exist; the Project manager shall designate another staff member to perform the duties and responsibilities of the holder of such posts.

## 9.4 Proposed EMP Reporting and Reviewing Procedures

This section will specify institutional responsibilities for contractors, Borrower, local authorities, and EPA, with the roles that prepare, submit, receive, review, and approve the reports. An implementation schedule detailing the timing, frequency and duration of mitigation measures, monitoring, and reporting of the progress will be prepared, showing phasing and coordination with procedures in the project operations manual and loan agreement. Recipients of such reports will include those with responsibility for ensuring timely implementation of mitigation measures and for undertaking remedial actions. In addition, the structure, content and timing of reporting will be specified to facilitate supervision, review and approval (if necessary) by EPA.

The implementation of the EMP will be the prime responsibility of the project proponents who designate responsibilities and obligations to their selected contractors and staff. Monitoring, documentation and reporting the compliance components of the EMP will be the responsibility of proponent.

### 9.4.1 Reporting

The relevant reporting structure will be included in site environmental training and induction and will be clearly displayed, along with contact names and numbers. In the event of an incident that causes, or is likely to cause, environmental harm, as defined in the EP Act, immediate action will be taken to minimize the effects of the incident. As soon as is reasonably practicable, the details of the incident and corrective actions taken will be reported to Process Plant Operator.

### 9.4.2 Review and Update

The EMP is intended to be dynamic and will be reviewed as often as necessary in accordance with changes to:

- Selected technologies or equipment
- Operational activities
- The legislative environment and/or approval conditions
- Improvements in best practice environmental management
- Corrective actions implemented as a result of complaints, incidents or non-conformance situations
- Audit Report recommendations.

## 9.5 Any Training need to Require to Ensure Implementation of EMP and Monitoring Plans

All staff and contractors will receive induction training about the general requirements of the EP Act and their specific duties and responsibilities associated with the operation of the project activities and with the EMP. At a minimum, the environmental component of the induction will address the following:

- 'General environmental duty' and 'duty to notify environmental harm'
- Specific environmental risks identified for the Project
- Requirements of the EMP
- Emergency contact information. In addition, relevant environmental issues will be reinforced at regular opportunities

## 9.6 Environmental Management Plan for Construction and Operation Phase

Environmental Management Plan (EMP) for Pre-construction, during construction and operational phase are given in Table-9-2 and Table 9-3 will be implemented for the better management of environmental issues which can be arises by the project activity.

**Table 9-2: Environmental Management Plan during Construction Phase**

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Constructional Stage** | | | | |
| 1. | Topography | To minimize negative impact to topography of the Project Area. | ▪ As the site for the project activity is already available therefore there will be no change on the topography of the project area.<br>▪ Tree plantation will be carried out on large scale to enhance to topographic beauty of the area. | ◪ Project Proponent<br>◪ Contractor |
| 2. | Soil | To minimize soil erosion and contamination. | ▪ Low embankments will be protected by planting Vetiver grass that can flourish in relatively dry conditions;<br>▪ Soil contamination by asphalt will be minimized by placing all containers in caissons;<br>▪ All spoils will be disposed off as desired and the site will be restored back to its original conditions before handing over;<br>▪ Soil erosion checking measures such as the formation of sediment basins, slope drains, etc, will be carried out. | ◪ Project Proponent<br>◪ Contractor |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Constructional Stage** | | | | |
| 3. | Health and safety of workers and associated communities | To minimize health risks | ▪ Provide training on basic First Aid to specified work staff in order to help the injured workers onsite.<br>▪ Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for laborers;<br>▪ Personal Protective Equipment (PPEs) will be provided to the workers operating in the vicinity of high risk area;<br>▪ Provision of adequate sanitation, washing, cooking and dormitory facilities including light up to satisfaction;<br>▪ Ensure strict use of wearing these protective clothing during work activities;<br>▪ Elaboration of a contingency planning in case of major accidents;<br>▪ Adequate signage, lightning devices, barriers and | ▪ Project Proponent<br>▪ Contractor |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Constructional Stage** | | | | |
| | | | persons with flags during construction to manage traffic at construction sites, haulage and access roads. | |
| 4. | Air Quality | To minimize air pollution | ▪ All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions;<br>▪ Open burning of solid waste from the Contractor's workforce will be strictly banned;<br>▪ Preventive measures against dust will be adopted for on-site mixing and unloading operations. Regular sprinkling of the Site by water will be carried out to suppress excessive dust emission(s);<br>▪ PEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery will be enforced during construction | ▪ Project Proponent<br>▪ Contractor |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Constructional Stage** | | | | |
| | | | works; and<br>▪ Ensure precautions to reduce the level of dust emissions from hot mix plants, crushers and batching plants will be taken up; e.g. provide protection canvasses and dust extraction units. Mixing equipment will be well sealed and equipped as per existing standards.<br>▪ All excavation work will be sprinkled with water;<br>▪ Vehicles used for construction will be tuned properly and regularly to control emission of exhaust gases. | |
| 5. | Noise | To minimize noise pollution | ▪ Selection of up-to-date and well maintained mill or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices;<br>▪ Confining excessively noisy work to normal working hours in the day, as far as possible; | ▪ Project Proponent<br>▪ Contractor |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Constructional Stage** | | | | |
| | | | ▪ Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and training them in their use;<br>▪ Preferably, restricting construction vehicles movement during nighttime;<br>▪ Heavy machinery like percussion hammers and pneumatic drills will not be used during the night without prior approval of the Client;<br>▪ Contractors will comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures. | |
| 6. | Groundwater | To avoid contamination of groundwater | ▪ Protection of groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality; | ▪ Project Proponent<br>▪ Contractor |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Constructional Stage** | | | | |
| | | | ▪ The solid waste will be disposed off in designated disposal site to sustain the water quality for domestic requirements;<br>▪ water required for construction in such a way that the water availability and supply to nearby communities remain unaffected;<br>▪ Regular water quality monitoring according to determined sampling schedule;<br>▪ The contractor shall ensure that construction debris do not find their way into the drainage system which can block them;<br>▪ Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond. | |
| 7. | Flora | To minimize the impact on floral resources | ▪ As discussed in the EIA report there will be no tree cutting involved during the construction | ▪ Project Proponent<br>▪ Contractor |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Constructional Stage** | | | | |
| | | | phase of this project activity. However new aggressive campaign will be launched for tree plantation<br>▪ Local species of plants will be used during plantation to avoid any foreign unwanted species of plants. | |
| 8. | Fauna | To minimize the impact on birds and their dislocation | ▪ Plantation of large number of trees along the proposed project site and around the industry will be carried out to provide shelter for birds.<br>▪ Noisy work will not be carried out in night time so that there will be no disturbance to local birds and animals; | Project Proponent<br>Contractor |
| 10. | Public Utilities and Infrastructure | To minimize the disturbance to public utilities and infrastructure | ▪ Rehabilitation of existing utilities before construction to avoid any inconvenience to the residents of the Project Area or provide them with alternative arrangement during the construction period. | Project Proponent<br>Contractor |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Constructional Stage** | | | | |
| 11. | Traffic Management | To minimize traffic problems in the Project Area | ▪ As discussed in the EIA report the project site is located on the main road it is wide enough to cater any traffic jams so there will be no problem of small number of additional vehicles on this road. However, following mitigation measure will be taken care for the smooth running of traffic;<br>▪ Movement of vehicles carrying construction materials will be restricted during daytime to reduce traffic load and inconvenience to the local people. | ▪ Project Proponent<br>▪ Contractor |

**Table 9-3: Environmental Management Plan during Operation Phase**

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Operational Stage** | | | | |
| 1 | Flora | Proper maintenance of sapling planted | ▪ The saplings planted in and around the mill would be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients. Therefore, proper care of newly planted trees will need special care;<br>▪ An awareness campaign targeted on the neighbourhood farmers/factory owners will be run to popularize the planting of trees; and<br>▪ Organic farming will be encouraged to minimize the use of chemical fertilizers and pesticides. | ▪ Project Proponent |
| 2. | Air Quality | To minimize air quality | ▪ Setting up of a system to monitor air quality along Project area in accordance with the applicable standards/limits;<br>▪ Installation of cyclone, flue to air heat exchanger, bag house dust collector and ID | ▪ Project Proponent |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Operational Stage** | | | | |
| | | | fans will be made before release of air into the environment.<br>▪ Construction of shed for raw materials stockyard for scrap & ingots, other raw materials to avoid fugitive emissions.<br>▪ For primary fume control from electric induction furnace, hood with proper geometry followed by a dry bag house of dry type will be installed.<br>▪ Dust will be collected automatically in Flue Storage Silos through automated conveying system. Flue will be recycled.<br>▪ Height of the stack will be as per statutory requirement. Stack will have stack monitoring facility (SMF). Measures will be taken to avoid fugitive dust emission such as water sprinkling and vehicle washing.<br>▪ Flue gas analyzer will be installed for proper | |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Operational Stage** | | | | |
| | | | checkup.<br>▪ Raw material storage will be covered and separated to avoid dust dispersion due to wind blowing.<br>▪ Idle running of vehicles is minimized during material loading / unloading operations<br>▪ Good housekeeping will be made essential for alloys casting complex.<br>▪ Helping the owners and occupants of the affected premises to identify and implement special measures;<br>▪ Regular road maintenance to ensure good surface condition;<br>▪ Monitoring air quality at defined schedule; and<br>▪ Regular vehicle check to control/ensure compliance with PEQS. | |
| 3. | Noise | To minimize noise pollution | ▪ Noise measurements will be carried out at | ▪ Project Proponent |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Operational Stage** | | | | |
| | | | locations according to specified schedule to ensure the effectiveness of mitigation measures;<br>▪ Provision of ear muffs/plugs for the workers working in high noise zones; and<br>▪ Provision of sign boards for sensitive zones<br>▪ Tree plantation will be further enhanced on the boundary walls of the factory which will act as additional buffer/barriers for community exposure.<br>▪ Noise generating sources will be enclosed to minimize noise/ vibrations.<br>▪ Vehicles and road maintenance will be done time to time. Loading of vehicles will be under limit. | |
| 4. | Security | To minimize the risk | ▪ Mitigation measure will include strict enforcement of regulations. | ▪ Project Proponent |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Operational Stage** | | | | |
| 5. | Landscape | To improve the aesthetics of the Project Area | ▪ Plantations in and around the mill will be further enhanced.<br>▪ Fountains are already installed in the existing unit and such measure will also be taken to increase the beauty of area.<br>▪ Outside the mill more plantations will be carried out to further beautify the area around the factory. | ▪ Project Proponent |
| 6. | Health, Safety and Environment Plan | To improve the working conditions and environment for the insurance of safe work | ▪ Provision of all the resources to ensure the safety for workers<br>▪ Personnel protective equipments (gloves, eye shields, mouth shield, ear muffs/plugs, helmet, clothes, shoes etc) will be provided to the employees and workers for safety measures.<br>▪ Training to personnel will be imparted to generate awareness about PPEs and safety. | ▪ SHE Supervisor |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Operational Stage** | | | | |
| | | | ▪ First aid will be provided at work site and training and first aid will be also given to all staff.<br>▪ It will be ensured that workers are not exposed above the threshold limits prescribed above through suitable administrative controls.<br>▪ Long term changes in the infrastructure and machinery to ensure the health of the workers<br>▪ Frequent environmental monitoring of generators and other sources of emissions in the industry.<br>▪ Indoor air quality monitoring specially in the working areas for workforce. | |
| 7. | Solid Waste Management | To save the environmental from degradation | ▪ Solid waste shall be disposed of by contractor<br>▪ All the legal and obligatory requirements will be fulfilled | ▪ Project Proponent |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Operational Stage** | | | | |
| | | | ▪ Testing system for Solid Waste Slag will be made in which There will be a "lined" slag pit designed to dispose of the solid waste<br>▪ Solid waste spectrophotometer analyser will be installed for control check.<br>▪ No damage to nearby habitat<br>▪ The generation of solid wastes from process operation will be minimal, including slag generated from manufacturing of Ingots/ billets. Dust from bag filter, domestic waste and used / spent oil from machineries shall be carefully handled.<br>▪ Domestic waste from septic tank followed by soak pit will be collected annually and will be used as manure for green belt. | |
| 9 | Ground Water | To save the natural resources | ▪ Water conservation campaign will be launched for the new project in order to minimise the wastage of ground water. | ▪ Project Proponent |

| Sr. No | Project Component or Impact | Target | Mitigation | Responsibility |
|---|---|---|---|---|
| **Operational Stage** | | | | |
| | | | ▪ New washing techniques will be introduced for water conservation | |

## 9.7 Environmental Monitoring Program

The monitoring program is designed to ensure that the requirements of the NOC awarded by the EPA are met. Monitoring Program (MP) provides important information that allows for more effective planning and an adaptive response based on the assessment of the effectiveness of mitigation measures. The monitoring of various parameters will help to determine the extent to which project construction/operation activities will cause environmental disturbance. Following is a tentative plan for environmental monitoring;

**Table 9-4: Environmental Monitoring Plan**

| Sr. No | Monitoring Parameter | Monitoring Location | Remarks | Monitoring Frequency |
|---|---|---|---|---|
| **A. Construction Stage** | | | | |
| 1. | Noise | Construction Vehicle/ Machinery/ generators/Welding work | Construction vehicles / machinery / generators will be checked regularly for noise level by the contractor during construction phase. | Quarterly Basis |
| 2. | Smoke Emissions | Construction Vehicle/ Machinery/ generators | Construction vehicles / machinery / generators will be checked regularly for smoke emissions by the contractor during construction phase. | Quartely Basis |
| **B. Operation Stage** | | | | |
| 1. | Security | At the Unit | Security arrangement will be made. | During Project Life |
| 2. | HSE Plan | --- | Health, safety and Environmental will be monitored on daily basis. | Monthly Basis |
| 3. | Gaseous Emissions monitoring | Generators and Furnace | Will be carried out on quarterly basis from the stacks of generator and boiler | Monthly Basis |
| 4. | Noise | All plant | On daily basis by the mill management and on quarterly basis by a third party | Monthly Basis |
| 5. | Waste Water Monitoring | From final discharge point of Waste Water | As described by SMART | Monthly Basis |

## 9.8 Environmental Budget

The cost for environmental management and monitoring will be the part of contract of Contractor and Consultants respectively. However, a lump sum amount of Rs. 1 million rupees will be allocated by the project proponent as cost for environmental

management program for a period of 3 months during construction and operation of the project. After that, monitoring program will be revised in consultation with EPA and cost will be revised accordingly.

The cost estimated for implementing EMP will be 1 million rupees. The details are given in table 9.5.

**Table 9-5: Summary of EMP Cost**

| Sr. No | Parameter | Cost (Pak Rupees) |
|---|---|---|
| 1. | Greenbelt Development | 0.3 Million |
| 2. | Solid Waste Management | 0.4 Million |
| 3. | Health & Safety | 0.3 Million |
| **Total** | | **1 Million** |

## 9.9 Tree Plantation

### 9.9.1 Planning of Site for Plantation

- Site selection
- Arrangement of work Plan
- Site preparation for plantation

### 9.9.2 Choosing Species

There are many conifer (needle-bearing) and hardwood (broadleaf) tree and shrub species available through private nurseries to help to meet objectives.

**Table 9-6: Trees to be Planted**

| Sr. No. | Local Name | Scientific Name |
|---|---|---|
| 1. | Shisham | *Dalbergia sissoo* |
| 2. | Keekar | *Acacia arabica* |
| 3. | Siris | *Albizzia lebbeck* |
| 4. | Ber | *Ziziphus jujuba* |

**Deciduous**: Trees and shrubs that, unlike evergreens, lose their leaves and become dormant during the winter.

**Evergreen**: An evergreen tree is a plant that has leaves throughout the year and is always green.

**Perennial**: They grow for more than two years. These are non-woody plants that die back to the ground each fall. The roots, however, survive the winter and the plants re-sprout in the spring.

## 9.10 Green Belt Design

Extensive tree plantation will be carried out to act barrier to control escape of odor, if any, in the surrounding areas. As a part of tree plantation plan, plants which are moderately tolerant to the pollutants but are endowed with fast growing, dense foliage canopy will be planted. The number of plants to be grown along the boundary line of the area will be estimated after physical survey of the during construction and will be approximately **1000** in single row with a tree to tree distance of **5ft/l.5m**. The trees planted here will have dense spreading canopy. The trees will also be grown along the roads and the open stretches. This area will not only act as to reduce the pollution but also will increase the aesthetics of the area. So the trees grown in this area must be flowering as well ornamental plants. All along the boundary of the treatment plant, a strip of plantation with trees which are tall in nature and evergreen in habit. This area will act as a barrier and as far as possible check the pollutants from their escape and potential contamination of other components of local environment.

### 9.10.1 Lawn Planting

No lawn shad be planted when temperatures are above 90° F or if the ground is in a muddy condition/ or other conditions that are unsuitable in the area. The sweet soil surface shall be moistened with a fine spray immediately before planting.

The lawn shall be planted according to acceptable standards practice in order to ensure a completely healthy grass cover. The planting procedures shall be approved by designated person at site.

### 9.10.2 General Landscape Protection

Planting areas and plants shall be protected all times against trespassing and damage of all kinds for the duration of maintenance period. If any plant/s become damage or injured, they shall be treated or replaced. Protection shall also include all temporary protections fences and barriers, all signs and all other work incidental to proper maintenance.

## 9.11 Emergency Response Plan & Evacuation Exit Plan

### 9.11.1 Objective of Emergency Response Plan

Emergency preparedness helps to minimize the human suffering and economic losses that can result from emergencies. It will be understood that the size and density of projects, as well as their access and location, have a bearing on the degree of planning necessary for emergencies. It is therefore strongly recommended that the constructor ensure that a member of staff on site assist in developing the emergency response plan.

### 9.11.2 Scope of Emergency Response Plan

This plan assesses risk, assign role and responsibilities and give the major steps to be followed in any emergency situation. Its increases understandings of workers and officials in handling different emergency situations which may occur at project area.

### 9.11.3 Emergency Situations

Following emergencies may occur at workplaces:

- Fire
- Fuel spillage
- Gas leaks
- Explosions
- Injury from machinery and equipment
- Fall, climbing accident
- Emergency as a result of environmental conditions (e.g., heat, cold, wet, snow, wind, lightning, bushfires, floods, high seas, cyclones) emergencies requiring evacuation
- Hazardous substances and chemical spills
- Internal emergencies such as loss of power or water supply and structural collapse
- Serious injury events or medical emergencies
- Bomb threats
- Civil disorder or criminal acts such as robberies and shootings

### 9.11.4 General Evacuation Procedure

It is not always necessary to evacuate a building during an emergency. A power outage, for instance, does not necessarily call for evacuation of a building of mill. The overall safety of the building must first be evaluated: lighting, hazardous materials, ventilation systems, and other hazardous operations. If the building can be safely occupied, evacuation is not necessary. In the case of evacuation the workers in the effected zone receive instructions from their supervisor or designated person. As per instruction the workers will immediately leave their places of duty and assemble at the assembly point.

- Area supervisor will roll call the employees to ensure all are out of danger zone.
- On receiving first information of emergency situation the administrative head will contact the Security Officer to ensure that alarm system is activated or not.
- After assessing the emergency situation Security Officer or designated person instruct through telephone to initiated the emergency response procedure and call the responsible personnel at site.
- Administrative Head may also call the external help like fire brigade, police, bomb disposal squad, ambulance etc. and communicate with them.
- Security Officer after consulting the Administrative Head may order the evacuation of workers from affected area.

If evacuation is ordered, follow these procedures:

- Stay calm, do not rush, and do not panic.
- Safely stop your work.
- Gather your personal belongings if it is safe to do so.
- If safe, close your door and window, but do not lock them.
- Use nearest safe stairs and proceed to nearest exit. Do not use the elevator.
- Wait for any instructions from emergency responders.
- Do not re-enter the building or work area until you have been instructed to do so by the emergency responders.

### 9.11.5 Fire Emergency Response Plan

In the case of fire emergency, following emergency response steps will be followed:

- When any employee notice fire or smoke he must immediately decide if the nature of fire is such that he could take action on his own or verbal call for help.
- If it is considered to be beyond the scope of individual control the alarm will be raised.
- The Security supervisor will immediately reach that area and simultaneously called for the emergency response procedures.
- After the alarm called for fire emergency all the members of fire squad will reach the affected area and take instruction of Fire Master.
- If fire reaches the raised alarm state the members are allowed to leave the area except one guard for the main gate to guide the external Fire Brigade helpers.
- Off-duty key personnel and security staff will also report immediately for duty.
- Equipments will be removed from the affected area.
- The nearest hospital will be informed for possible causalities.
- In addition of fire fighting, supervisor will ensure all the flammable articles are removed.

#### 9.11.5.1 Special Fire Emergency Response and Fire-protection precautions

- **"Joint Code of Practice"** includes fire protection measurements and compliance with the regulations and requirements is to tackle with fire emergency in multistory building.
- **Fire-Resistant Materials**- To ensure the stability of a high-rise building in the event of a fire, the supporting structure and ceilings must be resistant to fire. The characteristic "fire resistant" must be defined in the applicable standards. However, this means that the requirements to be met by fire resistant parts can

easily differ from one country to the next, depending on the standards applied. The same holds true for the inspection procedures specified for verification.

- **Fire Compartments** Fire can also spread via the outer facade if windows have been shattered by the heat so it is perfectly appropriate to use fire resistant glazing, Partition walls, ceilings must be fire resistant and made of noncombustible materials.
- **Doorways** will at least be sealed with tightly closing, fire-retardant doors; any other openings required in the walls must be sealed in an equivalent manner.
- **Partition walls** in corridors will reach right up to the structural ceiling.
- **Smoke vents** must be installed at the top of all stairwells; internal stairwells must be equipped with a mechanical, automatically activated ventilation system connected to an emergency power supply. If a fire breaks out, excess pressure must be generated in the stairwells to prevent the ingress of smoke.
- **Ventilation and Air-Conditioning Systems**- Ventilation and air-conditioning systems must be installed in such a way that fire or smoke cannot be transmitted to stairwells and other floors or fire compartments.
- **Fire Fighting**- Fire extinguishers, fire-fighting water to every point on floor and an automatic sprinkler system is the most effective protective measure for fighting and controlling a fire.

#### 9.11.5.2 Supportive Services

One electrician, one mechanic and four general workers (for salvage operations) will be arranged to ensure the necessary services to unaffected areas continue and removal of any equipment etc. which may be affected by the incident.

**Table 9-7: Fire Extinguishing Methods**

| Fire Class | Status of fire | Extinguishing Method | Type of Extinguisher to be used | Color Coding |
|---|---|---|---|---|
| **A** | Solid combustible material | Cooling | ▪ Dry chemical powder (DCP)<br>▪ Water type<br>▪ Halotron | ▪ Blue<br>▪ Red<br>▪ Green |
| **B** | Flammable Liquid | Cut off supply | ▪ Foam<br>▪ Carbon dioxide $CO_2$<br>▪ Dry chemical powder (DCP)<br>▪ Halotron | ▪ Yellow<br>▪ Black<br>▪ Blue<br>▪ Green |

| Fire Class | Status of fire | Extinguishing Method | Type of Extinguisher to be used | Color Coding |
|---|---|---|---|---|
| **C** | Flammable/ Explosive gases | Cut off supply | ▪ Carbon Dioxide $CO_2$<br>▪ Dry Chemical<br>▪ Dry Chemical powder (DCP) | ▪ Black<br>▪ Blue<br>▪ Green |
| **D** | Fire in Combustible Metal | Smothering & Starvation | Dry Chemical Powder (DCP) | Blue |
| **E** | Fire due to Electricity | Smothering & cut off supply | ▪ Carbon dioxide ( $CO_2$)<br>▪ Dry chemical powder (DCP)<br>▪ Halotron | ▪ Black<br>▪ Blue<br>▪ Green |

## 9.12 Personal Protective Equipments (PPE'S)

PPE, Personal Protective Equipment, are the tools that ensure the basic health protection and safety of users. PPE is any device or appliance designed to be worn by an individual when exposed to one or more health and safety hazards. PPE includes all clothing and other work accessories designed to create a barrier against workplace hazards, and using PPE requires hazard awareness and training on the part of the user. Employees must be aware that the equipment does not eliminate the hazard; if the equipment fails, exposure will occur. To reduce the possibility of failure, equipment must be properly fitted and maintained in a clean and serviceable condition. List of important protection equipment (PPE's) are given in table 9-8.

**Table 9-8: List of Important Protection Equipment (PPE's)**

| Protected Part | PPE's |
|---|---|
| Protection against electric shock | ∝ Insulating gloves & shoes<br>∝ Insulated tools<br>∝ Safety belt against falls |
| Protection of eye | ∝ Goggle<br>∝ Shields<br>∝ Dust screen |
| Protection of face and eye | ∝ Safety hamlets<br>∝ Shields<br>∝ Hoods |
| Protection of arms, hand and fingers | ∝ Finger cots or stalls<br>∝ Gloves band cuff |

| Protected Part | PPE's |
|---|---|
| Protection of foot and leg | ∝ Safety shoes<br>∝ Guards |
| Protection of Head | ∝ Protective caps<br>∝ Hard hats |
| Protection of ears against noise | ∝ Ear plug<br>∝ Helmet |
| Protection of respiratory system | ∝ Respirator<br>∝ Gas mask<br>∝ Hose mask blower |
| Protection of skin and body against heat of fire | ∝ Flame resistant coveralls<br>∝ Face shields |

# STAKEHOLDERS CONSULTATION

# 10 STAKEHOLDERS CONSULTATION

Stakeholder consultation is a means of involving all primary and secondary stakeholders in the project's decision-making process in order to address their concerns, improve project design, and give the project legitimacy. Stakeholder consultation, if conducted in a participatory and objective manner, is a means of enhancing project sustainability. Community input (both of knowledge and values) on socioeconomic and environmental issues can greatly enhance the quality of decision-making. Stakeholder consultation was therefore conducted in the project area not only to satisfy the legal requirements of the EIA process in Pakistan but also to improve and enhance the social and environmental design of the project.

## 10.1 Proponent Environment Management Team

Environment Management Team of M/S Alpha Engineering includes the following members for smooth operation of Effluent treatment plant

- Project Manager
- HSE Officer
- Process Plant Engineer
- Waste Management Team
- Electrical Technician

The above all members will be hired after the completion of construction activities

## 10.2 The Responsibility Authority

Alpha Engineering management shall be the responsible authority to take all measures prior to start the project and during operation.

## 10.3 Other Departments and Agencies

For the impact analysis detailed with the management, local community, educational institutes, industrial locals. All issues were discussed related to implementation of the project. Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders in the area.

## 10.4 Environmental Practitioners and Experts

During visit to the project site, discussion with stakeholders and consulted with the local people of nearby and other towns to evaluate the project socio-economic impacts. People of the area belong to different professions like mostly belong to employment, own businesses, doctors, some in abroad, teaching, in agriculture etc. women were also consulted for their point of view regarding the betterment of the area by this project, some of them communicated but according to social value of the area they mostly hesitate to communicate comfortably and get pictured. People

provide the massive information about the project and have positive remarks regarding the project development.

## 10.5 Affected and Wider Community

There is no affected community present in the area of the proposed project. Team has consulted with the inhabitants or neighboring areas. The remarks of people are positive regarding the project and people foresee positive impacts like employment opportunities, business, development of the area etc.

# CONCLUSION AND RECOMMENDATIONS

# 11 CONCLUSIONS AND RECOMMENDATIONS

Based on the study conducted for Environmental Impact Assessment (EIA) of the project, the following recommendations are made:

- Plantation as far as permissible and within the scope of the project is carried out.
- Sustainable development approach through conservation of natural environment is followed.
- Environmental aspects of the project will be well taken care through implementation of the Environmental Management & Monitoring Plan as recommended in this report.
- The project management may adopt "cleaner and greener environment" as its motto and this will make the project more environment friendly.

On the basis of the findings of the EIA, it is concluded that the project will not pose any adverse impact on the local population and the environment. Therefore, it is recommended that the competent authority may please be issues Environmental Approval for the construction and operation of this project.

# APPENDICES

# APPENDIX – A: REFERENCES

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

a. Information and data provided by project proponents;

b. Project Pre-feasibility Study Report;

c. Technical Design Data related to the project.

d. Information gathered through discussions with the project related persons of the project proponent;

e. Information collected from the Technical documents of various suppliers of machinery/equipment.

f. Punjab Environment Quality Standards for Ambient Air November 2010;

g. Punjab Environment Quality Standards Noise Levels November 2010;

h. Punjab Environment Quality Standards for Drinking Water November 2010:;

i. Pakistan Environmental Protection Act, 1997;

j. The Punjab Environmental Protection (Amendment) Act 2011 covers aspects related to:

   i. The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development;

   ii. Establishing complete regulatory and monitoring bodies, policies, rules, regulations and Punjab environmental quality standards; and

   iii. To ensure enforcement, the act establishes regulating bodies i.e. Punjab Environmental Protection Council (PEPC) and responsible bodies i.e. Punjab Environmental Protection Agency (Punjab EPA) at Provincial level.

k. Environment related Laws in Pakistan and the Province of Punjab;

l. Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review and Approval of Environmental Assessment, 2000;

m. Google earth, maps.

n. Guidelines for Public Consultations - These guidelines cover:

   - Consultation, involvement and participation of Stakeholders
   - Techniques for public consultation (principles, levels of involvements, tools, building trust)
   - Effective public consultation (planning, stages of IEE where consultation is appropriate)
   - Consensus building and dispute resolution.

o. workplace safety and health act 2011
p. Land Acquisition Act (LAA) of 1894
q. The forest Act 1927
r. Pakistan Penal Code, 1860
s. Provincial Wildlife Act, 1974

# APPENDIX – B: TERMS OF REFERENCES

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

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

# APPENDIX – C: GLOSSARY

| | |
|---|---|
| **Air Quality** | Measurement of the pollutants in the air; a description of healthiness and safety of the atmosphere. |
| **Alloys** | An alloy is a mixture or metallic-solid solution composed of two or more elements. Examples of alloys include materials such as brass, pewter, phosphor bronze, amalgam, and steel. Complete solid solution alloys give single solid phase microstructure. |
| **Aluminum** | Aluminum is the most abundant metallic element in Earth's crust and the most widely used nonferrous metal. |
| **Consultation** | Consultation refers to two-way transfer of information or joint discussion between project staff and the affected population. Systematic consultation implies a sustained and rigorous sharing of ideas. Bank experience shows that consultation often yields the best resettlement alternatives, fruitful procedures for continued participation, and independent information on actual conditions for implementation. |
| **Coordinates**<br>**Contaminate** | Each of a group of numbers used to indicate the position of a point, line, or plane to make impure, pollute. |
| **Cyclone** | Cyclones are separation devices (dry scrubbers) that use the principle of inertia to remove particulate matter from flue gases. Cyclone separators are one of many air pollution control devices known as pre-cleaners since they generally remove larger pieces of particulate matter. |
| **Environmental**<br><br>**Management** | Attempt to control human impact on and interaction with the environment in order to preserve natural resources. |
| **Land Acquisition** | The process whereby a person is compelled by a public agency to cede all or part of the land a person owns or possesses, to the ownership and possession of that agency, for public purpose in return for compensation. |
| **Mitigation** | The action of reducing the severity, seriousness, or painfulness of something. |
| **Monitoring** | Supervising activities in progress to ensure they are on-course and on-schedule in meeting the objectives and performance targets. |

| | |
|---|---|
| **Production Capacity** | Production Capacity is the volume of products or services that can be produced by an enterprise using current resources. |
| **Proponent** | A person who advocates a theory, proposal, or course of action. |
| **Rehabilitation** | Include all compensatory measures to re-establish; at least lost incomes, livelihoods, living and social systems. It does not include the payment of compensation for required assets. |
| **Resettlement** | Means all measures taken to mitigate any and all adverse impacts, resulting due to execution of a project on the livelihood of the project affected persons, their property, and includes compensation, relocation and rehabilitation. |
| **Stakeholders** | Include affected persons and communities, proponents, private and public businesses, NGOs, host communities and EPA. |
| **Ton** | A unit of gross internal capacity, equal to 100 cu. ft (2.83 cubic meters). |
| **Topography** | Details of the surface features of land. It includes the mountains, hills, creeks, and other bumps and lumps on a particular hunk of earth. |

# APPENDIX – D: LIST OF ACRONYMS

| | |
|---|---|
| EA | Environmental Approval |
| EIA | Environmental Impact Assessment |
| EMtP | Environment Mitigation and Monitoring Plan |
| EMP | Environmental Management Plan |
| EPA | Environmental Protection Agency |
| Ft | Feet |
| GoP | Government of Pakistan |
| HSE | Health Safety Equipment |
| IEE | Initial Environmental Examination |
| LMS | Light Melting Scrap |
| M&E | Monitoring and Evaluation |
| MT | Metric Tons |
| MSW | Municipal Solid Wastes |
| MW | Mega Watt |
| PEQS | Punjab Environment Quality Standards |
| NGOs | Non–Government Organizations |
| NOC | No Objection Certificate |
| OHS | Occupational Health and Safety |
| Pak–EPA | Pakistan Environment Protection Agency |
| PKR | Pak Rupees |
| PM | Project Manager |
| PPC | Pakistan Penal Code |
| PPE | Personal Protective Equipment |
| QA | Quality Assurance |
| SHE | Safety Health& Environment |
| VOC | Volatile Organic Compounds |

# APPENDIX – E: PERSONS PERFORMING THE EIA STUDY (TEAM MEMBERS)

The proponent (M/S Alpha Engineering has assigned the task of preparing EIA report to M/S Integrated Environment Consultants. The EIA study of the proposed project has been conducted according to Environmental Assessment Procedures-1997, Review of IEE and EIA Regulation-2022 as prescribed by the Federal Environmental Protection Agency (Pak-EPA), Government of Pakistan.

Study team of M/S Integrated Environment Consultants which completed the EIA report consists of following experts:

**Lists of Experts Performing EIA**

| Name | Qualification | Status in Project |
|---|---|---|
| Mr. Ahtasham Raza | M.Phil (Env. Science) | Project In-charge |
| Mr. Adnan Sharif | M.Phil (Env. Sciences)<br>DEL (Env. Law) | Team Leader |
| Mr. Mehmood Amjad | BS. (Env. Science) | Monitoring In-charge |
| Mr. Muhammad Zain | BS (Env. Sciences) | Environmentalist |

*Only the main roles of the team members are given. However, their role was not restricted to these, rather it also includes many other studies in their respective fields in the context of this EIA studies.

## CHECKLIST (EIA)

## PAK EPA GUIDELINES FOR PREPARATION AND REVIEW OF ENVIRONMENTAL REPORTS, 1997

| Required Content | EIA Report | | |
|---|---|---|---|
| | **PAGE NO.** | **REMARKS (If Any)** | **LACKING** |
| **Executive summary:**<br>**1.** Title and location of project | Pg. I | | |
| **2.** Name of the proponent | Pg. I | | |
| 3. Name of the organization preparing the report | Pg. I | | |
| 4. A brief outline of the proposal (type, process, technology and land requirement) | Pg. I | | |
| 5. The major impacts | Pg. II | | |
| 6. Recommendations for mitigation measures | Pg. III | | |
| 7. Proposed monitoring | Pg. V | | |
| **Introduction**:<br>1. Purpose of report | Pg. 1 | | |
| **2.** Identification of project and proponent | Pg. 2 | | |
| 3. Details of consultant | Pg. 2 | | |
| 4. Brief description of nature, size, and location of project | Pg. 2 | | |
| **Screening:**<br>Whether the Project requires IEE or EIA as per Regulations | Pg. 4 | | |
| **Scoping** | | | |
| 1. Spatial and Temporal Boundaries of Environmental Assessment | Pg. 5 | | |
| 2. Important issues and concerns raised during consultation | Pg. 6 | | |

| Required Content | EIA Report | | |
|---|---|---|---|
| | **PAGE NO.** | **REMARKS (If Any)** | **LACKING** |
| 3. Significant impacts and factors to be determined | Pg. 6 | | |
| **Consideration of Alternatives** | | | |
| 1. Site alternatives, their selection and rejection criteria | Pg. 7 | | |
| 2. Design/Technology alternatives, their selection and rejection criteria | Pg. 8 | | |
| 3. Environmental Alternatives, their selection and rejection criteria | Pg. 9 | | |
| 4. Economic Alternatives, their selection and rejection criteria | Pg.10 | | |
| **Description of the project**: | | | |
| **1.** Objectives of Project | Pg. 12 | | |
| 2. Location and Site Layout of the project (May be annexed at the end of report) | Pg. 12 | | |
| 3. Land use on the site | Pg. 13 | | |
| 4. Road access | Pg. 13 | | |
| 5. Vegetation features of the site | Pg. 13 | | |
| 6. Cost and Magnitude of operation | Pg. 13 | | |
| 7. Schedule of implementation | Pg. 13 | | |
| 8. Description of the project (Process flow chart/steps, Technology, Raw material and products, by-products) | Pg. 15-20 | | |
| 9. Restoration and rehabilitation plans | Pg. 20 | | |
| **Description of Environment**:<br>Clear-cut picture of existing environmental resources: | Pg. 35 | | |

| Required Content | EIA Report | | |
|---|---|---|---|
| | **PAGE NO.** | **REMARKS (If Any)** | **LACKING** |
| 1. Baseline Physical Environment | | | |
| 2. Baseline Ecological Environment | Pg.40 | | |
| 3. Baseline Socioeconomic Environment | Pg. 42 | | |
| 4. Lab reports of environmental analyses (along with soil tests, geoinvestigation in case of building projects and industries) | Annexure | | |
| 5. Suitability of the site (not prohibited, environmentally sensitive, incompatible to surroundings and unsuitable) | Pg. 47 | | |
| **Impact Assessment**<br>1. Methodologies for impact identifications (One/more) | Pg. 48 | | |
| ✓ Checklists | | | |
| ✓ Matrices | | | |
| ✓ Networks | | | |
| ✓ Overlays | | | |
| ✓ GIS and Computer expert systems | | | |
| 2. Characteristics of impacts (nature, magnitude, extent and location, timing, duration, reversibility, risk) | Pg.51 | | |
| **Screening of potential Environmental Impacts and mitigation measures on/during**: | | | |
| 1. Project location | Pg. 52 | | |
| 2. Design | Pg. 52 | | |

| Required Content | EIA Report | | |
|---|---|---|---|
| | **PAGE NO.** | **REMARKS (If Any)** | **LACKING** |
| 3. Construction phase | Pg. 52 | | |
| 4. Operational phase | Pg. 54 | | |
| 5. Potential Environmental Enhancement Measures | Pg. 55 | | |
| **Environmental management and monitoring program** | | | |
| i. Description of proposed mitigation actions along with: | | | |
| ii. Schedule for implementation and Environmental budget | Pg. 78 | | |
| iii. Environmental Management Team along with their Roles and responsibilities (by name or position) | Pg. 63 | | |
| iv. Proposed monitoring program to assess performance or output of EMP | Pg. 64 | | |
| v. Proposed EMP reporting and reviewing procedures | Pg. 77 | | |
| vi. Any training needs required to ensure implementation of EMP and Monitoring plans | Pg. 65 | | |
| **Stakeholders Consultation**: Communicate the possible impacts and concerns to the following to assist further analysis and decision making: | | | |
| i. Proponent's Environment Management Team | Pg. 87 | | |

| Required Content | EIA Report | | |
|---|---|---|---|
| | **PAGE NO.** | **REMARKS (If Any)** | **LACKING** |
| ii. The responsible authority | Pg. 87 | | |
| iii. Other departments and agencies | Pg. 87 | | |
| iv. Environmental practitioners and experts | Pg. 88 | | |
| v. Affected and wider community | Pg. 88 | | |
| **Appendices** | | | |
| 1. Glossary | 95 | | |
| 2. List of abbreviations | 97 | | |
| 3. Lists of individuals and organizations consulted along with their written feedback | | | |
| 4. Sources of data and a full list of all reference material used | 92 | | |
| 5. Terms of references of environmental reports and those given to individual specialists | Pg. 94 | | |
| 6. List of names, qualifications and roles of team members carrying out the IEE/EIA study | 98 | | |
| 7. Approvals from other concerned departments | | | |