CONSTRUCTION OF YADGAR STEEL UNIT

Mouza Lakhodair Tehsil, Shalimar, District Lahore

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Prepared by

Climate Caretakers

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The establishment of a steel unit in Pakistan holds paramount importance for the nation's development. Not only does it play a pivotal role in infrastructure development, providing essential materials for bridges, roads, and buildings, but it also serves as a catalyst for economic growth. A domestic steel industry contributes significantly to job creation, stimulates economic activity, and bolsters the country's GDP. By reducing reliance on steel imports, Pakistan can enhance its economic resilience against external market fluctuations and geopolitical uncertainties. Moreover, a local steel unit facilitates the transfer of advanced technology and skills, fostering innovation and the development of a skilled workforce. This move towards self-sufficiency also has strategic implications for national security, ensuring a stable supply of steel for defense purposes. Additionally, it allows for the value addition to abundant raw materials within the country, positively impacting the trade balance and promoting environmental sustainability through better regulation and management of the steel production process. Overall, the establishment of a steel unit in Pakistan is integral to its economic, technological, and strategic advancement.

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

i- TITLE AND LOCATION OF PROJECT:

The proposed project is the Construction of Steel Unit by M/S Yadgar Steel.

Location: Mouza Lakhodair Tehsil, Shalimar, District Lahore

PROJECT PROPONENT

Proponent: Muhammad Nazir

Address: Shadi Pura, Band Road, Darogawala, Post Office Darogawala, Lahore Cantt, District Lahore

NAME OF ORGANIZATION PREPARING REPORT:

Climate Caretaker

ii- BRIEF OUTLINE OF PROJECT

The envisioned Steel Unit installation in Lahore, Pakistan, is designed for an annual production target of 100,000 MT, with a storage capacity of 6,000 MT. To sustain this ambitious production scale, the mill plans to annually import 105,000 MT of scrap from sources in the Middle East, Saudi Arabia, and Europe. The production process involves state-of-the-art technology, featuring 2 sets of induction furnaces, 2 casting strands, and 2 slitting rerolling units. These elements form a comprehensive production line, from scrap handling to the final rolling stage.

iii. ENERGY AND WATER AVAILABILITY

The steel power plant boasts a formidable power capacity of 710,000,000 kilowatts per anum, signifying its substantial capability to generate electricity. The sheer magnitude of this power output underscores the plant's potential to meet significant energy demands. In terms of resource consumption, the mill utilizes a substantial volume of water, specifically 32,970,000 cubic liters per anum, indicating a reliance on water resources for various operational processes. Additionally, the inclusion of 35 million cubic feet per anum of gas highlights the significance of natural gas in fueling the plant's energy production. In addition to gas, the mill incorporates other fuels, consuming 100,000 cubic feet annually, demonstrating a diverse energy mix to sustain its operations. This comprehensive approach to energy sourcing highlights the plant's commitment to efficiency and resilience, positioning it as a key player in both the steel production and energy generation sectors.

iv. PROJECT IMPACTS AND RECOMMENDATIONS FOR THEIR MITIGATION

Impact assessment is crucial for project initiation as it enables the identification and comprehension of a project’s potential positive and negative effects. Understanding these impacts aids in tailoring the project to maximize benefits and minimize risks. Impact assessment assists in recognizing environmental, social and economic challenges and risks and gives the directions to develop strategies that mitigate these risks and adjust the plan accordingly.

Table E-1Possible Impacts and their Mitigation Measures

Possible Impact	**Impact Magnitude**	**Proposed Mitigation Measures**
CONSTRUCTION PHASE		
Dust emissions likely to occur during the excavation of the top soil. Vehicular Emission from the heavy machinery used.	Minor/Short Term	• Water Sprinkling on construction areas when necessary. • Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard. Pave, apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites. • Cleaning of all paved access roads, parking areas and staging areas at construction sites. • Provision of PPEs to workers
Water Quality Degradation.	Minor/Short Term	• Use of impermeable sheets to avoid contamination of the groundwater/surface water • Proper disposal of waste material on dumping sites
Construction waste will be produced from construction activities	Minor/Short Term	• Conduct separate collection of construction and domestic waste to promote recycling and re-use.

Possible Impact	**Impact Magnitude**	**Proposed Mitigation Measures**
		• Proper disposal of waste to the authorized sites. The area to be leveled and contoured after disposing excess material. • No waste or debris will be thrown in the nearest canal water or other water bodies.
Noise pollution due to the moving machines (mixers, tippers, communicating workers) and incoming vehicles	Minor/Short Term	• Install portable barriers to shield compressors and other small stationary equipment where necessary. • Proper maintenance of vehicles and construction equipment. • Minimize/avoid unnecessary use of drills and other noisy machinery • The personal protective equipment (PPE) will be provided to the construction workers and its usage will be made mandatory.
Workers Health & Safety	Minor/Long Term	• Provide training regarding proper handling and use of chemicals/ paints • Install fire extinguishers at fire handling places

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		• Continuous monitoring be carried out to ensure that contractor is following safe working procedures and practices.
OPERATION PHASE		
Air Impact	Moderate/Long Term	• Pollution Control System will be installed to reduce air pollution. • Air quality monitoring program will ensure the compliance with Punjab Environmental Quality Standards (PEQs).
Impact on Noise	Moderate/Long Term	• The installation of noise barriers and enclosures, acoustic insulation in plant structures. • Provision of ear plugs and ear muffs.
Water Quality	Moderate/Long Term	• Reverse Osmosis (RO) plant will serve as an efficient unit for the treatment of wastewater produced from the steel plant. • Implementing a robust water quality monitoring program will ensure the compliance with

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		Punjab Environmental Quality Standards (PEQs).
Health and Safety	Moderate/Long Term	• It will be ensured that workers have access to and consistently use appropriate PPE, including respiratory protection, gloves, safety goggles, and hearing protection, to minimize direct exposure to hazards.

v. Environmental Monitoring Plan

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

Table E2 Environmental Monitoring

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
A. Construction phase				

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
1.	**Noise**	Construction vehicle/ machinery/ generators/welding work	Noise meter	Construction vehicles / machinery / generators will be checked regularly for noise level by the contractor during construction phase.
2.	**Air Emissions**	Construction vehicle/ machinery/ generators	Ambient particulate matter monitoring.	Construction vehicles / machinery / generators will be checked regularly for smoke emissions by the contractor during construction phase.
B. Operation phase				
1.	**Air Emissions**	Air release points from different machinery at the plant.	Particulate matter, sulfur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO)	Will be carried out on quarterly basis
2.	**Wastewater monitoring**	Rolling mill effluents, water treatment plant effluents, and	Chemicals release during the processing	Will be carried out on quarterly basis.

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
		final effluent discharge points		
3.	**Noise Monitoring**	Areas near Induction furnaces, rolling mills	Noise Meter	Will be carried out on monthly basis.

1 INTRODUCTION

The installation of a steel unit in Lahore is of significant importance due to the city's growing industrial and construction demands. As a major urban center, Lahore is witnessing rapid development in infrastructure projects, including the construction of buildings, bridges, and highways. A local steel unit can supply the necessary materials, reducing dependency on imports and ensuring timely availability of high-quality steel. This, in turn, can expedite project completion times, enhance the structural integrity of developments, and support the overall economic growth of the region.

Furthermore, the establishment of a steel unit in Lahore can create numerous employment opportunities, directly benefiting the local economy. It can stimulate job creation not only within the Steel Unit but also in related sectors such as transportation, logistics, and retail. Additionally, the presence of a steel unit can attract further investments in the region, fostering a more robust industrial ecosystem. By enhancing the local supply chain and contributing to economic diversification, the steel unit installation stands as a critical step towards sustainable industrial advancement in Lahore.

1.1 PURPOSE OF THE REPORT

As per the Punjab Environmental Protection Act (PEPA), Section 12, which covers Initial Environmental Examination and Environment Impact Assessment, no project proponent is allowed to initiate construction or operations without filing the necessary documentation with the designated Government Agency under the Provincial Environmental Agencies. If the project is anticipated to cause adverse environmental effects, it necessitates an environmental impact assessment. Subsequently, approval must be obtained from the Government Agency. This requirement set forth by the Government of Punjab mandates the preparation of this Environmental Impact Assessment (EIA) Report to secure Environmental Approval (EA) from the **Environmental** Protection Agency (EPA), Government of Punjab, Lahore.

This report provides comprehensive information and data on the environmental, economic, and social impacts of the project, enabling its assessment and justification that the project will comply with the requirements of environmentally sustainable practices during both installation and

operation stages, as required by the Punjab Environmental Protection Act, 2012, the Punjab Environment Quality Standards, and the rules and regulations thereof.

1.2 IDENTIFICATION OF PROJECT AND PROPONENT

The proposed project is the Construction of Steel Unit by M/S Yadgar Steel.

Proponent detail as following:

Proponent: Muhammad Nazir

Address: Shadi Pura, Band Road, Darogawala, Post Office Darogawala, Lahore Cantt, District Lahore

DETAILS OF CONSULTANTS

Climate Caretakers

1.3 BRIEF DESCRIPTION OF NATURE SIZE AND LOCATION OF PROJECT:

The proposed steel unit installation in Lahore, Pakistan, represents a robust industrial venture with an annual production target of 100,000 MT and a storage capacity of 6,000 MT. To meet this ambitious goal, the project plans to import 105,000 MT of scrap annually from key sources in the Middle East, Saudi Arabia, and Europe. The installation includes cutting-edge technology, featuring 2 sets of induction furnaces, 2 casting strands, and 2 slitting rerolling units. The total area for the proposed project is 20 acres.

2 SCREENING OF THE PROJECT

Based on the Punjab Environmental Protection Act 2012 and the Review of IEE & EIA Regulations, 2022 for filing, reviewing, and approving environmental assessments, the present project is classified under Schedule II class C (2). Following list shows the projects included in Class C.

Mining and mineral processing

1. Mining and processing of coal, gold, copper, Sulphur and precious stones

2. Mining and processing of major non-ferrous metals, iron and steel rolling & re-rolling

3. Smelting plants with total cost of Rs.50 million and above.

3 SCOPING OF THE PROJECT

The scoping process outlines the essential concerns and impacts requiring detailed investigation. It establishes the spatial and temporal limits, crucial concerns raised during consultations, and significant impacting factors impacting the project.

3.1 SPATIAL AND TEMPORAL BOUNDARIES OF ENVIRONMENTAL ASSESSMENT

The spatial and temporal boundaries of Yadgar Steel is given below;

Figure 3-1 **Spatial and Temporal Boundaries of Yadgar Steel**

3.2 IMPORTANT ISSUES AND CONCERNS RAISED DURING CONSULTATION

The EIA for the proposed project incorporated a two-stage consultation process, primarily focused on one-on-one meetings. In the initial stage, the consultation was specifically directed towards engaging local government authorities, affected individuals, and local communities. The primary goal of this stage was to evaluation both the short-term and long-term impacts that might result from the new development proposed for the project in its early stages. The intent was to gather insights and perspectives from key stakeholders in the immediate vicinity to better understand potential environmental, social, and economic implications of the project.

The second stage of consultations, as indicated, will be conducted through a more extensive process of public participation if deemed necessary. This broader involvement will allow for a wider outreach to the public, enabling a more comprehensive engagement to gather additional feedback, concerns, and insights from a larger cross-section of the community. This will ensure a more inclusive approach, providing an opportunity for a wider range of stakeholders to contribute their perspectives, concerns, and suggestions, which can be valuable in shaping and refining the EIA for the proposed project.

3.3 SIGNIFICANT IMPACTS AND FACTORS TO BE DETERMINED

The installation of the steel unit entails a meticulous examination of various significant impacts and factors to ensure sustainable and responsible development. Environmental considerations encompass assessing air and water quality impacts, land use changes, and managing energy consumption during the energy-intensive steel production processes. Sourcing raw materials, especially the imported scrap from the Middle East, Saudi Arabia, and Europe, requires scrutiny for responsible and sustainable practices. Waste generation, noise, and vibrations from manufacturing processes necessitate effective mitigation strategies. Social and economic impacts, including employment opportunities and community health considerations, are vital aspects requiring thorough evaluation. The project's influence on local infrastructure and transportation networks, compliance with regulatory standards, and the identification and management of potential risks demand careful attention. Engaging with the local community and stakeholders to understand concerns and incorporating feedback is integral to responsible project planning. A comprehensive Environmental Impact Assessment (EIA) will serve as a crucial tool in

systematically addressing these multifaceted factors and ensuring the steel unit's sustainable integration into the local and national context.

3.4 DEVELOPMENT OF AN ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) in an EIA is crucial as it outlines strategies to mitigate environmental impacts, ensures regulatory compliance, guides project operations, promotes sustainability, reduces risks, assures stakeholders, and allows for ongoing improvement and adaptation to address environmental concerns throughout the project's lifecycle.

These key parts of EMP include a clear description of the project, an outline of potential environmental impacts and risks, specific mitigation measures tailored to address these impacts, a comprehensive monitoring and reporting system to track environmental indicators, protocols for emergency response and contingency planning, details on stakeholder engagement and communication strategies, and a framework for ongoing review and updates to ensure the plan's adaptability and effectiveness over the course of the project. Together, these components form a comprehensive EMP designed to guide environmental practices, minimize adverse impacts, and maintain compliance with regulations and best practices in environmental management.

4 ALTERNATIVES

The alternatives for the proposed project and their relative potential impacts on the environment were considered to evaluate the best project option. The following alternatives were considered for the project.

Project Alternatives

- No project option/worst scenario option.
- Site Alternative
- Technology Alternative

4.1 NO PROJECT OPTION / WORST SCENARIO OPTION

Analysis

Strengths and Opportunities

If the project is not taken up at all then all the funds, efforts and inconvenience will be saved and these will become available for diversion to other projects of the proponent. No more land will be required and no disturbance will be caused to people through project construction process. Further the recurring cost of the maintenance of the project along with enhanced operational cost will be saved. No disturbance will be caused to any physical, biological and social part of the environment. The people benefiting out of a status quo will continue benefiting.

Weaknesses and Threats

The absence of a Steel Unit in a region, such as Lahore can entail several drawbacks and missed opportunities. One of the primary disadvantages is the lack of local employment opportunities and the subsequent migration of skilled labor to areas with thriving industrial sectors. This brain drain can hinder the region's economic growth and lead to a loss of valuable human capital. Additionally, without a local Steel Unit, the region may face challenges in meeting its demand for steel, resulting in dependence on external sources and potential economic strain due to import costs. The absence of a Steel Unit also hampers downstream industries that rely on steel as a raw material, limiting the growth potential of sectors such as construction and manufacturing. Furthermore, without a

local Steel Unit, the region may miss out on the potential for infrastructure development, foreign investments, and the overall economic stimulation that typically accompanies the presence of a key industrial facility. Overall, the drawbacks of not having a Steel Unit extend beyond the economic sphere, impacting the community's socio-economic fabric and limiting the region's overall industrial and developmental potential**.**

Conclusion

The establishment of a Steel Unit in Lahore holds significant importance for several reasons. First and foremost, it can serve as a catalyst for local economic development by generating employment opportunities for the community. The presence of a Steel Unit would contribute to skill development and training programs, enhancing the region's workforce capabilities. Additionally, it could spur infrastructural development, attracting investments and fostering a supportive industrial ecosystem. The Steel Unit's operations would likely stimulate economic growth by providing raw materials for various downstream industries, creating a ripple effect of economic benefits. Moreover, a strategically located Steel Unit can contribute to regional self-sufficiency in steel production, reducing dependence on imports and promoting domestic industrial resilience. Lastly, the establishment of a Steel Unit in Lahore could enhance the region's overall economic prosperity and contribute to the national steel industry, aligning with broader industrial and economic development goals.

The “No project option” reveals that the absence of Steel Unit impacts affordability, convenience, health, the environment, and economic development in the area. Therefore, this option is not recommended.

4.2 LOCATION Alternatives

4.2.1 Construction on Government Land

Constructing a Steel Unit plant on government-owned land may pose various challenges and drawbacks. Government-owned lands are often designated for public use or specific purposes, and repurposing such areas for industrial activities like a Steel Unit may conflict with existing zoning regulations or land-use plans. Additionally, government-owned lands may have legal restrictions or environmental considerations that complicate industrial development. The bureaucratic

processes involved in obtaining approvals, permits, and navigating through governmental regulations can be time-consuming and complex, potentially delaying the project and increasing costs. Moreover, there might be competing demands for the use of government-owned land, ranging from public amenities to conservation efforts, making it challenging to secure the necessary approvals for a Steel Unit. Balancing the interests of the community, environmental considerations, and the strategic use of government-owned land requires careful evaluation and coordination, making alternative privately-owned sites often more feasible and expedient for the construction of a Steel Unit plant.

4.2.2 Construction on Proponent's Land

Constructing a Steel Unit on the proponent's own land offers various advantages. First and foremost, ownership of the land streamlines the development process, eliminating potential delays associated with negotiations, permitting, and approvals that might arise on external properties. This autonomy allows for more efficient decision-making and faster implementation of the project. Additionally, the proponent has greater control over the site selection, ensuring that the chosen location aligns seamlessly with the operational and logistical needs of the Steel Unit. Ownership also facilitates long-term planning, enabling the implementation of sustainable practices and environmental considerations that align with the proponent's values and goals. Financially, using owned land minimizes ongoing costs associated with lease payments or land acquisition, contributing to the overall economic viability of the Steel Unit. Furthermore, the proponent has the flexibility to optimize the layout and design of the facility to maximize efficiency and productivity. Overall, constructing a Steel Unit on the proponent's own land provides a strategic advantage in terms of control, efficiency, and long-term sustainability.

Conclusion

The construction of Steel Unit on proponent's land was preferred because it provides more control and flexibility to the proponent over the project's development and operation.

4.3 TECHNOLOGY ALTERNATIVE

Blast Furnace

The blast furnace process, a cornerstone of traditional steel production, initiates with the charging of raw materials—iron ore, coke, and limestone—into a towering furnace. As intense heat emanates from the burning coke, a reduction reaction occurs, transforming iron ore into metallic iron. The molten iron, denser than the accompanying slag of impurities and ash, gravitates to the furnace's bottom. Periodic tapping releases the molten iron, or pig iron, which serves as a foundational material for subsequent steelmaking processes. The molten iron undergoes further refining in furnaces like the basic oxygen furnace (BOF) or electric arc furnace (EAF), where its carbon content is adjusted, and alloying elements are introduced to produce the final steel product with desired characteristics. Modern blast furnace operations incorporate recycling initiatives and emission control measures, aligning with sustainable and environmentally conscious steel production practices.

Induction Furnace

The induction furnace process for steel production is a high-efficiency and flexible method that begins with the charging of scrap steel into the furnace. Unlike traditional methods, induction furnaces use electromagnetic induction to generate heat directly within the metal charge. As alternating current passes through a coil surrounding the furnace, it induces an electric current in the metal, causing it to heat rapidly. The intense heat melts the scrap steel, creating molten metal suitable for steel production. This method offers advantages such as precise temperature control, allowing for tailored metallurgical properties in the final steel product. Additionally, induction furnaces are well-suited for recycling as they efficiently melt various types of scrap, contributing to sustainable steel manufacturing practices. The process's adaptability, quick start-up and shutdown capabilities, and minimal environmental impact make induction furnaces an attractive choice, particularly in operations requiring agility, precision, and a focus on recycling and energy efficiency.

Conclusion

Induction furnaces hold several advantages over blast furnaces in specific industrial contexts. Their notable energy efficiency, quick start-up and shutdown capabilities, and flexibility in adapting to varying production demands make them particularly well-suited for operations requiring agility and precision. Moreover, induction furnaces demonstrate environmental benefits by emitting

fewer pollutants, contributing to cleaner and more sustainable steel production practices. Their versatility in melting various metals, including steel, and efficient use of scrap materials align with modern recycling initiatives. The precise temperature control of induction furnaces enhances their suitability for achieving specific metallurgical properties in the final steel product. Additionally, their compact size reduces space requirements, making them ideal for smaller-scale operations or facilities with limited space. While induction furnaces excel in these aspects, the choice between induction and blast furnaces ultimately hinges on factors such as the scale of production, raw material availability, and the specific requirements of the steelmaking process.

5 DESCRIPTION OF THE PROJECT

5.1 OBJECTIVES OF THE PROJECT

The primary objectives of installing the Steel Unit in Lahore, Pakistan, revolve around fostering economic development, ensuring self-sufficiency, and contributing to national growth. With an annual production target of 100,000 MT and a storage capacity of 6,000 MT, the Steel Unit aims to play a pivotal role in supporting the country's infrastructure development. By importing 105,000 MT of scrap annually from the Middle East, Saudi Arabia, and Europe, the project seeks to secure a stable and diverse source of raw materials. Beyond economic considerations, the project aims to generate employment opportunities, stimulate economic activity, and contribute to the local community by implementing training programs. The establishment of the Steel Unit aligns with broader objectives of reducing dependence on imports, enhancing national security through self-sufficiency in steel production, and adhering to sustainable and responsible industrial practices.

5.2 LOCATION AND SITE LAYOUT OF THE PROJECT

The Location and Site Layout of the project are shown in Figure 5-.

5.3 DESCRIPTION OF THE PROJECT

The envisioned Steel Unit installation in Lahore, Pakistan, is designed for an annual production target of 100,000 MT, with a storage capacity of 6,000 MT. The location in Lahore was strategically chosen for its proximity to key transportation networks and the availability of essential utilities. The Steel Unit also places a strong emphasis on environmental considerations, incorporating sustainable practices and adhering to local and international standards. Beyond its economic impact, the project aims to contribute to the local workforce by generating employment opportunities and implementing training programs. The outlined plan.

Figure 5-1 Location of the Steel Mil Plant

encompasses a timeline, milestones, and strategies for risk mitigation, making it a holistic blueprint for the successful establishment and operation of the Steel Unit.

5.3.1 Total Area

The project site spans a total area of 5.12 Kanal in the Tehsil Lakhudair, Shalimar, District Lahore.

5.3.2 Raw Materials

To sustain this ambitious production scale, the mill plans to annually source 105,000 MT of scrap.

5.3.3 Technology Used

The production process involves state-of-the-art technology, featuring 2 sets of induction furnaces, 2 casting strands, and 2 slitting rerolling units. These elements form a comprehensive production line, from scrap handling to the final rolling stage.

Induction Furnace Process

The induction furnace process for transforming steel scrap into billets is a sophisticated and highly efficient sequence that encompasses melting and the controlled addition of ferroalloys. Commencing with the meticulous selection of steel scrap imported from the Middle East, Saudi Arabia, and Europe, the induction furnace process ensures a diverse and reliable raw material base. The steel scrap is then meticulously charged into two sets of advanced induction furnaces. These furnaces utilize electromagnetic induction to generate intense heat, rapidly melting the scrap and transforming it into a homogeneous pool of molten steel.

At this crucial stage, the process incorporates the addition of ferroalloys to enhance the desired properties of the steel. Ferroalloys, such as ferrosilicon and ferromanganese, are introduced in controlled quantities to achieve specific alloy compositions and refine the steel's characteristics. This strategic addition of ferroalloys contributes to the fine-tuning of the steel's chemical composition, ensuring it meets stringent industry standards and product specifications.

Following the precise alloying stage, the molten steel is directed into casting strands, where it undergoes controlled solidification to take the form of billets. The casting process ensures the production of high-quality billets with consistent dimensions and mechanical properties. The use of two sets of induction furnaces not only enhances the overall operational efficiency but also allows for a continuous and reliable supply of molten steel.

Figure 5-2 Induction Furnace

Continuous Casing Machine (CCM)

The Continuous Casing Machine (CCM).is the machine which converts the molten steel into square shaped Billet. The temperature in the CCM mold is kept at 1535 to 1555°C. The copper mold tubes are cooled with water circulation in the mold the billets are produced according to the required sizes and lengths. In the case of the billets as the final product, billet is kept in the air for cooling at billet cooling at billet cooling bed and hot charged billets will have moved to Re-Rolling Mills.

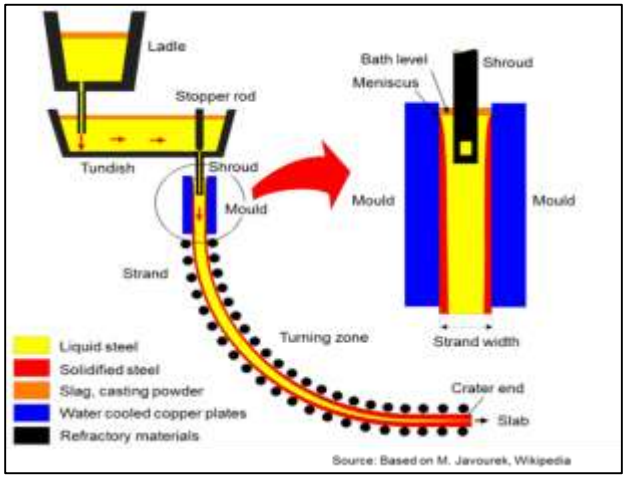

Figure 5-3 Continuous Casing Machine (CCM)

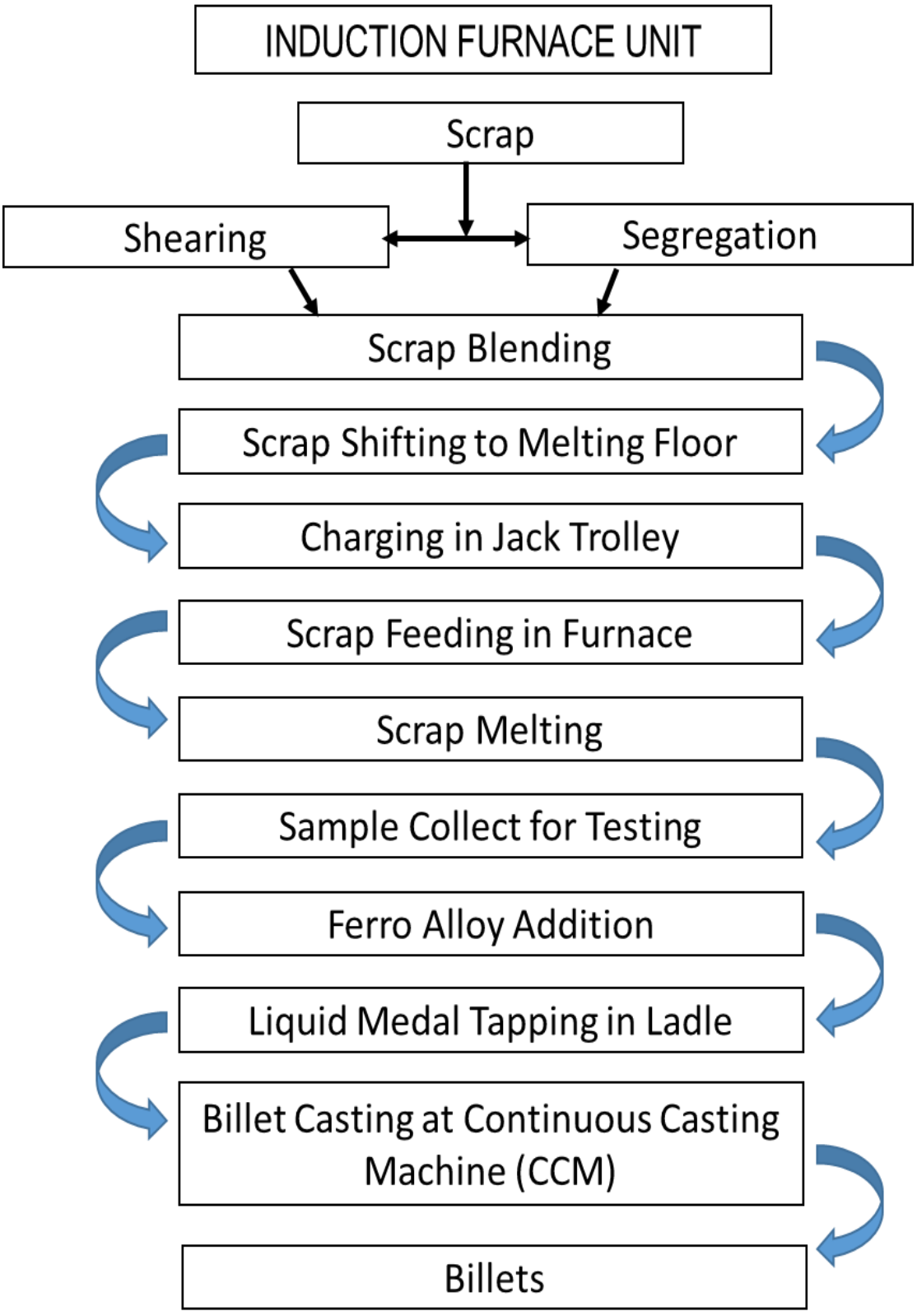

Figure 5-4 Induction Furnace Unit

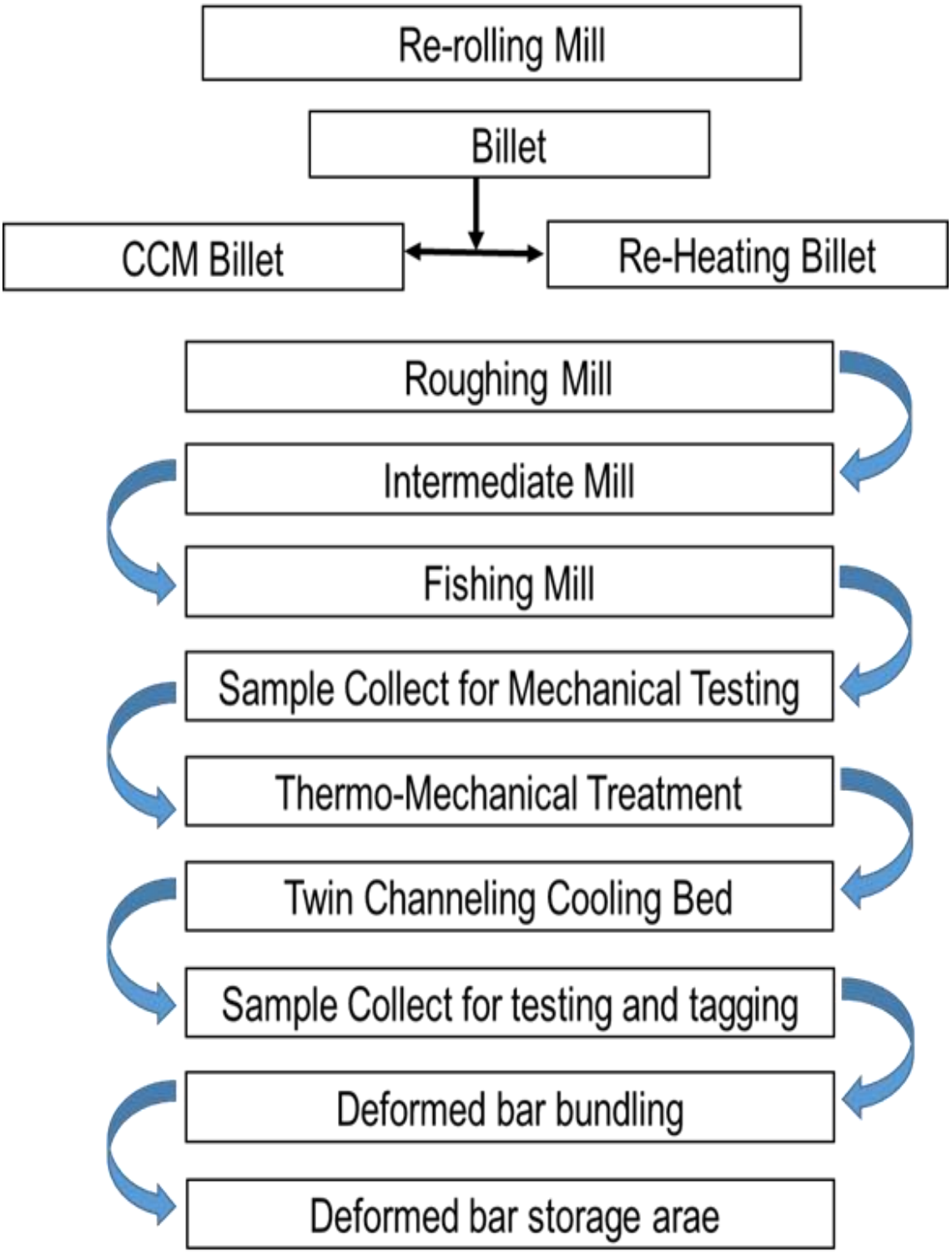

Figure 5-5 Re-Rolling Unit

Re-Rolling Mill

The transition from billets to the deformed bar storage area in a re-rolling unit involves a series of precisely orchestrated steps to shape, refine, and store the steel products. Following the production of billets in the casting process, they undergo the rerolling phase in a specialized unit. Initially, the billets are carefully heated to the optimal rolling temperature in a reheating furnace, ensuring malleability for subsequent processing.

Subsequently, the heated billets are guided through a series of rolling mills, where they undergo a sequence of passes to progressively reduce their cross-sectional area and achieve the desired shape and dimensions. The use of multiple stands in the rolling mill allows for precise control over the final product's specifications, including diameter and surface finish. Additionally, this process imparts necessary mechanical properties to the steel, enhancing its strength and durability.

Figure 5-6 Re-Rolling Mill

5.3.4 Pollution Control Measures

Environmental sustainability is a cornerstone of the project's design. To address air quality concerns, a pollution control system with a suction capacity of 150,000 m^3/hr, PLC-controlled for precision, will be meticulously installed. This system aims to maintain adherence to stringent air quality standards, reflecting the project's commitment to minimizing its environmental footprint.

Figure 5-7 Air Pollution Control System

5.3.5 Wastewater Management

In parallel, the project incorporates a cutting-edge Reverse Osmosis (RO) plant with a capacity of 20 m^3/hr. Equipped with mechanical filters for the water circuit, this facility ensures responsible water consumption and effluent management. This commitment to water sustainability aligns with global best practices for industrial water usage.

5.3.6 Equipment Used

Following list of equipment has been proposed.

5.3.7 Operational Hours

Operating for 8,400 hours annually, the facility is poised to meet the demands of the steel market with efficiency and precision

5.3.8 Employment

The project envisions a dynamic workforce of approximately 600 staff members, contributing to local employment and fostering skill development within the community. Training programs and skill enhancement initiatives will ensure that the workforce aligns with the high standards of operation and safety protocols.

5.3.9 Energy Use

The steel power plant boasts a formidable power capacity of 710,000,000 kilowatts per year, signifying its substantial capability to generate electricity. The sheer magnitude of this power output underscores the plant's potential to meet significant energy demands.

5.3.10 Water Use

In terms of resource consumption, the mill utilizes a substantial volume of water, specifically 32,970,000 cubic liters annually indicating a reliance on water resources for various operational processes.

Table 5-1 Water Balance Sheet of Steel Plant

WATER BALANCE SHEET OF STEEL PLANT							
Sr. No.	User	Unit	Total Flow Rate	Make Up			
				Evaporation	Mechanical Loss	Blown Down	Remarks
1	Induction Furnace 1	m^3/hr	250	4.6875	0.5	0	Approx. losses 0.2% of total flow
2	Induction Furnace 2	m^3/hr	250	4.6875	0.5	0	Approx. losses 0.2% of total flow
3	CCM primary	m^3/hr	300	5.625	0.60	0	Approx. losses 0.2% of total flow
4	CCM secondary	m^3/hr	170	3.1875	0.34	1.5	Included sludge water 0.5%
5	Rolling Mill	m^3/hr	150	2.8125	0.00	0.55	Included secondary
6	Fire Fighting	m^3/hr	5	0	0.00	0.015	In case of emergency (150 Lt/A)

7	Labor residence	m^3/hr	1.86	0	0	1.45	80-100 Liter/day for one person
8	HOD residence	m^3/hr		0	0	0.41	80-100 Liter/day for one person
				21	2.24	3.925	

5.3.11 Fuel Use

Additionally, the inclusion of 35 million cubic feet of gas highlights the significance of natural gas in fueling the plant's energy production. In addition to gas, the mill incorporates other fuels, consuming 100,000 cubic feet annually, demonstrating a diverse energy mix to sustain its operations. This comprehensive approach to energy sourcing highlights the plant's commitment to efficiency and resilience, positioning it as a key player in both the steel production and energy generation sectors.

5.4 ENERGY USED

The steel power plant boasts a formidable power capacity of 710,000,000 kilowatts, signifying its substantial capability to generate electricity. The sheer magnitude of this power output underscores the plant's potential to meet significant energy demands. In terms of resource consumption, the mill utilizes a substantial volume of water, specifically 32,970,000 cubic liters, indicating a reliance on water resources for various operational processes. Additionally, the inclusion of 35 million cubic feet of gas highlights the significance of natural gas in fueling the plant's energy production. In addition to gas, the mill incorporates other fuels, consuming 100,000 cubic feet annually, demonstrating a diverse energy mix to sustain its operations. This comprehensive approach to energy sourcing highlights the plant's commitment to efficiency and resilience, positioning it as a key player in both the steel production and energy generation sectors.

5.5 LAND USE ON THE SITE

The proposed land for the development project is characterized as an open expanse, currently covered with a mix of shrubs and grass.

5.6 ROAD ACCESS

The road access is given in the figure below;

Figure 5-8Road Access

.VEGETATIVE FEATURES OF THE SITE

The identified land for the construction of a Steel Unit is currently adorned with vegetation, predominantly comprising shrubs and other plant species with minimal ecological importance. The presence of these plants, while contributing to the aesthetic aspect of the landscape, does not significantly contribute to the local ecosystem's biodiversity or ecological balance. Recognizing the limited ecological importance of the existing vegetation allows for a pragmatic evaluation of the land's potential for industrial development. However, it is essential to acknowledge that any land-use change, particularly in areas with existing vegetation, necessitates careful consideration and mitigation measures to minimize environmental impact. Responsible planning and environmental assessments are vital to ensure the conservation of biodiversity and the implementation of compensatory measures, such as tree plantation initiatives, to offset any ecological disruption caused by the construction and operation of the Steel Unit plant.

5.7 COST AND MAGNITUDE OF OPERATION

The total cost of the project is PKR 785 Million. The time period for the completion of the project is proposed as 1 year.

5.8 SCHEDULE OF IMPLEMENTATION

The outlined project implementation schedule is intended to be followed, contingent upon smooth execution as per the plan and the absence of significant obstacles. The implementation stages of the project activity include:

1st Stage

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

2nd Stage

The stage –2 comprises the following task:

- Digging the ground to lay foundation and starting to build or put together the structure.
- Building support structures and foundation work.

- Beginning construction, electrical and mechanical tasks.
- Establishing essential infrastructure.
- Fitting of instrumentation

3rd Stage

The stage –3 comprises the following task

- Commercial building civil structure erection completion.
- Completion of the basic infrastructures water supply system, electricity supply etc.

4th Stage

The last stage will be the commencement of regular use of the plant.

6 DESCRIPTION OF THE ENVIRONMENT

6.1 GENERAL

An environmental baseline study is intended to establish a database against which potential project impacts can be predicted and managed later. 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 general 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

The topography of the project area is flat. The General height of the area is approximately 220 meters above the Mean Sea Level (MSL). The district Lahore is divided into two parts. The low lying alluvial soil is along the Ravi River and the upland in the east. Upland is a plain slope from north-east to south-west. The lowlands are generally inundated during the monsoon season by Ravi River, flowing in the west of district along its boundary with district Sheikhupura. Figure 6.1 represents the topography of the area

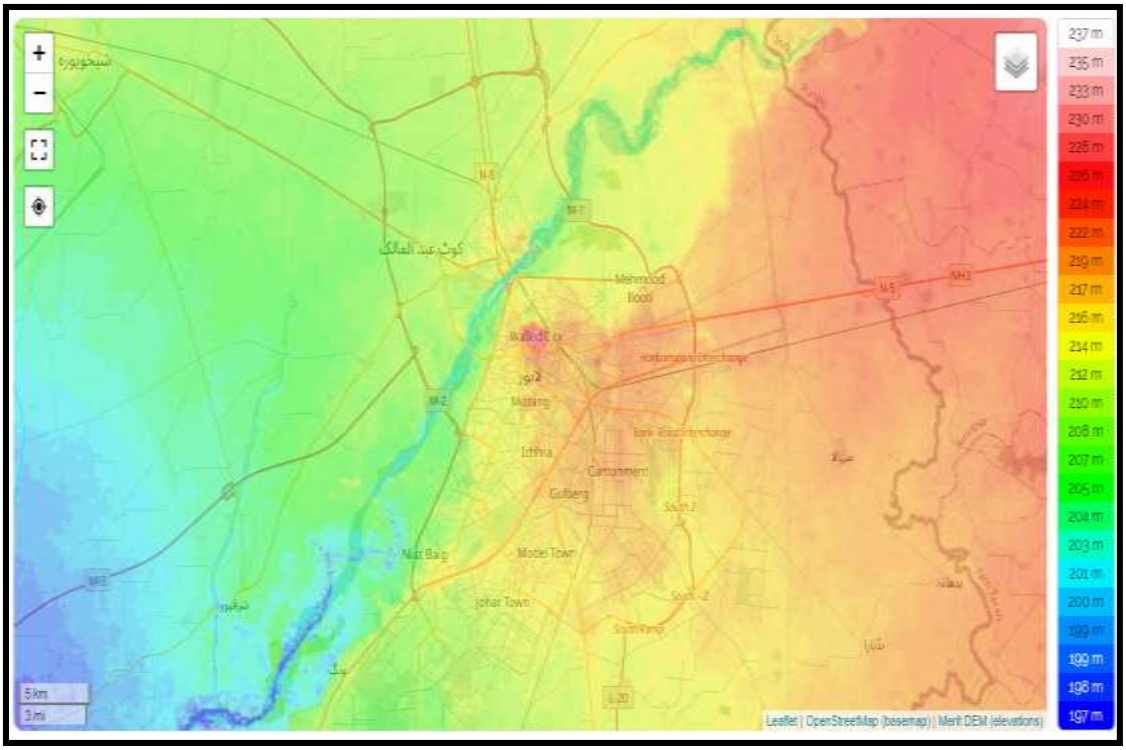

Figure 6-1Topography of Area

6.2.2 Soils

The soil is different in character and generally inclined to be dry. However, it is rich in potential plant nutrients. Rainfall is low and groundwater is saline and brackish at the shallow depth and irrigation is largely dependent on the canals. Tube wells have also been sunk to the greater depths in the Project Area where fresh water is available.

The chemical quality of groundwater in the district varies with depth. However, the sweet potable water is available in a belt five to twenty miles wide paralleling the Ravi River.

Alluvium is soil or sediments deposited by a river or other running water. Alluvium is typically made up of a variety of materials, including fine particles of silt and clay and larger particles of sand and gravel. A river is continually picking up and dropping solid particles of rock and soil from its bed throughout its length. Where the river flow is fast, more particles are picked up than dropped. Where the river flow is slow, more particles are dropped than picked up. Areas, where more particles are dropped, are called alluvial or floodplains and the dropped particles are called alluvium.

6.2.3 Climate and Meteorology

Seasonal climatic conditions must be considered for the design and execution of Project. The climate including air, temperature, precipitation, humidity, and evaporation is an influencing factor, affecting the construction of the plant and other engineering structures. However, to determine the overall effect of the climatic stresses, daily and seasonal temperature changes, site altitude, direct solar radiation, and precipitation must be considered. The Project Area has extreme climate: it has hot summer and cold winters. The summer starts from April and lasts till September. May, June, and July are the hottest months. The mean maximum and minimum temperature ranges from 45 ºC and 27.3 ºC respectively for these months.

The winter seasons lasts from November to March. December, January, and February are the coldest months. The mean maximum and mean minimum temperature ranges from 19.8ºC to 5.9ºC in January. Temperatures in the Project Area vary from 5.9 ºC to 45 ºC.

Table 6-1Meteorological and Climatic Features

Classification Of Climate	Tropical (Hot/Humid)
Predominant Wind Direction	East/Northeast
Wind Intensity	Weak To Moderate
Average Annual Precipitation	>650 Mm
Rainy Season	July To September
Dry Season	October To June
Average Annual Temperature	19-20 °C
Average Summer Temperature	36-38 °C
Average Winter Temperature	6.5-10.5 °C

Table 6-2 Average Monthly Temperature, Precipitation and Relative Humidity (2021)

Month	Mean Temperature		Precipitation (Mm)	Average Relative Humidity (%)
	Maximum	Minimum		
January	19	7	100	72
February	23	10	31	60
March	28	15	39	54
April	34	20	62	40
May	39	25	50	37
June	39	28	176	54
July	36	27	200	68
August	35	27	184	69
September	35	25	50	63
October	32	19	0	56
November	27	13	19	72
December	22	9	31	63
Annual	30.75	18.75	666	78.34

Table 6-3 Rainfall Data of the Area

MONTH	Precipitation (Millimeters)
January	23
February	28.6
March	41.2
April	19.7
May	22.4
June	36.3
July	202.1
August	163.9
September	61.1
October	12.4
November	4.2
December	13.9
Annual	628.7

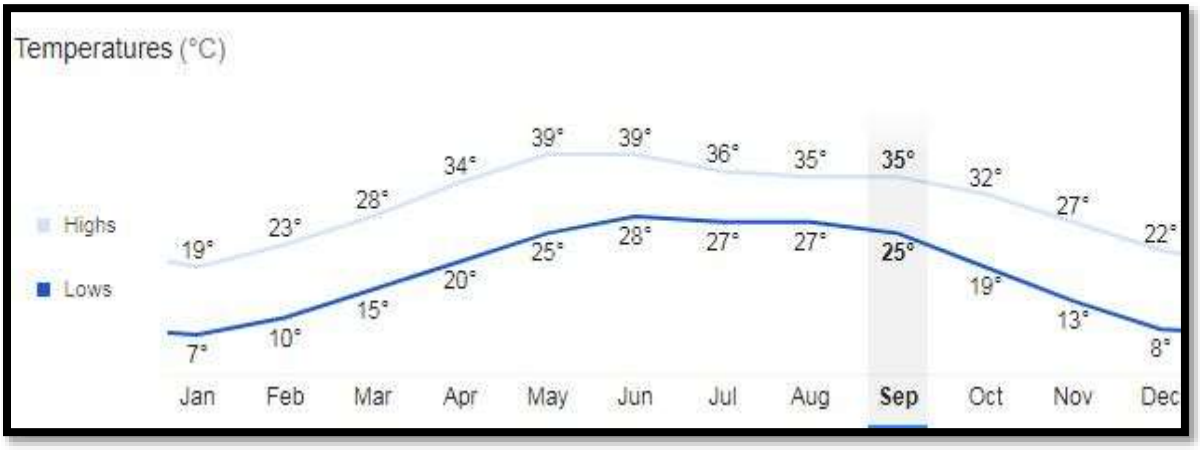

Figure 6-2 Average Temperature in Lahore

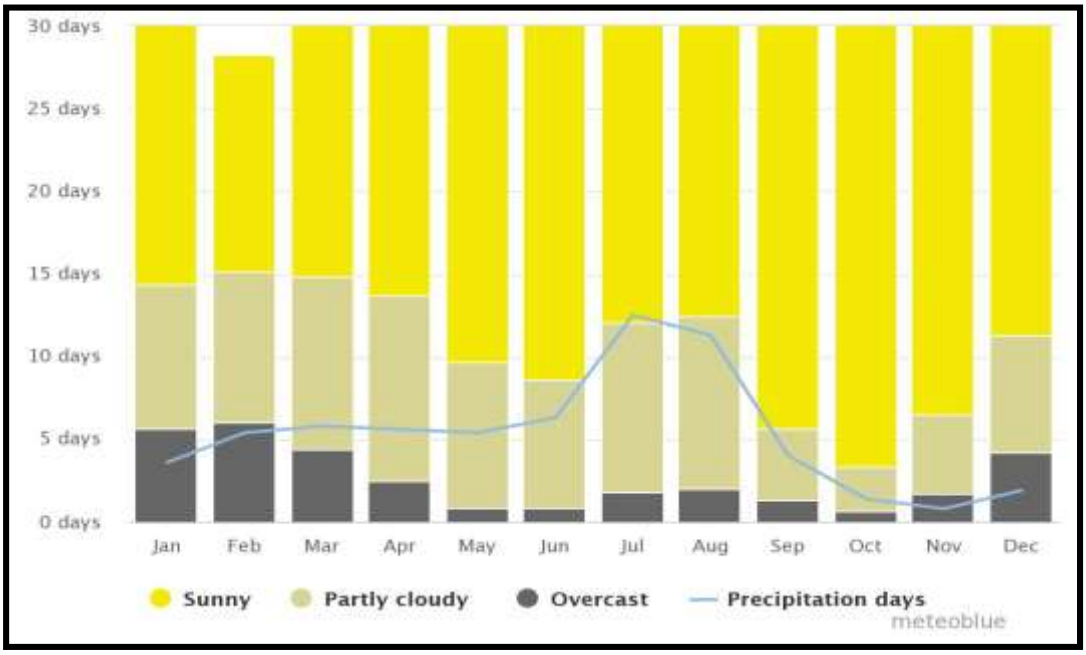

Figure 6-3 Average Cloudy Sunny and Precipitation Days

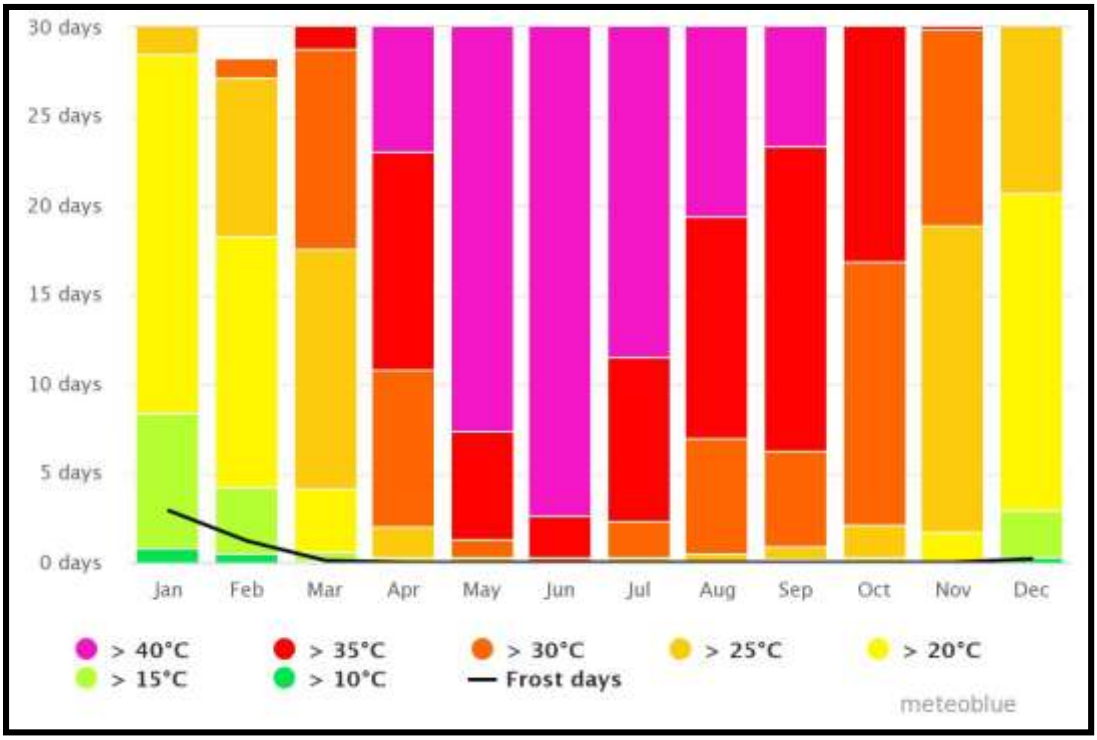

Figure 6-4 Maximum Temperatures in Lahore

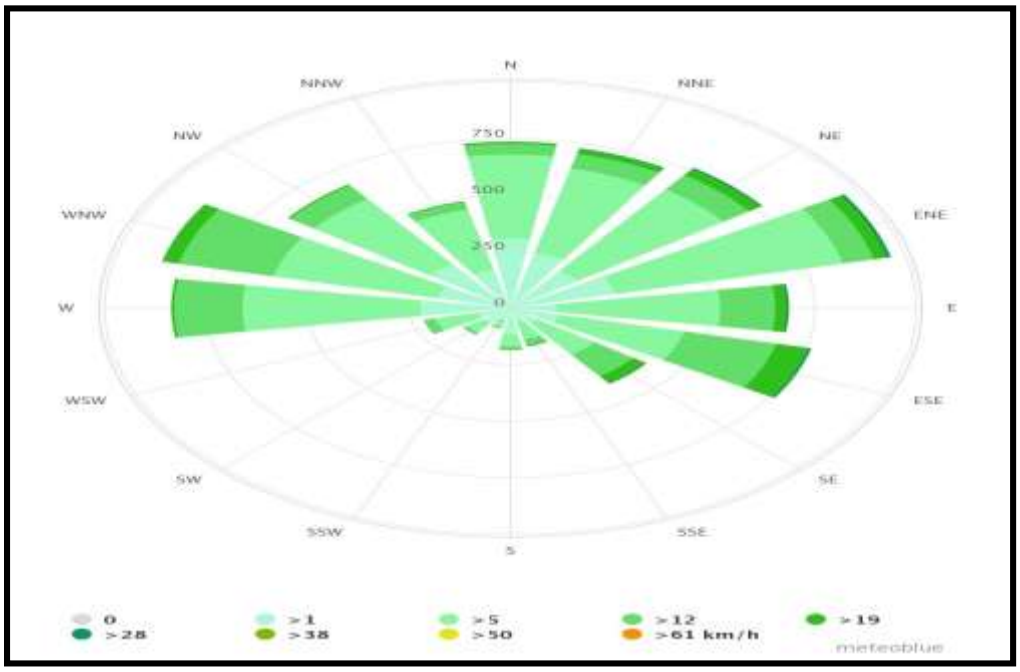

Figure 6-5 Average Wind Rose in Lahore

Based on climatic elements, five seasons are recognized

6.2.4 Pre-Monsoon Season

Pre-monsoon refers to the period from April to June prior to the setting in of the monsoon. This is the hottest and the driest season, with persistent dry and hot winds. Daytime temperature rises to 40-40 °C. The flows in the river begin to rise simultaneously due to snow-melt water in the high mountains. The water table falls to the maximum depth

6.2.5 Monsoon Season

Monsoon is the main rainy period, which starts at the beginning of July, reaches its climax in August and gradually, subsides in September. High-intensity Rainfall causes soil erosion which is a function of erosivity and erodibility. The cool monsoon winds followed by heavy showers lower the temperature to great extent. The part of rain percolates into the soil and is conserved in the subsoil and part ads to the groundwater. The conserved moisture in the soils is generally sufficient to rejuvenate the vegetation. All plants grow rapidly and mature towards the end of the season. With the start of monsoon season, the rivers flow at their peak level. The groundwater level is improved toward the end of the season in September and October.

6.2.6 Post-Monsoon Season

Post monsoon season refers to autumn (October-November). The temperature starts falling but the extreme aridity prevents plants to flower early and sets seed toward mid-seasons. Groundwater level rises as a result of infiltration from rainfall.

6.2.7 Winter Season

Winter refers to the period from December to January. The lowest temperatures (< 20°C) and cold winds characterize this season. The plants become dormant and most of them dry out. Most of the trees shed their leaves and few remain green or partly green. Sometimes this season becomes severe due to cold Siberian winds. Groundwater level declines in this season due to low flows in the rivers and no or little rains which usually fall in light showers causing little soil erosion.

6.2.8 Spring Season

Spring refers to the period from February to March. Temperatures become pleasant. The mean maximum temperature is 27°C with the highest precipitation of 41.2 mm and relative humidity of 57.6 percent. Some light showers of rain may also fall without generating runoff. The vegetation sprouts again because of conserved moisture from winter and spring rains, if any. The water table

starts falling

6.3 SURFACE WATER & GROUND WATER

6.3.1 Surface Water

No rivers exist in the vicinity; however, storm water drains cross the route for disposal into the Ravi River. Water from River Ravi, flowing on the northwestern side of the city of Lahore, is being used for other purposes other than drinking purposes. River Ravi receives almost all the municipal/ industrial wastes from the city of Lahore. The potential value as a recreational water body and breeding place for fish is threatened by the municipal and industrial pollution.

6.3.2 Groundwater

Groundwater quality is fresh (defined as acceptable in terms of its salinity). Raw water abstracted from the deep tube wells is believed to be essentially bacteria free. The status of quality of groundwater both in the country and Punjab Province is shown in fig. The water quality in the upper 50 meters zone of the subsoil is generally brackish. For city's drinking purposes water is abstracted from groundwater aquifer by means of tube wells located throughout the city. The quality of water is generally adequate for direct consumption. About 83% of the city population is consuming groundwater for drinking purposes. Groundwater is available at a depth ranging between 15 to 23m below the natural surface level.

Water consumption varies significantly and its variation as of industrial units. Usual water consumption pattern for industrial units and data collected from the prospective industrialist will form the basis for total water demand.

According to Master Plan-2030 for the city of Lahore, the mean average decline in groundwater is about 2.03 feet per year. The water table contour map for the Year-2000 is exhibited in Exhibit-4.14. It is noted from the exhibit that groundwater is at a greater depth in the central part of the city where abstraction is more than the re-charge and close to surface waters i.e. Ravi River and Canal, the situation is in the reverse order.

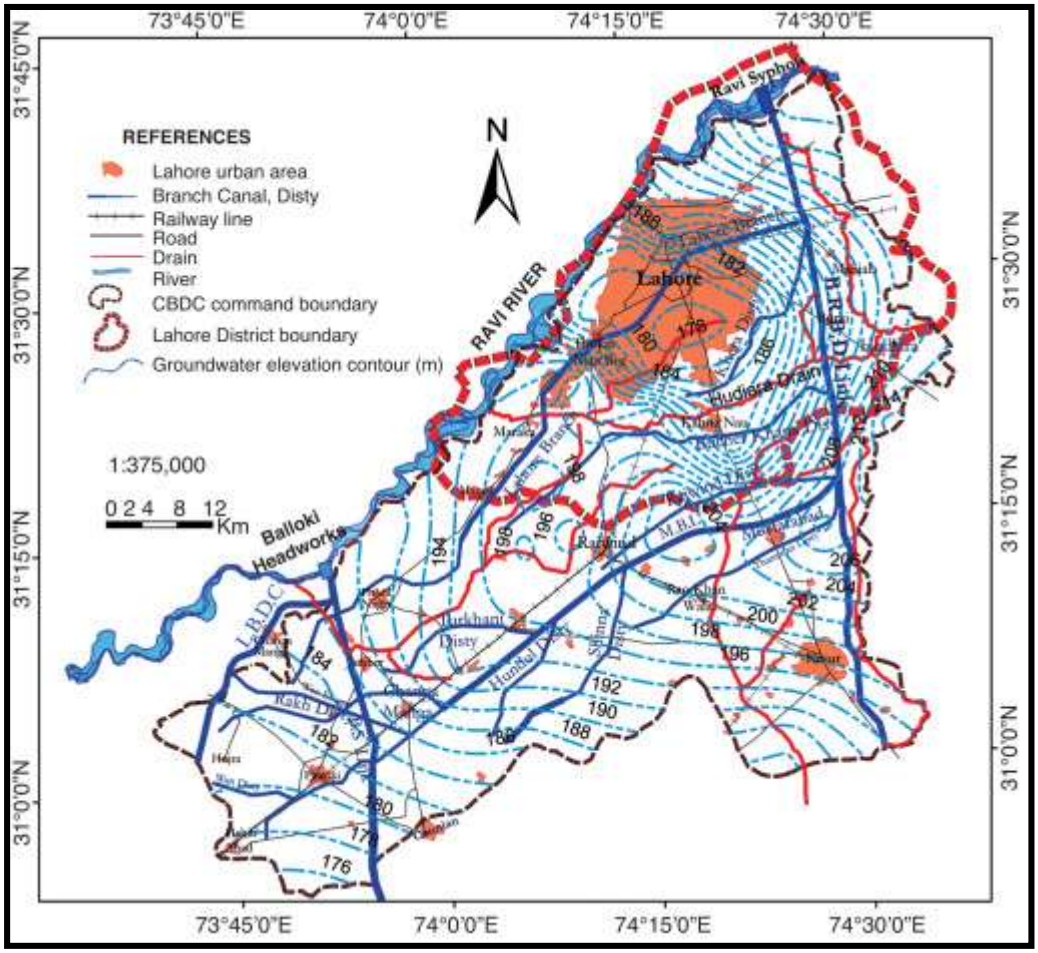

Figure 6-6 Groundwater in Lahore

6.4 SEISMOLOGY

Pakistan Building Code distributes the country into 4-zones, fig. The project site falls in Moderate Damage Zone, as such structural design of buildings and others will follow the applicable criteria for the zone.

Seismic details are a very important consideration for any planning activity. As it directly lays impact on the construction of the site.

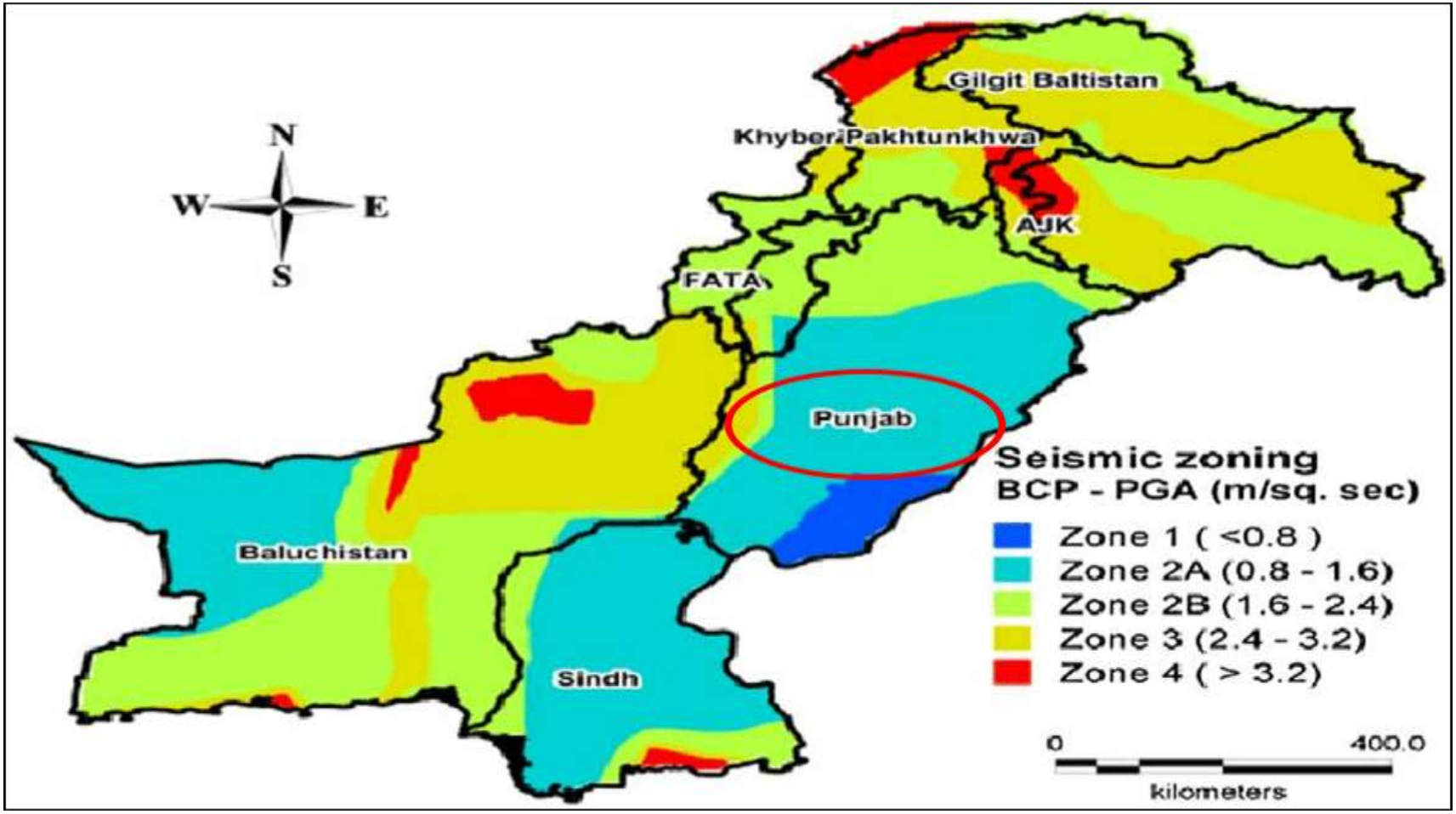

Figure 6-7 Seismic Activity of Lahore

6.5 FLOODING

No surface drainage problems are foreseen as surface water can be disposed of in the existing primary and secondary drainage network including partly moving into the sewerage.

6.6 WATER LOGGING AND SALINITY

There are no signs of water logging in the project site

6.7 ECOLOGICAL RESOURCES

6.7.1 Marine and Aquatic Ecology

This is not applicable to the Project area.

6.7.2 Flora

The diversity and distribution of plant species within the Lahore District depend upon the availability of water and the underlying geology. There are significant numbers of trees in Green Belts alongside the roads of Lahore.

6.7.3 Fauna

Common birds found in the area are crows and sparrows. Chirping birds are having their nests at the well-grown trees that are providing a natural habitat for the birds. Some squirrels, parrot, rats, weaver, sparrows are also found in the area.

Different species of reptile and amphibians such as lizards and frogs are also found. Various bird species known to occur in the area include myna, bulbul, crow and sparrow.

6.7.4 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.

6.8 SOCIOECONOMIC ENVIRONMENT

6.8.1 General

Lying between 31°15′—31°45′ N and 74°01′—74°39′ E, Lahore is bounded on the north and west by the Sheikhupura District, on the east by Wagah, and on the south by Kasur District. The Ravi River flows on the northern side of Lahore. Lahore city covers a total land area of 404 square kilometers (156 sq mi) and is still growing. With a rich history dating back over a millennium, Lahore is a main cultural center of Punjab and one of the most densely populated cities in the world. The city of Lahore remains an economic, political, transportation,

entertainment, and educational hub. It is referred to as the "Mughal City of Gardens" due to the historic presence of gardens in and around the city dating back to the Mughal period.

6.8.2 Political and Administrative Setup

The project area falls in Lahore City of the Lahore District. District Co-ordination Officer is the highest ranked administrator of the district. For the collection of revenue and administration, the districts are subdivided into Tehsils. Local governments also administer the area through Union Councils and Tehsils. The total area of the district Lahore is 2,300 square kilometers.

6.8.3 Economy and Industrial Activities

The project is located in a vibrant industrial region, characterized by a diverse array of industries in its vicinity. As illustrated in the figure below, the area is home to numerous manufacturing plants, warehouses, and logistics centers, all contributing to a bustling economic environment. This strategic location ensures that the project benefits from well-established infrastructure and easy access to essential services and resources, fostering an ideal setting for industrial operations and growth.

Figure 6-8 Economic Units in the Project Area

6.9 QUALITY OF LIFE VALUES

6.9.1 Demographic Characteristics of the Project Area

The total population of Lahore District was 6,318,745 as enumerated in March 1998 with an intercensal percentage increase of 78.3 since March 1981 when it was 3,544,942 souls. The average annual growth rate of population in the district during intercensal period 1981-1998 was 3.5 percent. The total area of the district is 1772 square kilometers, which gives population density of 3,566 persons per square kilometer as against 2000 persons observed in 1981 indicating a fast growth rate of the district. The table gives population, its intercensal increase and average annual growth rate since 1951 of Lahore district.

Table 6-4 Intercensal Demographic Survey

Description	**1951**	**1961**	**1972**	**1981**	**1998**	**2017**
Population (in 000's)	1,135	1,626	2,588	3,545	6,319	11,126
Intercensal Increase (%)	43.3	59.2	37.0	78.3	-	-
Average Annual Growth Rate (%)	3.7	4.1	3.8	3.5	-	-

6.9.2 Rural and Urban Distributions

The urban population was 5,209,088 or 82.4 percent of the total population of the Lahore district, which grew at an average rate of 3.3 percent during 1981-98. The growth decreased from 3.7 percent, which was observed during 1972-81. There are one Metropolitan Corporation, two Town Committees and one Cantonment in the District.

There were 261 Mauzas (the smallest revenue unit) in 1998. Of these 61 had a population over 5 thousand, another 61 had 2 to 5 thousand, 64 had one to two thousand, and 74 had under one thousand persons while one was uninhibited.

6.9.3 Religion

The population of the district is predominantly Muslims i.e. 93.9 percent. The next higher percentage is of Christians with 5.8 points followed by Ahmadis 0.2 percent. While other minorities like Hindu etc. are very small in number.

6.9.4 Ethnic Structure

The main castes and groups of the Lahore district are Arain, Jat, Rajput, Malik, Pathan, Mughal, Sheikh, Komboh and Gujjar. Besides, there are also village artisans, which include Lohars (blacksmiths), Tarkhan (carpenter), Kumhars (potters), Mochis (cobblers), Machhis (water-carrier), barbers and weavers etc.

6.9.5 Mother Tongue

The mother tongue refers to the language used for communication between parents and their children in any household. Punjabi is the predominant language being spoken by the majority (86.2 percent) of the population of the district followed by Urdu, Pushto, and Siraiki being spoken by 10.2, 1.9, and 0.4 percent. Sindhi is spoken by 0.1 percent.

6.9.6 Institutions

Since this area has numerous industries in its vicinity, schools are located farther away. The industrial nature of the region necessitates the allocation of space primarily for factories, warehouses, and other commercial facilities, which leaves limited room for educational institutions. Consequently, residents often need to travel a considerable distance to access schools, resulting in a separation between residential and educational zones. This geographical arrangement underscores the distinct prioritization of industrial development in this region.

Figure 6-9 Educational Institutes in the Project Area

6.9.7 Transportation

The city of Lahore is one of the most accessible cities of the Punjab Province. In addition to the historic Grand Trunk Road (G.T. Road), a motorway (M- 2) was completed in 1997 from Lahore to Islamabad. The government has built underpasses to ease congestion and prevent traffic jams, and according to official figures, Lahore transportation services have improved to accommodate the growing number of visitors to the city. It is well connected by air to other countries as well as all major cities of Pakistan. Buses, trains, taxis, and rickshaws are the other means of transport available in Lahore.

Figure 6-10 Transportation in Lahore

6.9.8 Health Facilities

Ample medical and health facilities are available in the Lahore Metropolitan Corporation area and its suburbs. Shaukat Khanam Hospital is the latest addition to the medical care facilities in Lahore for the most dangerous disease in the country i.e. Cancer. There are also other hospitals of voluntary organizations which provide health coverage to the general public. Among the prominent hospitals are General Hospital, Lady Willington Hospital, Mayo Hospital, Fatima Jinnah Hospital, The Children Hospital, Services Hospital, and Ganga Ram Hospital etc. Besides, a number of private medical practitioners, Hakims, and homeopathic doctors are also practicing in the city. Services Hospital is the nearest health care facility that is present in the vicinity of the project.

Figure 6-11 Hospitals in Lahore

6.9.9 Architecture Style

Lahore, Pakistan architecture refers to the various structures built during different time periods. Walled city is famous for its gates and architecture. Mostly there are three types of old buildings in Lahore. Victorian Architecture: When British conquered sub-continent they made these buildings during the period 1857 -1947 keeping in mind the climate conditions. Mughal Architecture: By an architectural point of view, therefore, Lahore is essentially a Mughal city, Made by Mughal emperors during the period of 1504 -1857. Minarets are attached to buildings. Cylindrical construction with internal staircases and balconies leading to the conical roof. All buildings are symmetrical creating a mirror-like effect. British Architecture: Under British rule (1849–1947), colonial architecture in Lahore combined Mughal, Gothic and Victorian styles. Under British rule, Sir Ganga Ram (sometimes referred to as the father of modern Lahore) designed and built the General Post Office, Lahore Museum, Aitchison College, Mayo School of Arts (now the NCA), Ganga Ram Hospital, Lady Mclagan Girls High School, the chemistry department of the Government College University, the Albert Victor wing of Mayo Hospital, Sir Ganga Ram High School (now Lahore College for Women) the Hailey College of Commerce etc. In modern Lahore, Pakistan; the traditions of architecture have been changing. The dome, minaret, the arch, the intricate mirror work and the extravagant use of ornaments which were features of the Mughal style, have now gone out of fashion. Changing patterns of

economy, industrialization and increase in population have contributed a great deal in revolutionizing the entire basis of architectural forms.

Figure 6-12 Architecture Style of Lahore

6.10 SITE SUITABILITY

As per the above physical and biological baseline assessment, it has been concluded that Mouza Lakhodair in Tehsil Shalimar, Lahore is best suited for the construction of a Steel Unit. The comprehensive evaluation of the area's topography, soil quality, and environmental conditions indicates that it meets all necessary criteria for industrial development. Additionally, the region's existing infrastructure and accessibility further support the feasibility of establishing a Steel Unit, ensuring that it can operate efficiently while minimizing potential environmental impacts. This strategic location offers a conducive environment for the steel industry's growth, making it an ideal choice for this significant industrial project

7 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

7.1 GENERAL

Impact assessment is crucial for project initiation as it enables the identification and comprehension of a project's potential positive and negative effects. Understanding these impacts aids in tailoring the project to maximize benefits and minimize risks. Impact assessment assists in recognizing environmental, social and economic challenges and risks and gives the directions to develop strategies that mitigate these risks and adjust the plan accordingly.

7.2 PROJECT AREA OF INFLUENCE

Before commencing the environmental analysis of the project, its essential to define the specific area of influence. While the primary construction activities will be contained within predetermined boundaries, there are certain aspects where construction-related tasks may extend beyond these confines. These include

- Establishment of construction camps and erection of material grinding plants on temporarily acquired land
- Borrowing soil material from temporarily acquired land
- Quarrying aggregate material; and Construction of haul tracks for transportation of construction material, etc.

Environmental impacts have been identified within the Project Area of Influence; which lies within 0.5 km boundary of the proposed commercial building. Therefore, the identification of Project impacts and recommendations of mitigation measures will be limited within this area.

7.3 METHODOLOGY FOR IMPACT ASSESSMENT

A comprehensive risk assessment was conducted using both qualitative and quantitative analysis methods to evaluate the potential impacts associated with the design, construction, and operational phase of the Steel Plant. The probability, severity, and consequences of the impacts were analyzed.

7.4 PROJECT DESIGN RELATED ENVIRONMENTAL PROBLEMS

Steel plants can pose significant environmental challenges, with several design-related issues contributing to their environmental impact. One major concern is air pollution resulting from the release of pollutants during various stages of steel production. Emissions of particulate matter, sulfur dioxide, nitrogen oxides, and carbon monoxide can lead to poor air quality in the vicinity of the plant, impacting both human health and the environment. Water pollution is another critical issue associated with steel plants. The production processes often involve the use of large amounts of water for cooling, cleaning, and processing. The discharge of wastewater containing heavy metals, oils, and other pollutants can contaminate nearby water bodies, affecting aquatic ecosystems and potentially harming human communities that rely on these water sources.

The energy-intensive nature of steel production contributes to greenhouse gas emissions, particularly if the mill relies on fossil fuels. Carbon dioxide, a major greenhouse gas, is released during the combustion of coal, natural gas, or other carbon-containing fuels. Addressing this issue requires a strategic design approach, incorporating energy-efficient technologies and renewable energy sources to minimize the carbon footprint of the steel plant. The disposal of solid waste, including slag, dust, and other by-products of steel production, poses another environmental challenge. Proper waste management strategies, such as recycling and safe disposal practices, are crucial to minimize the impact on land and prevent the accumulation of hazardous materials.

To mitigate these environmental problems, Steel Unit design should prioritize technologies and practices that enhance energy efficiency, reduce emissions, and promote sustainable resource use. Incorporating cleaner production methods, implementing effective waste management systems, and adopting environmentally friendly technologies can contribute to a more sustainable and eco-friendly operation of steel plants.

7.5 IMPACTS DURING CONSTRUCTION PHASE

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

Table 7-1 **Screening of Possible impacts during Construction Phase**

Potential Impacts	Likelihood	Consequences	Risk Level

	(Certain, Likely, Unlikely, Rare)	**(Catastrophic, Major, Moderate, Minor)**	**(Significant, Medium, Low)**
Soil Erosion	Likely	Minor	Low
Land Contamination	Likely	Minor	Low
Soil Contamination	Likely	Minor	Low
Solid Waste	Likely	Minor	Low
Contractor Camp	Likely	Minor	Low
Ground Water	Likely	Minor	Low
Dust	Likely	Moderate	Low
Noise	Likely	Minor	Low

7.5.1 Land Contamination

The construction machinery, including cranes, trucks, loaders/dumpers, and batching plants, used during the construction period can release or spill lubricants, oil, chemicals, and toxic materials, contaminating the land. Paints used in the construction phase can also pose threats to both the environment and human health.

Mitigation Measures

Land contamination will be controlled by the following measures:

- Vehicles and other equipment will be maintained only in designated areas with concrete slabs.
- Prevent the release of contaminated effluent into the environment.
- Direct machinery wash and other potentially contaminated effluents will be drain to a mud pit.

- Proper Handling and storage of fuels, oils, and other hazardous substances according to standard safety practices, such as using secondary containment will be ensured.
- Fuel tanks will be properly labeled and have impervious linings and dykes.
- Leakages during fuel and oil transfer operations will be prevented.
- Checking of fuel, oil, and chemical storage daily for leaks will be ensured.
- Shovels, plastic bags, sandbags, and absorbent materials will be available near fuel and oil storage areas.
- Vehicles will be properly maintained to avoid spills.
- Maintain a leak/spill record for each vehicle.
- Control of soil contaminated by moderate spills or leaks (up to 200 liters) using shovels, sand, and mud.

7.5.2 Soil Erosion

Soil erosion may occur in the construction area due to improper runoff management from equipment washing yards and inadequate construction management practices. This impact is considered negative of minor magnitude.

Mitigation Measures

Soil erosion will be controlled by using good engineering practices especially both at construction site and peripheral area. Following measures should be taken to avoid soil erosion due to runoff water:

- Ensuring that surface run-off controls are implemented and maintained so as to minimize erosion.
- Main drainage courses within the proposed project development site will be lined to avoid erosion.
- Plantation of indigenous grass which will flourish under project site conditions. This should be done for low road embankments.

7.5.3 Soil Contamination

Soil contamination during the construction phase can occur from waste generated from construction camps, such as garbage, putrescible waste, rubbish, and residues; discarded construction materials, such as wires, plastics, cut pieces of pipes, pieces of empty fuel and lubricant tins, and cardboard packing materials; and paint, varnishes, and other hazardous chemicals and toxic materials used in construction activities. This impact is considered negative of minor magnitude.

Mitigation Measures

- Oil, paint, and other chemical leakages will be controlled by storing these substances in special containers. Keep these containers away from unauthorized people and only allow authorized personnel to access them.
- Store other chemicals in adequate and appropriate places, depending on the type of material.
- Place safety equipment, such as fire extinguishers, near these storage areas, along with signs warning of danger and fire.
- Provide workers with Material Safety Data Sheets (MSDS) for each chemical, and take care when handling and storing these chemicals.
- Develop and implement a proper solid waste management plan to avoid waste problems.
- Collect solid waste by placing solid waste collection containers at various locations. Provide separate arrangements for organic and inorganic waste, and make workers aware of the solid waste management system in place at the site.

7.5.4 Impacts of Dust Emissions

Construction activities require machinery and equipment's such as transport vehicles, cranes, excavators, trucks for material excavation, dump/haul truck, etc. This machinery will generate air emissions that contain particulate matter (PM), smoke, dust, Carbon Monoxide (CO), and Oxides of Nitrogen (NO_2).

Mitigation Measures

- Vehicular emissions of NOx, oxides of sulfur, PM, and CO will be controlled by tuning and maintaining vehicles in good working condition.
- Dust emissions will be controlled by regularly sprinkling water and covering trucks carrying earth, sand, aggregate, and other materials.
- Tuning of all equipment, generators, and vehicles used during the construction phase.
- Ensuring that concrete mixers meet the requirements of zero emissions.
- Minimizing dust emissions due to vehicular traffic by reducing speed, minimizing traffic through good traffic management, and sprinkling water when required.
- Minimizing dust emissions at construction sites by implementing best management practices.

7.5.5 Impact of Noise

Construction activities may increase noise levels at active construction sites. Noise impact on construction workers/ laborers may be avoided in case of loud noise by provision of adequate. Personal Protective Equipment's (PPEs) like ear muffs, ear plugs, etc. This impact is considered negative of moderate magnitude.

Mitigation Measures

Following measures should be adopted to minimize the noise levels;

- Noise barriers (paneled fencing) will be installed where possible to keep the noise levels within permissible limits.
- While replacing equipment, quieter alternatives will be purchased. New equipment may introduce a noise problem; therefore, a noise assessment will be carried out while installing new piece of equipment.
- Contractor obligation will be to use appropriate and fit machinery.
- Noise analysis will be done every month during construction phase.

7.5.6 Impact of Solid Waste and Sewerage Generation

The contractor camp is expected to generate waste. Improper disposal of this waste can lead to both land and water contamination. To address this, storage and collection system will be provided. This impact is considered minor but negative.

Mitigation Measures

- Solid waste will be collected and segregated.
- Material suitable for recycling will be stored separately and will be handed to vendor.
- It will be ensured that the dumping area having construction waste will be leveled properly after disposal of waste material.

7.5.7 Impacts on Flora

The proposed construction of a Steel Unit on land currently occupied by shrubs and plants deemed to have minimal ecological importance presents an opportunity for positive environmental engagement. While these plants may not be ecologically significant, the project's commitment to compensatory tree plantation demonstrates a conscientious effort to mitigate potential impacts on the local flora. The introduction of new trees, chosen with careful consideration of the ecosystem, not only reflects a commitment to environmental sustainability but also provides an opportunity to enhance the aesthetic and green aspects of the area. This approach, coupled with ongoing monitoring and community involvement, ensures that the construction process aligns with a broader commitment to responsible and environmentally friendly development.

7.6 IMPACTS DURING OPERATIONAL PHASE

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

Table 7-2 **Screening of possible impacts during operational phase**

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)

Air Quality	Likely	Moderate	Medium
Noise	Likely	Minor	Low
Water Quality	Likely	Moderate	Medium
Soil Quality	Likely	Minor	Low
Safety Hazard	Likely	Moderate	Medium

7.6.1 Air pollution

The operational phase of a Steel Unit can have significant impacts on air quality, primarily due to emissions from various processes. Common pollutants released during steel production include particulate matter, sulfur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), and volatile organic compounds (VOCs). These emissions can contribute to air pollution, affecting both human health and the environment.

Mitigation Measures

Mitigation measures are essential to minimize these impacts:

- Establishing green belts and vegetation barriers around the Steel Unit can help absorb pollutants and improve local air quality. Trees and plants act as natural filters, trapping particulates and absorbing some gases.
- Implementing effective dust control measures, such as using covered conveyors and enclosing storage areas, can reduce the release of particulate matter into the air.
- Pollution Control System can be employed to reduce air pollution.
- Implementing a robust air quality monitoring program ensures that any deviations from Punjab Environmental Quality Standards (PEQs) are detected early.

7.6.2 Water Pollution

The operational phase of a Steel Unit can have notable impacts on water quality and the surrounding aquatic environment. Key concerns include the discharge of wastewater containing heavy metals, suspended solids, and other pollutants.

Mitigation Measures

Mitigation measures are crucial to address these impacts:

- Implementing Effluent Treatment Plants (ETPs) is essential for treating the wastewater generated during steel production. Reverse Osmosis (RO) plant can serve as an efficient unit for the treatment of wastewater produced from the steel plant.
- Implementing a robust water quality monitoring program ensures that any deviations from Punjab Environmental Quality Standards (PEQs) are detected early.

7.6.3 Noise Pollution

The operational phase of a Steel Unitintroduces notable noise impacts, emanating primarily from the extensive machinery, industrial processes, and material handling activities inherent to steel production. Heavy equipment like blast furnaces, crushers, and conveyors, along with metal processing and transportation activities, collectively contribute to elevated ambient noise levels in the plant's vicinity.

Mitigation Measures

- The installation of noise barriers and enclosures, acoustic insulation in mill structures.
- The optimization of equipment design to reduce noise emissions.
- Operational controls, such as scheduling noisy activities during less sensitive times.
- The implementation of vegetative buffers to act as natural sound barriers.
- The noise level should be less than 55 dB (A) as against the limiting value of 65 dB (A) by the PEQS for commercial industrial areas.
- Monitoring of noise should be done to ensure compliance with PEQs.

7.6.4 Soil Pollution

The operational phase of a Steel Unitintroduces notable impacts on soil, primarily driven by activities like dust emissions, chemical discharge, and alterations to the landscape. Dust from various steel production processes settles on the soil, potentially introducing contaminants and particulate matter, thereby affecting soil quality and nutrient composition. The discharge of effluents or runoff from steel production may contain chemicals and heavy metals, leading to chemical contamination that can detrimentally impact soil fertility.

Mitigation Measures

To mitigate the impacts of the operational phase of a Steel Uniton soil, a multifaceted strategy is essential.

- Dust control measures, including covering storage piles and implementing dust suppressants, help minimize the dispersion of particulate matter into the surrounding soil.
- Reverse Osmosis (RO) plant and runoff management strategies are crucial for preventing the discharge of contaminated water into the soil, addressing chemical contamination.
- Proper disposal and management of solid waste, including slag and by-products, are vital to prevent soil degradation.

7.6.5 Health and Safety

The operational phase of a Steel Unitcan significantly impact the health and safety of workers involved in various aspects of production. Exposure to high temperatures and airborne particulate matter during certain manufacturing processes poses respiratory hazards, potentially leading to respiratory issues among workers. Additionally, the operation of heavy machinery and handling of raw materials increase the risk of occupational injuries, ranging from falls and crush injuries to repetitive strain injuries. Chemicals used in steel production processes may pose exposure risks, potentially causing skin irritations, eye injuries, or long-term health effects. Noise levels generated by machinery can contribute to hearing loss over time.

Mitigation Measures

Mitigating the impacts of the operational phase of a Steel Unit on the health and safety of workers involves a comprehensive approach to address various risks. Key mitigation measures include:

- Ensuring that workers have access to and consistently use appropriate PPE, including respiratory protection, gloves, safety goggles, and hearing protection, to minimize direct exposure to hazards.
- Implementing engineering controls, such as Pollution Control System to minimize airborne particulate matter, fumes, and other pollutants, reducing the risk of respiratory issues.

- Providing thorough training and education programs for workers on safety protocols, proper handling of machinery, and the correct use of protective equipment to enhance their awareness and reduce the likelihood of accidents.
- Implementing noise control measures, such as enclosing loud machinery, using noise barriers, and scheduling maintenance tasks during non-working hours, to reduce the risk of hearing damage due to prolonged exposure to high noise levels.

By integrating these mitigation measures, steel plants can significantly enhance the health and safety of their workforce, creating a safer working environment and reducing the potential for occupational hazards during the operational phase.

7.6.6 Fire Safety

- Ensuring fire safety at a Steel Unit necessitates a comprehensive approach to identify, prevent, and respond to potential hazards.
- Conducting a thorough risk assessment specific to the facility helps identify fire-prone areas, enabling the implementation of targeted prevention measures. These include regular maintenance of machinery, and stringent housekeeping practice.
- Installing reliable fire detection and alarm systems, coupled with automatic fire suppression systems like sprinklers, provides early warnings and quick response capabilities.
- Training programs for employees on fire safety protocols, proper equipment usage, and fostering a culture of awareness are crucial.
- Additionally, meticulous electrical safety practices, strategic storage of flammable materials, and a hot work permit system further contribute to fire prevention.
- Regular inspections, audits, and collaboration with local emergency services ensure ongoing compliance with safety standards and the continuous improvement of fire safety measures.

The collective implementation of these measures establishes a proactive and effective fire safety framework within the steel plant.

7.6.7 Economic Impacts

The establishment of a Steel Unit poised to generate 600 jobs holds substantial economic implications for the local and regional landscape. Foremost, the creation of employment opportunities directly addresses unemployment concerns, fostering financial stability and

elevating the economic status of the community. The wages and salaries disbursed to these 600 employees not only contribute to increased household incomes but also fuel heightened local spending on goods and services. This surge in consumer activity, in turn, catalyzes growth within various sectors such as retail, housing, and healthcare, creating a positive domino effect. The local business ecosystem stands to benefit significantly, with a boost in demand for products and services. Moreover, the plant's operations contribute to local and regional tax revenues, providing essential funds for public services, infrastructure development, and community-oriented initiatives.

7.7 POTENTIAL ENVIRONMENTAL ENHANCEMENT PROCEDURES

To minimize these environmental impacts, Steel Unit can implement a variety of enhancement measures, including:

- Pollution control system with a suction capacity of 150,000 m^3/hr, PLC-controlled for precision, has been meticulously installed. This system aims to maintain adherence to stringent air quality standards, reflecting the project's commitment to minimizing its environmental footprint.
- The project incorporates a cutting-edge Reverse Osmosis (RO) plant with a capacity of 20 m^3/hr. Equipped with mechanical filters for the water circuit, this facility ensures responsible water consumption and effluent management. This commitment to water sustainability aligns with global best practices for industrial water usage.
- Sewage will be discharged to the main sewerage system; after its treatment through a septic tank and also getting the permission from the competent authority.
- Water sprinklers in a Steel Unit serve as a vital fire protection measure, swiftly responding to potential fire hazards by providing immediate water dispersion to suppress flames and safeguard the facility and its assets.
- Rainwater disposal will be done through the adequate system.
- Trees plantation can help to absorb pollutants from the air and water.
- Energy-efficient equipment can help to reduce greenhouse gas emissions.

8 ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

An environmental management and monitoring program involves the systematic approach to controlling, mitigating, and assessing the impacts of human activities on the environment. The aim is to protect, preserve, and enhance environmental quality while ensuring sustainable use of resources

8.1 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

The objectives of an Environmental Management and Monitoring Program for a Steel Unit are to ensure sustainable and responsible industrial practices, minimize environmental impact, and comply with regulatory requirements. The specific objectives may include:

- Ensure strict adherence to local, national, and international environmental laws and regulations governing the steel industry.
- Identify potential environmental risks and impacts associated with Steel Unit operations through thorough assessments and implement effective mitigation measures.
- Monitor and manage air quality by implementing measures to control and reduce emissions of particulate matter, gases, and pollutants generated during steel production processes.
- Implement measures to protect and preserve water quality by monitoring and controlling the discharge of effluents, preventing contamination of water bodies, and ensuring compliance with water quality standards.
- Develop and implement strategies to manage and minimize waste generated during steel production, promoting recycling and responsible disposal practices.
- Implement energy-efficient technologies and practices to minimize the environmental footprint of the Steel Unitand reduce energy consumption.
- Identify and implement measures to protect local biodiversity, including the preservation of natural habitats, vegetation, and ecosystems surrounding the steel plant.
- Foster transparent communication with the local community, stakeholders, and regulatory authorities to address concerns, provide information, and incorporate feedback into environmental management strategies.
- Develop and regularly update emergency response plans to effectively manage and mitigate the impact of potential environmental incidents or accidents.

- Establish a culture of continuous improvement by regularly reviewing and updating environmental management practices based on monitoring data, technological advancements, and evolving regulatory standards.
- Provide training programs to employees to enhance environmental awareness and ensure that staff is equipped to implement and adhere to environmental management practices.
- Establish a robust monitoring and reporting system to regularly assess the effectiveness of environmental management measures, track key performance indicators, and report findings to regulatory authorities and the public.

By addressing these objectives, a steel plant's Environmental Management and Monitoring Program aims to achieve a balance between industrial productivity and environmental sustainability, demonstrating a commitment to responsible business practices and the well-being of surrounding ecosystems and communities.

8.2 INSTITUTIONAL CAPACITY

Project Proponent will be responsible for Monitoring and Evaluation, but Environment consultant (of the proponent) will responsible to monitor EMP implementation in the field and reporting to the Project Proponent. The Project Proponent will integrate monitoring reports in the main monthly reports of the project. The Environment Specialist of Supervision Consultant will carry out a final evaluation at the end of the Project. In addition, for external monitoring, proponent is to engage an independent agency (an NGO, an academic institute or an individual consultant) to conduct 3rd party validation of EMP implementation. District Office of the EPA at district will monitor the overall activity at the site.

8.3 SCHEDULE FOR IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PLAN

The implementation stages of the project activity include:

1st Stage

The stage –1 comprises the onsite contouring studies and soil investigations and the finalization of the project designs.

2nd Stage

The stage –2 comprises the following task:

1) Laying of foundations excavation and commencement of erection work.
2) Shoring and piling
3) Start of civil, electrical and mechanical work.
4) Development of basic infrastructure.
5) Fitting of instrumentation.

3rd Stage

The stage –3 comprises the following task:

1) Commercial building civil structure erection completion.
2) Completion of the basic infrastructures water supply system, electricity supply etc.

4th Stage

The last stage will be the commencement of regular use.

8.4 SCOPE OF ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides mitigation and management measures for the following phases of the project:

8.4.1 Construction Phase

This section of EMP provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required within the construction phase are specified. These specifications will form part of the contract documentation and therefore, the contractor will be required to comply with the specifications to the satisfaction of the project Manager and Environmental Control Officer, in terms of the construction contract.

8.4.2 Operation and Mitigation Phase

This section of EMP provides management principles for the operation and maintenance phase of the project. Environmental actions, procedure and responsibilities are required from proponent within the operation and maintenance phase are satisfied.

8.5 ENVIRONMENTAL PLAN FOR CONSTRUCTION AND OPERATION PHASE

Environmental plans for the construction and operational phase of Steel Unit plant are explained in Table 7 and 8, respectively.

***Table 8-1*Environmental Management Plan (EMP) for Constructional Phase**

Sr. No.	Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
			Implementation	**Monitoring**
Constructional Phase				
1	**Air quality** Dust and particulate matter resulting from construction activities. Use of heavy machinery will produce dust emissions	Water sprinkling on regular basis will be ensured to limit pollution from dust and particulate matter. Proper maintenance and management of all the construction machinery and vehicles. Tree plantation will be done to reduce air pollution.	During construction phase	Proponent and Contractor
2	**Water quality**	Use of impermeable sheets to avoid contamination of the groundwater/surface water.	During construction phase	Proponent and Contractor

	Run-off water from construction area. Inappropriate storage of constructional waste can cause leakages contaminating ground water.	Proper disposal of waste material on dumping sites.		
3	**Waste Generation** Construction waste will be produced from construction activities Domestic waste from workers camp	Conduct separate collection of construction and domestic waste to promote recycling and re-use. Proper disposal of waste to the authorized sites. The area to be leveled and contoured after disposing excess material. No waste or debris will be thrown in the nearest canal water or other water bodies.	During construction phase	Proponent and Contractor
4	**Noise** Noise caused by construction	The contractor will strictly follow the PEQS	During construction phase	Proponent and Contractor

	machinery and vehicles used for mobilization of construction equipment and workers.	Proper maintenance of vehicles and construction equipment. Minimize/avoid unnecessary use of drills and other noisy machinery Unloading of constructional material will be done during day time. The personal protective equipment (PPE) will be provided to the construction workers and its usage will be made mandatory		
5	**Soil Quality**	Chemical leakages will be controlled by storing these substances in special containers. Proper waste management will be ensured.	During construction phase	Proponent and Contractor
6	**Materials Management**	Stockpiles shall not exceed a particulate height. Stockpiles maybe exposed to windy conditions or heavy rain, so they will be properly covered with plastic sheets. Stockpiles may further be protected by the construction of low brick walls around their bases.	During construction phase	Proponent and Contractor

7	**Workers Health & Safety**	Personal protective equipment will be provided to the workers. Provision of first aid box at work site to deal with emergency situation. Safety training to the workers. Adequate safety signs on site will be ensured. Provide training regarding proper handling and use of chemicals/ paints Install fire extinguishers at fire handling places. Inspection that lifting devices, such as cranes, are appropriate for expected loads. Stagnant water at the project site will be prohibited to avoid the dengue larva production. Continuous monitoring will be carried out to ensure that contractor is following safe working procedures and practices.	During Construction Phase	Proponent

8	**Clearance of site from extra material and construction equipment**	Regular removal of extra materials from the site to avoid congestion at work place. Construction waste will be collected and disposed of separately from other waste. Careful handling of waste will be ensured.	During Construction phase	Proponent and Contractor

Table 8-2 **Environmental Management Plan (EMP) for Operational Phase**

Sr. No.	**Project Component/ Impact**	**Mitigation/ Preventive Action**	**Responsibility**	
			Implementation	**Monitoring**
	Operational Phase			

1	**Air Impact** During steel production, particulate matter, sulfur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO), and volatile organic compounds (VOCs).	Establishment of green belts and vegetation barriers around the Steel Unitwill help in absorbing pollutants and improve local air quality. Pollution Control System will be installed to reduce air pollution. Air quality monitoring program will ensure the compliance with Punjab Environmental Quality Standards (PEQs).	During Operational Phase	Proponent
2	**Impact on Noise**	The installation of noise barriers and enclosures, acoustic insulation in plant structures. The optimization of equipment design to reduce noise emissions. Operational controls, such as scheduling noisy activities during less sensitive times. The implementation of vegetative buffers to act as natural sound barriers. Provision of ear plugs and ear muffs.	During Operational Phase	Proponent

		Monitoring of noise will be done to ensure compliance with PEQs.		
3	**Soil Contamination**	Dust control measures, including covering storage piles and implementing dust suppressants will help in minimizing the dispersion of particulate matter into the surrounding soil. Reverse Osmosis (RO) plant and runoff management strategies will be crucial for preventing the discharge of contaminated water into the soil, addressing chemical contamination. Proper disposal and management of solid waste, including slag and by-products, will be vital to prevent soil degradation	During Operational Phase	Proponent
4	**Water Quality** .	Reverse Osmosis (RO) plant will serve as an efficient unit for the treatment of wastewater produced from the steel plant.	During Operational Phase	Proponent

		Implementing a robust water quality monitoring program will ensure the compliance with Punjab Environmental Quality Standards (PEQs).		
5	**Health and Safety**	It will be ensured that workers have access to and consistently use appropriate PPE, including respiratory protection, gloves, safety goggles, and hearing protection, to minimize direct exposure to hazards. Engineering controls, such as Pollution Control System to minimize airborne particulate matter, fumes, and other pollutants, reducing the risk of respiratory issues will be implemented. Providing thorough training and education programs for workers on safety protocols, proper handling of machinery, and the correct use of protective equipment to enhance their awareness and reduce the likelihood of accidents. Noise control measures, such as enclosing loud machinery, using noise barriers, and scheduling	During Operational Phase	Proponent

		maintenance tasks during non-working hours, to reduce the risk of hearing damage due to prolonged exposure to high noise levels.		
6	**Fire Safety**	Installation of fire detection and alarm systems, coupled with automatic fire suppression systems like sprinklers, provides early warnings and quick response capabilities. Training programs for employees on fire safety protocols, and proper equipment usage.	During Operational Phase	Proponent

8.6 ENVIRONMENTAL MANAGEMENT TEAM ALONG WITH THEIR ROLES AND RESPONSIBILITIES

The project proponent bears the responsibility for overseeing all the project activities. To cater to the varying requirements during operational phase, the proponent will hire personnel specifically dedicated to environmental management at the project site. This step is crucial to ensure the effective implementation and operations of the Environmental Management Plan (EMP).

Assigning the responsibilities to designated individuals is paramount to uphold accountability in the event of any oversight or mishap. Each appointed person will have specific duties outlined within the EMP. These responsibilities will be tailored to their roles, ensuring they are accountable for the successful execution of environmental protocols and procedures.

By delineating and assigning these responsibilities to individuals, the project proponent establishes a framework where each person understands their role and obligation within the broader context of environmental management. This structuring allows for a more efficient response to any environmental issue. This approach aims to create a clear chain of accountability, ensuring that the implementation of EMP is conducted diligently and that there are identifiable points of contact for any concerns or queries related to environmental management during the project's operational phase.

8.7 ENVIRONMENTAL MONITORING PROGRAM

The Environmental Monitoring Plan (EMP) is of paramount importance in a steel unit, serving as a comprehensive framework for ensuring environmental sustainability, regulatory compliance, and responsible industrial practices. By systematically monitoring emissions, effluents, and various environmental parameters, the EMP enables the steel unit to adhere to local, national, and international environmental regulations, avoiding legal repercussions. Additionally, the plan facilitates a thorough assessment of potential environmental impacts associated with steel production, addressing issues related to air and water quality, noise levels, and resource consumption. Beyond regulatory compliance, the EMP plays a crucial role in safeguarding public health and safety by identifying and mitigating potential risks to nearby communities. It contributes to efficient resource management, emergency preparedness, and stakeholder

engagement, fostering a transparent and collaborative relationship between the steel unit and its community. Moreover, the EMP serves as a dynamic tool for continuous improvement, encouraging the adoption of cleaner technologies and sustainable practices over time, aligning with corporate social responsibility initiatives and enhancing the steel unit's overall environmental performance and reputation.

The objectives of the Environmental Monitoring Plan are given below;

- Detecting environmental changes to prevent and minimize potential negative impacts on the environment.
- Ensuring compliance with environmental laws, permits, and regulations by regular monitoring and reporting environmental parameters. This helps in meeting legal requirements and avoiding penalties or sanction.
- Assessing and managing potential risks to the environment caused by human activities. This involves evaluating the impact of these risks and implementing strategies to mitigate or manage them effectively.
- Monitoring and managing the use of natural resources such as water, air, soil, and biodiversity. The goal is to conserve these resources and maintain ecological balance.
- Assessing the impact of specific actions, projects, or processes on the environment to understand their consequences and make informed decisions regarding future actions.
- Using collected data to improve environmental performance, refine strategies, and adapt measures to achieve better outcomes over time.
- Establishing protocols and responses for emergencies or unexpected environmental incidents, ensuring a rapid and effective reaction to minimize damage.

Table 8-3 **Monitoring Parameters**

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
A. Construction phase				
1.	**Noise**	Construction vehicle/ machinery/ generators/welding work	Noise meter	Construction vehicles / machinery / generators will be checked regularly for noise level by the contractor during construction phase.
2.	**Air Emissions**	Construction vehicle/ machinery/ generators	Ambient particulate matter monitoring.	Construction vehicles / machinery / generators will be checked regularly for smoke emissions by the contractor during construction phase.
B. Operation phase				
1.	**Air Emissions**	Air release points from different machinery at the plant.	Particulate matter, sulfur dioxide (SO_2), nitrogen oxides (NOx), carbon monoxide (CO)	Will be carried out on quarterly basis
2.	**Wastewater monitoring**	Induction furnace gas washer outfalls, wastewater,	Chemicals release during the processing	Will be carried out on quarterly basis.

Sr. No	Monitoring parameters	Monitoring location	Monitoring mechanism	Remarks
		rolling mill effluents, water treatment plant effluents, and final effluent discharge points		
3.	**Noise Monitoring**	Areas near induction furnaces, rolling mills	Noise Meter	Will be carried out on monthly basis.

8.8 ENVIRONMENTAL BUDGET

An environmental budget is crucial for both the construction and operation of a Steel Unit plant as it provides a financial framework for implementing sustainable practices and minimizing the environmental impact. During the construction phase, allocating funds for eco-friendly technologies, waste management systems, and pollution control measures ensures that the plant adheres to environmental standards from its inception. This proactive approach not only facilitates regulatory compliance but also helps build a positive public image and fosters community goodwill. In the operational phase, the environmental budget is indispensable for ongoing investments in pollution prevention technologies, emission control measures, and waste treatment facilities. It enables the implementation of best practices for resource efficiency, energy conservation, and environmental monitoring, aligning the Steel Unit's operations with long-term sustainability goals. Moreover, an environmental budget emphasizes corporate responsibility, demonstrating the Steel Unit's commitment to environmental stewardship and responsible business practices, which is increasingly important for regulatory approvals, stakeholder relations, and maintaining a competitive edge in the industry.

Table 8-4 **Environmental Budget**

Environmental Component	**Amount** **PKR**	**Details**	**Remarks**
A. Environmental Management Cost			
Fire and Health & Safety Measures **Training to the workers**	5,000,000	The workers are required to provide the PPEs for work site safety precaution and to avoid any safety hazard.	Amount to be included in the Project Budget.
B. Environmental Monitoring Cost			
Air, Water and Noise Monitoring	1,000,000	Monitoring will be performed as per EPA Standards	Amount to be Included in Project Budget
C. Tree Plantation Tree Plantations of Endemic / Local Species	2,000,000	Landscaping around the project site.	Required for implementation of true spirit of EMP
D. Solid Waste Management	2,000,000	Waste collection, segregation and disposal	Required for implementation of true spirit of EMP

Total Environmental Management and Monitoring Cost in PKR (A+B+C)	10,000,000	Summing up A, B, C	Amount to be included in the Project Budget.

9 TREE PLANTATION PLAN

In an era marked by growing environmental consciousness and pressing need to address climate change, the act of tree planting stands as an indispensable and powerful tool for the protection of the planet's future. With a firm commitment to biodiversity, sustainability, and ecological restoration, this plans tells us the systematic approach to select, plant and sustain trees at the project site. Through tree plantation plan we can circumvent the impacts of deforestation, improve air and water quality, enhance local ecosystems, and contribute to the global struggles to reduce climate change. Tree plantation plan is a testament to our dedication to a healthier and greener future, where trees are serving as a beacons of hope, life, and resilience.

9.1 OBJECTIVES OF TREE PLANTATION

The following objectives of tree plantation helps to clarify its basic purpose.

- Trees in urban areas provide shade and heat reduce heat, mitigation the urban heat island heat.
- Trees store carbon in their biomass, helping and reduce the atmospheric carbon dioxide levels.
- Trees contribute to visual appeal of urban and rural landscapes, making areas more attractive.
- Trees yield valuable resource such as timber, fruits, nuts, and medicinal plants.
- Trees plantations create employment opportunities for the people living in the vicinity of the project area.
- Trees act as a natural air filters by trapping airborne pollutants and particulate matter.
- Trees release oxygen during photosynthesis, improving air quality.
- Trees help maintain healthy watersheds, reducing the risk of floods and ensuring a consistent water supply.
- Trees help prevent soil erosion by anchoring soil with roots.
- Trees planted strategically can safeguard against landslides and protect roads and buildings.
- Trees absorb carbon dioxide and release oxygen, helping reduce greenhouse gas level and circumvent climate change.

- Trees can efficiently serve as windbreaks.

9.2 BENEFITS OF TREE PLANTATION

- A well-executed tree plantation plan offers numerous advantages, covering all the environmental, economic and soil aspects. Some of the key benefits of tree plantation are enlisted below;
- Plants absorb carbon dioxide (CO_2) from the atmosphere and store this carbon in the biomass helping to circumvent climate change by reducing greenhouse gas emissions.
- Roots of the trees help to stabilize soil and prevent soil erosion.
- Trees act as a natural air filter, by trapping particulate matter which leads to healthier living environments.
- Trees can provide habitat and food residues to birds contributing to local biodiversity.
- Trees act as a natural buffer that helps to control and purify water entering into the streams and rivers reducing the risks for the contamination of water.
- Well-maintained tree plantation enhances the visual appeal of the landscapes, making area more attractive.
- Tree roots can improve soil quality by increasing its organic matter content and nutrient availability.
- Tree plantation contribute to climate resilience by moderating temperature extremes, reducing the risk of heatwaves, and providing shelter from extreme weather events.
- Trees can help to enhance the mental and physical well-being of the people living around the project area.
- A well-designed tree plantation plan serves as a long-term investment in the environment and the future, as they continue to provide benefits for generations to come.

9.3 TREE CUTTING

In the implementation of the project, a conscientious approach was adopted to ensure the preservation of existing trees, with absolutely no tree cutting involved. While small shrubs devoid of significant ecological impact were cleared to facilitate the project's development, it is essential to highlight that this action was undertaken with utmost consideration for environmental sustainability. In acknowledgment of the intrinsic value of trees and their vital role in maintaining

ecological balance, a proactive strategy for environmental compensation has been proposed. This involves an extensive tree plantation initiative to not only offset the minimal impact caused by the removal of shrubs but also to contribute positively to the local ecosystem. This commitment to responsible environmental management underscores the project's dedication to ecological sustainability, ensuring a harmonious coexistence with the natural surroundings while promoting a proactive stance in environmental conservation efforts.

9.4 AREA ENHANCEMENT PLAN

Tree plantation plan of the area has been prepared keeping in view the project area and length. The plan is based on best possible estimations and can be modified accordingly at the execution stage.

9.5 TREES RECOMMENDED

Tree species are recommended for the plantation are the indigenous species of Lahore.

Table 9-1 **Trees to be planted**

Sr. No.	Plant Name	Picture
1.	Rose Mallow	
2.	Jasmine	
3.	Kangi Palm	

Sr. No.	Plant Name	Picture
4.	Motia	
5.	Gulab	
6.	Variegated Agave	
7.	Ballota	
8.	Purple Smoke Bushes	

9.6 COST OF TREE PLANTATION

The cost for the plantation and maintenance of trees at the project site is estimated as PKR 2,000,000. The budget has been calculated for the procurement of manure, continued supply of water throughout the year. The proponent will make a proper record of the current number and conditions of the planted trees.

10 FIRE SAFETY PLAN

A fire safety plan is a structured and comprehensive document that details procedures, protocols, and strategies aimed at preventing, preparing for, and responding to fire emergencies at the project site. This essential plan outlines preventive measures, emergency procedures, evacuation protocols, fire detection and suppression systems, training requirements and communication strategies. It assigns specific roles and responsibilities to individuals and provides clear instructions for evacuations, ensuring occupants, or employees understand what to do in case of a fire. Regular reviews and updates to the plan maintain its relevance, ensuring compliance with fire safety regulations and fostering a safe and prepared environment in the event of a fire emergency.

10.1 OBJECTIVES OF A FIRE SAFETY PLAN

Following objectives collectively aim to create a safe and prepared environment in the face of a fire emergency, ensuring the protection of lives, property, and assets.

- The primary goal is to prevent fires from occurring by implementing measures that reduce fire hazards, ensuring that all the safety systems, equipment, and protocols are up to standard, and that fire risks are minimized.
- Protecting the lives and well-being of occupants and employees by ensuring a quick and safe evacuation during a fire emergency. This involves establishing and regularly practicing efficient evacuation routes and procedures.
- Minimizing damage to property and assets by having effective fire detection and suppression systems in place. This includes regular maintenance of fire safety equipment such as fire alarms, sprinkler systems, and fire extinguishers.
- Outlining procedures to respond effectively and efficiently in the event of a fire. This involves establishing clear roles and responsibilities for personnel during a fire emergency.
- Ensuring compliance with local fire safety regulations and standards.
- Conducting regular training sessions, and fire drills to educate occupants and employees about fire safety procedures, evacuation routes, and the use of fire equipment.

- Regularly reviewing and updating the fire safety plan to incorporate any necessary changes in equipment, procedures, or regulations. This ensures the plan remains current and effective

10.2 FIRE SAFETY SYMBOLS

Fire safety symbols at a Steel Unit plant play a critical role in communicating essential information and promoting a safe working environment. These symbols serve as visual cues to identify the location of firefighting equipment, emergency exits, and fire alarm systems. Common symbols include the fire extinguisher icon to indicate the presence and type of extinguisher, exit signs for emergency egress routes, and alarm symbols to highlight fire detection and warning systems. Additionally, symbols for flammable materials, no-smoking areas, and emergency assembly points help reinforce fire safety protocols. Clear and standardized fire safety symbols not only contribute to efficient emergency response but also enhance overall awareness among workers, ensuring a proactive and informed approach to fire prevention and management within the Steel Unit plant.

Figure 10-1 Fire Safety Symbols

10.2.1 FIRE EXTINGUISHERS

The installation of fire extinguishers at a Steel Unit plant is imperative due to the diverse fire hazards inherent in its industrial operations. From the operation of heavy machinery, involving blast furnaces and rolling mills, to the handling of raw materials and the execution of hot work activities like welding, the potential for fire incidents is prevalent. Fire extinguishers act as critical first responders, allowing swift containment and extinguishment of small fires before they escalate into larger, more destructive events. The presence of flammable liquids and gases, coupled with the use of extensive electrical equipment, further underscores the necessity of fire extinguishers in addressing various fire scenarios. Compliance with safety regulations, protection of personnel, and the safeguarding of valuable assets reinforce the importance of these firefighting tools in ensuring the overall safety and resilience of the Steel Unit plant.

Figure 10-2 Fire Extinguishers

11 OCCUPATIONAL HEALTH AND SAFETY PLAN

Occupational health and safety (OHS) is indispensable at a Steel Unit plant due to the inherent risks associated with its industrial operations. The use of heavy machinery, exposure to high temperatures, handling of materials, and involvement in various steel production processes create a high-risk environment where accidents and injuries can occur. Prioritizing OHS is essential to mitigate mechanical hazards, prevent chemical exposures, address physical strain, and safeguard workers from noise, vibration, and heat-related stress. The implementation of proper safety measures, including machine guarding, personal protective equipment, and ergonomic practices, is crucial. Additionally, measures to counter electrical hazards, emergency preparedness, and compliance with OHS regulations contribute to creating a safe working environment, protecting employees' well-being, and ensuring the overall sustainability and productivity of the Steel Unit plant.

11.1 OBJECTIVES OF OCCUPATIONAL HEALTH AND SAFETY PLAN

he objectives of Occupational Health and Safety (OHS) at a Steel Unit are comprehensive and aimed at ensuring the well-being, safety, and overall health of workers in the challenging industrial environment. These objectives include:

- The primary goal is to prevent workplace accidents and injuries by implementing safety measures, conducting risk assessments, and providing adequate training to employees on safe work practices.
- Identify and minimize occupational health risks associated with exposure to chemicals, dust, noise, and other hazards inherent in steel production processes, promoting a healthy work environment.
- Ensure strict adherence to local, national, and international occupational health and safety regulations, standards, and guidelines applicable to the steel industry.
- Ensure strict adherence to local, national, and international occupational health and safety regulations, standards, and guidelines applicable to the steel industry.

- Establish and enforce safe work practices and procedures, emphasizing the correct operation of machinery, proper use of personal protective equipment (PPE), and adherence to safety protocols.
- Develop and regularly update emergency response plans to effectively manage and respond to potential accidents, fires, or other emergencies in the Steel Unit.
- Implement ergonomic measures to minimize physical strain, reduce the risk of musculoskeletal disorders, and enhance the overall comfort and well-being of workers performing physically demanding tasks.
- Introduce health surveillance programs to monitor and assess the health status of workers, identifying and addressing potential health issues related to their work environment.
- Establish a robust reporting system for injuries and incidents, followed by thorough investigations to identify root causes and implement corrective measures to prevent recurrence.
- Foster a culture of continuous improvement by regularly evaluating OHS performance, analyzing incident data, and implementing corrective actions to enhance safety measures and practice

11.2 PERSONAL PROTECTIVE EQUIPMENT

The utilization of Personal Protective Equipment (PPE) will be imperative at a steel unit plant due to the inherent occupational hazards associated with the industry. PPE will serve as a crucial line of defense for workers against various risks, including exposure to high temperatures, molten metal splashes, mechanical injuries, chemical exposures, and noise. In a steel unit, where heavy machinery, hot processes, and raw materials are integral to operations, PPE will play a vital role in ensuring the safety and well-being of workers. This includes but is not limited to flame-resistant clothing, heat-resistant gloves, safety goggles, ear protection, hard hats, and steel-toed boots. PPE not only safeguards workers from immediate dangers but also contributes to long-term health by minimizing the risk of injuries and exposure to hazardous substances. Moreover, adherence to PPE protocols will be regulatory requirement, emphasizing its essential role in maintaining a safe working environment and preventing accidents in the dynamic and challenging conditions of a steel unit plant.

11.3 PPE REQUIRED AT A STEEL UNIT PLANT

Several types of PPE will be ensured at a Steel Unit plant to manage the safety of workers in the challenging and potentially hazardous industrial environment. The specific PPE required may vary based on the nature of tasks, processes, and potential risks involved, but common PPE at a Steel Unit plant includes:

Head Protection:

Hard hats to protect against falling objects and head injuries.

Eye and Face Protection:

- Safety glasses or goggles to shield the eyes from flying debris, sparks, and chemicals.
- Face shields for additional protection during tasks like grinding and cutting.

Hearing Protection:

- Earplugs or earmuffs to reduce exposure to high levels of noise generated by machinery and industrial processes.

Respiratory Protection:

- Respirators to protect against airborne contaminants, dust, fumes, and gases.

Hand Protection:

- Heat-resistant gloves for handling hot materials.
- Cut-resistant gloves for tasks involving sharp objects and materials.
- Welding gloves for protection against heat and sparks.

Body Protection:

- Flame-resistant clothing to protect against molten metal splashes and high temperatures.
- Aprons or other specialized clothing for specific tasks.

Foot Protection:

- Steel-toed boots with metatarsal guards to protect against heavy objects and impacts.

- Heat-resistant boots for tasks involving high temperatures.

Chemical Protection:

Chemical-resistant suits, gloves, and boots for tasks involving exposure to hazardous chemicals.

It will be essential for employers to conduct thorough risk assessments to determine the specific PPE requirements for each job role and task within the Steel Unit plant. Additionally, regular training on the proper use, maintenance, and limitations of PPE will be ensured in safeguarding workers.

Figure 11-1 Personal Protective Equipment

12 STAKEHOLDER'S CONSULTATION

Stakeholder consultation is a way to involve both the primary and secondary stakeholders in making decisions about the project. This helps address their concerns, improve how the project is planned, and make sure it is seen as a legitimate effort. When stakeholder consultation is done fairly and inclusively, it can make the project more sustainable. Getting input from the local community, including their knowledge and values, can greatly improve the quality of decision-making on social and environmental matters, So, we conducted stakeholder consultations in the project area, not only because it is legally required in IEE process in Punjab province, but also to make the project better by considering social and environmental aspects.

12.1 OBJECTIVES OF STAKEHOLDERS CONSULTATION

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

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

This study was conducted with the main goal of understanding how the project would affect the local population through public consultation. The specific objectives of this assessment are

- Improve people's understanding of the project, what it aims to achieve, and its likely effects.
- Identify and address the concerns of all individuals and groups in the project area who are interested and affected.
- Create a way to find and solve problems before finalizing plans, which can prevent expensive delays and reduce the risk of public anger and resentment.
- Promote transparency and inculcate trust among various stakeholders to promote cooperation and partnership with the communities and local leadership.

12.2 PROPONENT ENVIRONMENT MANAGEMENT TEAM

All possible impacts and mitigation measures related to the project were discussed with the proponent and management. They assured to take all suggested mitigation measures to control any discrepancy arising from the project and to make the environment friendly.

12.3 THE RESPONSIBLE AUTHORITY

The Proponent shall be the responsible authority to take all measures before starting the project and during operation.

12.3.1 Other departments and agencies

The impact analysis is detailed with the management, local community, educational institutes, health institutes, hospitals, and NGOs. All issues were discussed related to the implementation of the project. Scoping sessions, focused group discussions, and wayside consultations were held with the relevant stakeholders in the area.

12.4 ENVIRONMENTAL PRACTITIONERS AND EXPERTS

Environmental consultants conducted a visit to the project site. They engaged in discussions with project stakeholders and conducted with residents from nearby villages and beyond to assess the project's socio-economic impacts. The people in the area come from various professions, including those employed in various fields, business owners, doctors, some living abroad, military personnel, and educators. Women were also consulted to gather their perspectives on how the project could improve the area. While some women openly shared their thoughts, many felt hesitant due to the area's social norms, making them uncomfortable with speaking or being photographed. Overall, the local community provided massive information about the project and expressed positive views regarding its potential for development.

12.5 AFFECTED AND WIDER COMMUNITY

There is no affected community present in the area of the proposed project. The proponent has consulted with the inhabitants of different villages. The remarks of people are positive regarding the project.

13 GRIEVANCE REDRESS MECHANISM

A Grievance Redress Mechanism is a structured system established to address and resolve complaints, concerns, or issues raised by individuals or entities regarding their experiences or interactions. This mechanism typically involves clear channels for lodging complaints, whether through written communication, online platforms, or dedicated grievance officers. Once a grievance is registered, the mechanism ensures a systematic and fair investigation of the matter, taking into account all relevant information and perspectives. Timely resolution and effective communication with the aggrieved party are essential components, helping to restore trust and rectify any perceived injustices. An efficient Grievance Redress Mechanism not only safeguards the rights and interests of individuals but also contributes to organizational transparency, accountability, and continuous improvement in service delivery.

13.1 COMPONENTS OF GRM

GRM typically involves several basic steps to address and resolve complaints or grievances effectively. While specific procedures may vary depending on the organization or context, the following are common steps in a basic GRM:

- Individuals submit their grievances through designated channels, which may include online platforms, written communication, or direct contact with a grievance officer.
- The received grievance is formally registered in the system, assigning a unique identifier. This step ensures proper tracking and documentation of each complaint.
- A preliminary assessment is conducted to determine the nature and severity of the grievance. This step helps in categorizing grievances and prioritizing them based on urgency.
- A thorough investigation is carried out to gather relevant information and facts related to the grievance. This may involve interviews, document reviews, or other means of inquiry.
- Clear and timely communication is maintained with the aggrieved party throughout the process. Regular updates and feedback are provided to keep them informed about the progress of the investigation.

- Once the investigation is complete, appropriate measures are taken to address the grievance. This may involve corrective actions, policy changes, compensation, or other forms of redress, depending on the nature of the complaint.
- The resolution is communicated to the aggrieved party, and feedback is sought to ensure their satisfaction. Follow-up may be conducted to confirm that the resolution has been implemented and to monitor any lingering concerns.
- The entire process, from grievance registration to resolution, is documented for record-keeping and reporting purposes. This documentation aids in analyzing trends, identifying systemic issues, and improving the overall grievance-handling process.

CONCLUSION AND RECOMMENDATION

Based on the study conducted for EIA of the project, the following recommendations are made:

- Plantation as far as permissible and within the scope of the project to be carried out.
- Sustainable development approach through conservation of natural environment is followed.
- Environmental aspects of the project should be well taken care through implementation of the Environmental Management 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.

Glossary

Air quality	Measurement of the pollutants in the air; a description of healthiness and safety of the atmosphere.
Area	Area is the quantity that expresses the extent of a two-dimensional figure or shape, or planar lamina, in the plane.
Billet	A billet is a semi-finished metal product, typically square or round in cross-section, produced by casting or extrusion, and used as raw material for further processing in metalworking.
Compensation	Includes cash payment, deferred payment, a bond, an insurance policy, stipend, payment in kind, rendition of services, grant of privileges and disturbance money, entitlement to special treatment by government and semi government entities, grant of alternative land, grant of import licenses and business, trade and commercial facilities in addition to the rehabilitation and resettlement of an affected person.
Consultation	Consultation refers to two-way transfer of information or joint discussion between project staff and the affected population. Systematic consultation implies a sustained and rigorous sharing of ideas. Bank experience shows that consultation often yields the best resettlement alternatives, fruitful procedures for continued participation, and independent information on actual conditions for implementation.
Continuous casting machine	A continuous casting machine is an industrial apparatus that continuously produces metal shapes, typically steel, by solidifying molten metal in a continuous process, resulting in long lengths of metal with a consistent cross-section.
Coordinates contaminate	Each of a group of numbers used to indicate the position of a point, line, or plane to make impure, pollute

Disclosure	The action of making new or secret information known
Disruption	Disturbance or problems which interrupt an event, activity, or process.
Environmental Management	Attempt to control human impact on and interaction with the environment in order to preserve natural resources
Evaluation	The making of a judgment about the amount, number, or value of something; assessment.
Geology	A science that studies rocks, layers of soil, etc., in order to learn about the history of the earth and its life
Ground water	Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solid content of 10,000 milligrams per liter or less, and are not "exempted aquifers.
Hazardous	Substance or material, which could adversely affect the safety of the public, handlers or carriers during transportation
Impact	Effect on someone or something
Induction furnace	An induction furnace is an electric furnace that uses electromagnetic induction to heat and melt metals, commonly employed in metallurgy for casting and forging applications.
Land acquisition	The process whereby a person is compelled by a public agency to cede all or part of the land a person owns or possesses, to the ownership and possession of that agency, for public purpose in return for compensation.
Mitigation	The action of reducing the severity, seriousness, or painfulness of something

Occupational health	Maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs
Project area	The area specified by the funding and/or implementing agency according to the official gazette notification and includes the areas within the administrative limits of the federal or a provincial government.
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.
Re-rolling furnace	A re-rolling furnace is a type of industrial furnace used in steel manufacturing that reheats and reshapes rolled steel products, improving their mechanical properties and dimensions.
Scope	The extent of the area or subject matter that something deals with or to which it is relevant
Social Environment	It includes the culture that the individual was educated or lives in, and the people and institutions with whom they interact.
Stakeholders	Include affected persons and communities, proponents, private and public businesses, NGOS, host communities and EPA.
Topography	Details of the surface features of land. It includes the mountains, hills, creeks, and other bumps and lumps on a particular hunk of earth.

LIST OF ABBREVIATION

CCM	Continuous Casting Machine
CO	Carbon Monoxide
EA	Environmental Approval
EIA	Environmental Impact Assessment
EMMP	Environment Mitigation and Monitoring Plan
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPC	Environmental Protection Council
GoP	Government of Pakistan
GRM	Grievance Redress Mechanism
HSE	Health Safety Equipment
HMS	Heavy Melting Scrap
IEE	Initial Environmental Examination
LMS	Light Melting Scrap
M&E	Monitoring and Evaluation
MT	Metric Tons
MW	Mega Watt
NGOs	Non–Government Organizations
NO	Nitrogen Oxide

NOC	No Objection Certificate
O&M	Operation and Maintenance
OHS	Occupational Health and Safety
PEQs	Punjab Environmental Quality Standards
Pak–EPA	Pakistan Environment Protection Agency
PEPA	Punjab Environmental Protection Agency
PKR	Pak Rupees
PM	Project Manager
PPE	Personal Protective Equipment
PTCL	Pakistan Telecommunication Limited
RO	Reverse Osmosis
UNCED	United Nations Conference on the Environment and Development
VOC	Volatile Organic Compounds

REFERENCES

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

1. Information and data provided by project proponents;
2. Project Pre-Feasibility Study Report;
3. Technical Design Data related to the project.
4. Information gathered through discussions with the project related persons of the project proponent;
5. Information collected from the Technical documents of various suppliers of machinery/equipment.
6. Punjab Environment Quality Standards for Ambient Air August 2016;
7. Punjab Environment Quality Standards Noise Levels August 2016;
8. Punjab Environment Quality Standards for Drinking Water August 2016:
9. Pakistan Environmental Protection Act, 1997;
10. The Punjab Environmental Protection (Amendment) Act 2012 covers aspects related to:

    - The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development;
    - Establishing complete regulatory and monitoring bodies, policies, rules, regulations and national environmental quality standards; and
    - To ensure enforcement, the act establishes regulating bodies i.e. Punjab Environmental Protection Council (PEPC) and responsible bodies i.e. Punjab Environmental Protection Agency (Punjab EPA) at Provincial level.

i. Environment related Laws in Pakistan and the Province of Punjab;
ii. Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review and Approval of Environmental Assessment, 2022;
iii. Google earth, maps.

iv. Guidelines for Public Consultations - These guidelines cover:

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

1. workplace safety and health act 2011
2. Land Acquisition Act (LAA) of 1894
3. The forest Act 1927
4. Pakistan Penal Code, 1860
5. Provincial Wildlife Act, 1974
6. Drugs Act 1976

TERM 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 provincial's laws & regulations including but not limited to:

- Identification and recommendation for suitable solution/treatment/mitigation measures of emissions and effluents such as waste water and sludge etc. in accordance with Punjab Environmental Quality Standards (PEQS).
- Identification and recommendation for suitable solution/treatment/mitigation measures of solvents, oils (tar), hazardous waste, organic compounds, steam, flue gases, particulate matter and chemical compounds harmful for the environment and other substances leading to air, noise, water and soil pollution in accordance with PEQS.

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