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1 EXECUTIVE SUMMARY

This executive summary presents the main findings of Environmental Impact Assessment (EIA) of Ahmed Corporation (Pvt) Limited at Plot No: 210, Sundar Industrial Estate, Lahore. The main objective of this is production of high quality and environment friendly equestrian metal products for the consumer.

1.1 Title & location of project

Ahmed Corporation (Pvt) Limited at Plot No: 210, Sundar Industrial Estate, Lahore.

1.2 Name of proponent

Ahmed Nawaz S/O Mian Allah Bakhsh

R/o House No 127, Street No 3, Cavalry Ground, Lahore.

CNIC No: 35200-9366220-7

1.3 Name of organization preparing the report

Ahmed Corporation (Pvt) Limited has engaged Environtech Consultants (Private) Limited at office no. 11, Second Floor, Centre Point Plaza, Main Boulevard, Gulberg-III, Lahore.

Table 1: Salient features of project

Salient features of project		
1.	Total Area	111,780 SFT
2.	Total covered area	29,984 SFT
3.	Cost of the project	Pkr/- 80 million approx.
4.	Capacity of project	1 Ton/M
5.	Location of project	31°16'57.4"N 74°10'41.4"E
6.	Nature of area	Industrial area
7.	Present status of land Use	Constructed building for industrial purposes.
8.	Land use in the surroundings of project site.	The surroundings are: North Industry South Road East Open/Vacant Plot West Industry
9.	Raw material	▪ Copper waste and Scrap ▪ Aluminum waste and Scrap ▪ Steel waste and Scrap

10.	Product	Equestrian metal products
11.	Description of the project	The said project is of manufacturing of equestrian metal products by processing steel, aluminum and copper waste through furnace.
12.	Nearby emergency services i.e. Hospital, police station, rescue, fire brigade etc.	Zia Medical Hospital at 4.3 Km Rescue 1122 at 6.2 km Police Station at 4.3 Km
13.	Water Source	Ground Water
14.	Status of Project	Open Land
15.	Source of Power	*LESCO*

1.4 A brief outline of proposal (type, process, technology and land requirements)

As per Punjab Environmental Protection Act 1997 (amended 2012) and Initial Environmental

Examination (IEE) & Environmental Impact Assessment (EIA) Regulations, 2022 the project falls under **Category B (18) "Steel Furnaces"** mentioned in **Schedule-II**. Thus, requires an EIA.

The current project is of Equestrian metal products manufacturing unit. Site selected for project is under the ownership of proponent. It is an environmentally friendly project which will produce quality Equestrian metal products. The estimated project cost is **PKR 80 million approx.,** and capacity of project will be **1 Ton/Day**. The project under consideration of this EIA is of Equestrian metal products manufacturing unit which is located at Plot No: 210, Sundar Industrial Estate, Lahore. Beyond this scope no other development activities have been covered in this EIA study.

1.5 The major impacts & recommendations for mitigation measures

The potential impacts associated with the project operation activities

Included: increase in water consumption;, air pollution from vehicle; vehicle movement, noise and disturbance and waste generation.

The machinery installed at the unit are automated machineries laid on concrete fortifications. The processing of metal does not require water while only water use will be during washing and domestic activities. Water conservation practices will be utilized to reduce the overall water consumption during project activities. Surface or

groundwater quality may deteriorate if pollutants are mixed with surface runoff during rain and carried to water resources in the vicinity or seeped in the ground. The impermeable septic tank will prevent untreated sewage from polluting surface water.

The ambient air quality of the area can be affected by exhaust emissions, vehicles and combustion process. The pollutants can seriously impair human health and ecological environment and other materials. The emissions include sulphur dioxide, oxides of nitrogen, carbon monoxide, carbon dioxide, and particulates. The emission levels depend on the type and size of activity, the type and quality of fuel and the manner in which it is burned. A significant impact will be interpreted if the concentration of pollutants in the ambient air exceeds the PEQS or recognized international guidelines for ambient air quality.

Monitoring of Ambient air parameters and emissions should be carried out on to ensure compliance with the PEQS.

Noise has the potential to cause an impact to nearby communities and working personnel. To avoid the impact of noise, it will be ensured that, vehicles and other potentially noisy equipment used are in good condition. The noise level monitoring results would be compared with Punjab Environmental Quality Standards (PEQS) for Noise to meet the permissible limits. All on-site personnel will use required personal protective equipment (PPE) in high noise areas that will be clearly marked.

All the waste generated during operational activities will be disposed-off through implementation of an effective waste management plan to ensure that any impact resulting from waste generation shall be minimal. The recyclable waste will be sold to waste contractors, as per waste management plan. No hazardous chemical will be uncontrollably discharged into the
Environment.

Table 2: Impacts and mitigation measures

Environmental Aspect	Potential Impacts	Mitigation Measures
Water Resources	Depletion in groundwater, contamination of water resources by	▪ Water extraction will be kept at minimum and water conservation measures will be practiced. ▪ Sewerage Wastewater from project site will be directed to settling tanks.

	surface runoff, spillage of fuel	▪ Fuels and lubricants will be stored in covered and with bund walls, underlain with impervious lining. ▪ Spill prevention plan shall be followed to mitigate any kind of spill.
Air Quality	Dust, combustion emissions, vehicular emissions used for project- related activities.	▪ Water will be sprinkled daily on all exposed surfaces to suppress emission of dust. ▪ Regular maintenance of project vehicles and equipment to ensure that engines are in sound working condition to minimize air emissions. ▪ Use of cleaner fuels for combustion ▪ Ambient monitoring should be carried out to ensure compliance with the PEQS.
Noise	Disturbance to the site workers, Nuisance for surrounding communities and wildlife	▪ Proper maintenance of vehicles and potentially noisy equipment. ▪ Minimize/avoid unnecessary use of noisy machinery. ▪ Blowing of horn will be prohibited. ▪ Provision of Personal Protective Equipment (PPE) to the on-site personnel in high noise areas.
Solid Waste	Soil contamination, air pollution, odor, health hazards, aesthetic issues	▪ Recyclable material will be separated at source and will be used again in manufacturing process.
Worker's Health and Safety	Health problems or immediate risk may take place, Occupational health of workers and community may be affected.	▪ Compliance to emergency response plan for emergencies and accidents will be ensured to avoid health safety risks. ▪ Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for laborers.

		▪ Protection devices (earmuffs) will be provided to the workers operating in the vicinity of high noise generating machines. ▪ Proper maintenance of facilities for workers will be monitored. ▪ Provision of protective clothing for laborers e.g. helmet, adequate footwear, protective goggles, gloves ▪ Ensure strict use of wearing PPE during work activities. ▪ Provision of proper safety signage at sensitive/accident prone spots.

1.6 Proposed monitoring

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

Considering the environmental conditions of the project area and the assessment of potential impacts of the project made in the EIA, the following environmental parameters will be monitored at identified locations.

Air Quality Monitoring – Air quality monitoring will be done during the operation phase of the project at the representative locations. Ambient air quality parameters will include NO_X, SO_X, CO and PM_{10},

Water Quality Monitoring – Ground and surface water quality monitoring will be done during the operation phase of the project at the representative locations.

Groundwater Quality Parameters: Total Coliforms, Total Colonial Count, E-Coli, pH, TDS, Total Hardness, Nitrate, Chloride, Fluoride, Color, Manganese, Aluminum, Chromium, Cadmium, Boron, Barium, Antimony, Arsenic, Cyanide, Mercury, Nickel.

Wastewater Quality Parameters: pH, DO, TSS, Alkalinity, BOD_5, COD, Turbidity.

Noise Monitoring - The monitoring will be carried out at key locations covering all receptors.

2 INTRODUCTION

This chapter of the report provides a brief description of nature, size and location of the project. A defined scope of study, the magnitude of efforts and concise description of project proponent is also included in this chapter. The project objectives are to meet the consumers' increased demand for high quality Equestrian metal products keeping in view the business sustainability and to maintain workplace safety. Project proponent aims to deliver sustainable, industry leading financial performance and earn trust through enhancing quality of life and contributing to a healthier future.

The study has been carried out to estimate the potential environmental impacts, both positive and negative, on the environment as well as socio-economic fabric of the surrounding environment during construction as well as operational phase. This report intends to provide satisfactory mitigation measures to avoid/eliminate any chance of adverse environmental impact on the socio-cultural, economic and environmental components. This report also intends to fulfill the regulatory requirements set under Punjab Environmental Protection Act, 1997 (Amended 2012) and its consequent legislative framework for IEE/EIA Regulations 2000 and the guidelines drafted for IEE and EIA under numerous sectorial heads. The entire set of legislative frameworks requires any new development project to undergo an IEE or EIA based on the categorization of the project under Schedule I and/or Schedule II.

2.1 Screening

According to the Section 12 of Punjab Environmental Protection Act, 1997 (amended 2012) which states;

"No proponent of a project shall commence construction or operation unless he has filed with the Government Agency designated by Federal Environmental Protection Agency or Provincial. Environmental Protection Agencies, as the case may be or where the project is likely to cause an adverse environmental effect an Environmental Impact Assessment (EIA) and has obtained from the Government Agency approval in respect thereof."

As per Punjab Environmental Protection Act 1997 (amended 2012) and Initial Environmental Examination (IEE) & Environmental Impact Assessment (EIA) Regulations, 2022 the project falls under Category **B (18) "Steel Furnace"** mentioned in **Schedule-II**. Thus, requires an EIA Report is being prepared for duly submission in EPA, Punjab.

2.2 Purpose of report

As per Punjab Environmental Protection Act, 1997 (Amended 2012) and the IEE/EIA Regulations, 2022 it is mandatory for the proponent of any development project to obtain Environmental Approval before commencing construction from EPA Punjab by filing an IEE or EIA as the case may be before the Agency. This EIA Study presents the findings of this unit. For this purpose, the proponent has engaged environmental consultants, M/s Environtech Consultants (Private) Limited. The purpose of this study is to identify the environmental baseline i.e. physical, biological and socio-economic/cultural conditions and assess all possible impacts arising during the operation phase of the project with the aim to find out appropriate measures for their mitigation, to either eliminate those impacts or to bring them to acceptable level and formulate Environmental Management and Monitoring Plan (EMMP) for implementation of the project in environment-friendly manner. This EIA Report provides relevant information, as required under the officially approved format, to facilitate the decision makers i.e. EPA Punjab for the issuance of Environmental Approval/NOC.

2.3 Identification of project and proponent

2.3.1 Project

The project to which this Environmental Impact Assessment (EIA) relates is entitled as “Ahmed Corporation (Pvt) Limited located Plot No: 210, Sundar Industrial Estate, Lahore.

2.3.2 Proponent

Name: Ahmed Nawaz S/O Mian Allah Bakhsh

R/O: House No 127, Street No 3, Cavalry Ground, Lahore.

CNIC No: 35200-9366220-7

Details of consultant

The EIA study was carried out by team of Environtech Consultant Private Limited comprising of environment scientists and engineers, sociologist, environmental chemist and environmental auditors with diversified experience on local and international assignments. The detail of the project team deputed on this assignment is attached to this report annexed with the EIA.

2.4 Brief description of nature, size and location of project

The project to which this Environmental Impact Assessment (EIA) relates is entitled as Ahmed Corporation (Pvt) Limited .The total area of the project is **111,780 SFT** with total cost of Pkr 80 million approx. capacity of project will be 1 Ton/M. The project under consideration of this EIA is the establishment of Equestrian metal products manufacturing unit which is located at located Plot No: 210, Sundar Industrial Estate, Lahore. Beyond this scope no other development activities have been covered under this EIA study.

3 DESCRIPTION OF PROJECT

This chapter provides the description of "Ahmed Corporation (Pvt) Limited, type and category of project, location and layout, vegetation features of site, project schedule of implementation and complete description of the project related to its process and steps.

3.1 Type & category of project

As per Punjab Environmental Protection Act 1997 (amended 2012) and Initial Environmental Examination (IEE) & Environmental Impact Assessment (EIA) Regulations, 2022 the project falls under Category **B (18) "Steel Furnace"** mentioned in **Schedule-II**. Thus, requires an EIA Report is being prepared for duly submission in EPA, Punjab.

3.2 Objectives of project

The objective of this project is to make affordable and user-friendly products (equestrian metal products) that have easy access in accordance with economic viability. To fulfill this, management of project will strive to provide with innovative, competitive and sustainable solutions, and in order to reduce the impacts on environment, while always taking patient needs into account. With technology, proponent will be able to assist customers at any and every stage of the development process to help ensure the product's success.

3.3 Consideration of Alternatives

This chapter will discuss alterative and their selection and rejection criteria.

3.4 Site alternatives (selection and rejection criteria)

The unit is already constructed and operational in an industrial Estate.

- Selected site is located in non-negative and non-agricultural area.
- Transportation infrastructure (road network) is available.
- Safe distance from sensitive receptors (residential area & protected area)
- The selected site is under the ownership of the proponent.

3.5 Design/technology alternatives (selection and rejection criteria)

Electric induction furnace will be installed which are up to date, also environment and eco-friendly.

3.6 Environmental alternatives (selection and rejection criteria)

Environmental considerations are of utmost importance. Being in an industrial zone there is no sensitivity in the area from environmental setting point of view. Thus, there

is no ecologically sensitive or declared protected area such as territorial waters, forest, game reserve or biodiversity parks within a 4 km radius of the project site, requiring the proponent to look for site alternatives.

3.7 Economic alternatives (selection and rejection criteria)

The technology selected for establishment of above stated project will be economical viable than alternatives present as compared to majority of the other available production technologies, but it will be most efficient and convenient to use.

3.8 Location and site layout of project

The project site is located Plot No: 210, Sundar Industrial Estate, Lahore. Google Earth map of site is given in **Fig-1**.

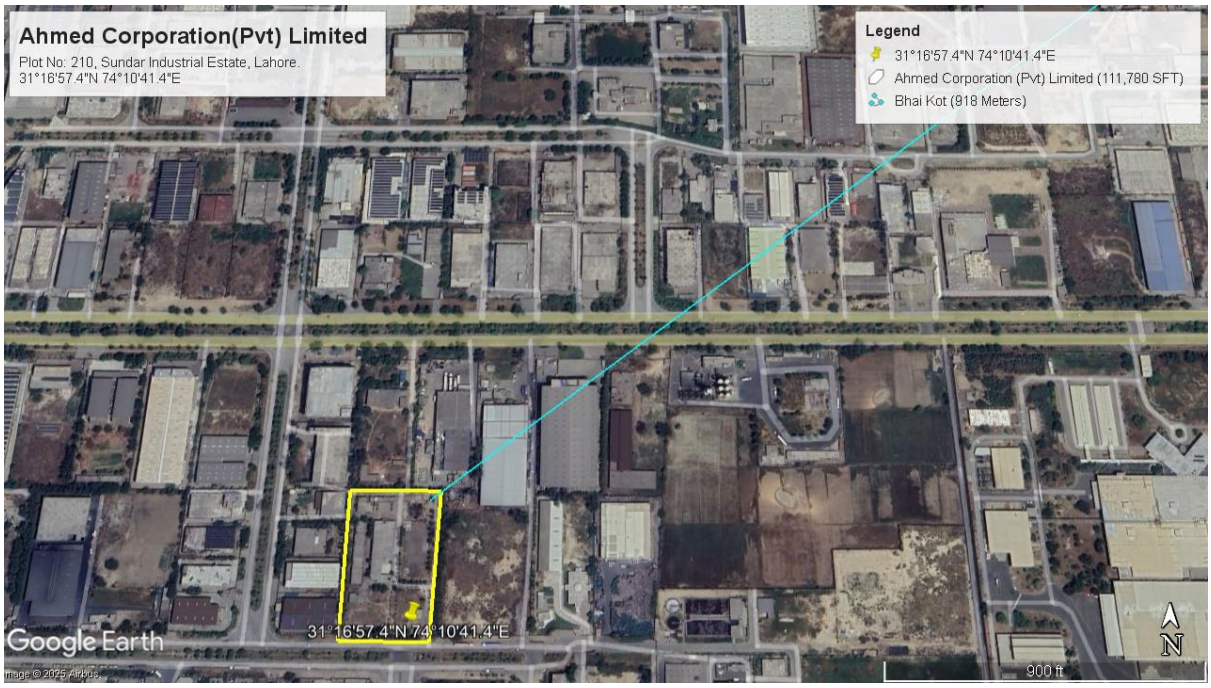

Figure 1: Location map of site

3.9 Land use on the site

The site is Industrial area. Further, there are no mountains or hills of any kind of sensitive area could be seen in the area.

3.10 Road access

The site is accessible through Carpeted Roads, Road access map is given in Fig-2

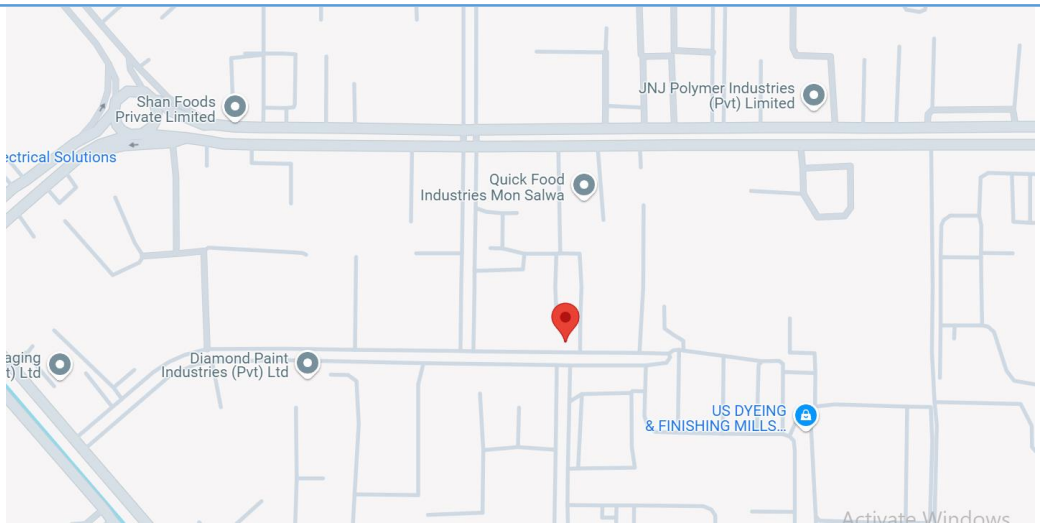

Figure 2: Road access map

3.11 Vegetation features of the site

There is no vegetation, as the project is present in an industrial land. However, proponent will make arrangements to plant trees, building green belts, and garden and plant ornamental plants.

3.12 Cost and magnitude of operation

Total cost of the project is estimated to be around **80 million PKR** which includes the provision of installation, associated amenities and cost for utilities and equipment/machinery. Production capacity of Equestrian metal products unit will be 1 Ton/M.

Table 3: Cost Breakup

Total Cost	80 million
Land Cost	20 million
Land development, Infrastructure and Amenities	40 million
Machinery	14 million
Monitoring and Salaries	4 million
Environmental Budget:	2 million

3.13 Schedule of implementation

The subject project is already constructed.

3.14 Description of the project (process flow chart/steps, technology, raw material and products, by-products)

The project will include installation of electric arc furnaces in order to manufacture equestrian metal products (Spurs English, Pinch Less Bits, Light Weight Bits, Rowel For Western Spurs, Western Bits, Driving Bits, Weymouths, Pelhams, Kimblewicks Icelandic Bits Show Jumping & Pessoa Bits Full Cheek Snaffles Dee Bits Egg Butt Snaffles, 158.14 Ss For Colloquist (New), Loose Ring Snaffles, ' Stirrup Accessories, Stirrups).

3.14.1 Raw materials & list of machineries

Table 4: Raw materials

Description of raw material	Source	Quantity
Copper scrap	Local purchase (imported/scrap yard)	1000 T/M
Aluminium scrap	Local purchase (imported/scrap yard)	1000 T/M
Aluminium scrap	Local purchase (imported/scrap yard)	1000T/M
Storage capacity of yard		1000 T/M

3.14.2 List of machineries to be installed

List of machineries is given in below **Table 4.**

Table 5: List of machineries

Sr No.	Description	Quantity
1.	Induction Furnaces (100 kg each)	05
2.	TIG	01
3.	MIG	04
4.	ARC Welders	01
5.	Buff Machine	01
6.	Polishers	02

3.14.3 Production process and by-products & technology

a) Products

The products will be equestrian metal products.

3.14.4 Process flow diagrams

The process flow diagram with is given below in Fig

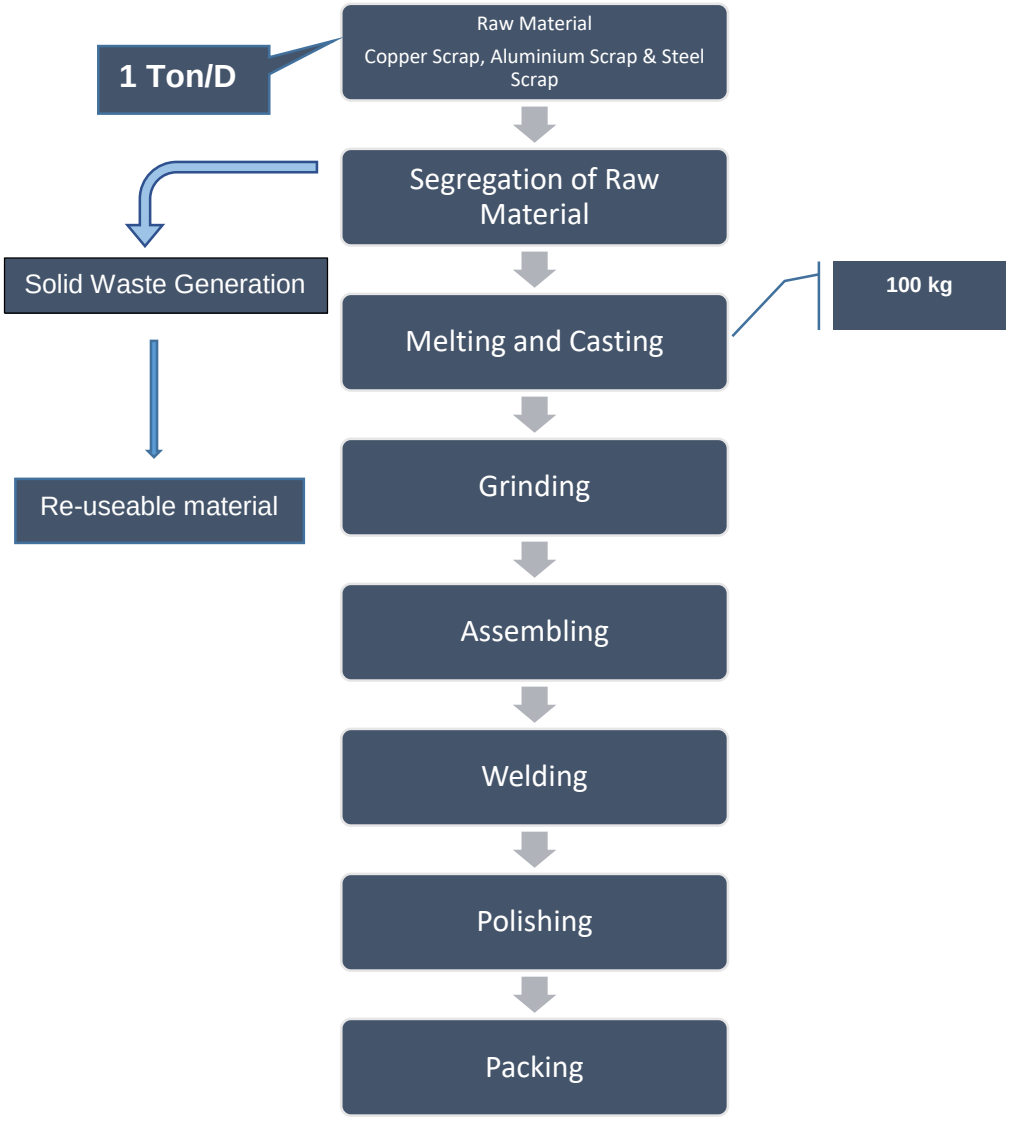

Figure 3: Equestrian Products manufacturing Flow Chart

3.14.5 Manufacturing process for Equestrian Metal Products

1. **Casting**

   Firstly metal scrap is introduced to induction furnace for casting/moulding**.**

2. **Grinding and Machining**

   Removing excess material, spruces, and assembling parts where needed.

3. **Welding**

   For joining parts or repairing cast defects.

4. **Polishing**

   Smoothening and shining the surface for a refined appearance.

5. **Buff Inspection**

   Final quality control and inspection before packaging

3.15 Pollution control technologies

Pollution control technologies will be installed to reduce the pollution load on environment. Below are given pollution control techniques.

3.15.1.1 Emission control

Air emissions will be generated while burning the scrap to convert it into sheets. The generated emissions will have high concentration of the PM, CO and CO_2. These emissions generate a dense cloud of the smoke. To control this, Emission Control System will be installed on chimneys which will reduce up to 95% of emissions. Furthermore, the furnaces will work on electricity and no fuel will be used to gaseous emissions will be negligible.

3.15.1.2 Waste water

Some of the process activities will generate wastewater for which an ETP will be installed while for grey water from kitchen, staff offices and washrooms will be treated in settling tanks prior to disposal.

3.15.1.3 Solid waste

The solid waste will be generated during the cooking in the workers mess. The amount of the solid waste generated will be quite low, which will be disposed off by using sustainable practices of the compost manufacturing. The generated waste will be collected in the bins and at the end of the day it will be dumped in the ground. The generated compost will be used for the horticultural practices at site.

3.16 Restoration and rehabilitation plans

There will be no any matter of rehabilitation as the site is already owned by the project proponent. However, at the end of the life of the unit, it will be duly dismantled with special precautions to avoid/minimize pollution and at the same time taking all safety precautions to protect human life and property around the project site. Debris or any other wastes resulting from demolishing will be disposed-off in environmentally

sustainable fashion. The materials capable of recycling/reuse will be either sold in the market or to be reused for other suitable purposes. While dismantling, Government rules and regulations as applicable to such activities will be strictly adhered. Safety measures as desired under the code of demolition will be adopted to avoid any harm to humans, property around, or the environment in the project area. Dust to be generated will be minimized by constant sprinkling of water. After completion; all demolishing matrix, debris and garbage will be removed off immediately from the site within the minimum possible time under safe conditions. Any minor spillover of these materials will be cleared adequately. The land, if and where pitted will be adequately levelled. On the whole, the project site and the area in its near vicinity will be made neat and clean.

3.17 Government approvals

The environmental approval according to the Section 12 of Punjab Environmental Protection Act is the mandatory requirement of the project.

4 DESCRIPTION OF ENVIRONMENT

This chapter provides baseline data (physical, biological and socio-economic parameters) related to the project and study area. The information has been compiled by using primary and secondary data resources. This chapter also refers to the theoretical analysis of the methodology adopted for collection of baseline data. The underlying principles and practices adopted in this regard are also discussed.

4.1 Methodology

The methodology employed to collect the baseline data and information regarding the social structure and various related parameters as discussed in sub-sections below:

4.1.1 Data Collection

The primary data was collected by visiting the project area and its communities in its nearby vicinity. The secondary data regarding physical parameters (topography, geology, seismology, and climate) was obtained by visiting relevant various government departments and their official websites. The biological parameters such as flora and fauna were studied by preparing a floristic list based on visual observation and fauna was studied by using opportunities approach. The species were recorded with reference to their existence in the project area. Information on wildlife fauna species (mammals, amphibians, reptiles, birds, etc.) in the assessment area was compiled based on opportunistic observation, gathering the existing information and consultation with local experts, community members and government and Non-Government Organizations (NGOs). The socioeconomic aspects were studied and analyzed by studying detailed village profile and by conducting household surveys.

4.1.2 Social Survey

The purpose of social survey was to record the present condition of the people living in the project area and to assess the expected project impacts on their life, subsistence systems and socio-cultural conditions. Prior to conducting the field surveys, the following steps were taken:

- Clear boundaries of the project area were identified
- Decided the sampling procedure in order to draw a representative sample size of the target population and households
- Developed the tools for data collection i.e. questionnaires to access the socio-economic status of the area

4.1.3 Sampling Design

Social baseline data of the persons residing in the study area has been estimated and collected through random sampling by using pre-developed questionnaires.

4.1.4 Questionnaires

In order to test the validity and reliability of the questionnaires, they were reviewed to assess whether questions needed to be clarified, changed or re-sequenced and then a final editing of questionnaires was conducted prior to their application in the project area. The sample of socio-economic questionnaires used is attached as Annexure.

4.1.5 Data Editing and Analysis

The filled questionnaires and recorded information were compiled by the same field investigators who were involved in the data collection. This was done immediately after completing the field investigations. Data sets were processed. Analysis of the data and preparation of conclusions in the minimum possible time was done using statistical techniques of data analysis.

4.2 Review of Legal and Administrative Framework

The objective of reviewing legal and administrative framework is to obtain information on all legislation pertaining project development. The Socio-Environment Team of Central Environment Services reviewed the environmental policies, national, international and provincial laws and guidelines relevant to the development of project which helped in systematic identification of impacts.

4.3 Baseline Conditions

This chapter provides baseline data (physical, biological and socio-economic parameters) related to the project and study area

4.4 Physical Environment

Pakistan Can be divided into five broad physiographical regions. These are the mountainous regions of the north, the western highlands and plateaus, the sub-mountains Indus region, the Potohar Plateau, Salt Range, and the Indus Plain.

4.4.1 Topography and soil

Lahore is generally flat and slopes towards south and south-west at an average gradient of 1:3000. It can be divided into two parts i.e. the low-lying area along River Ravi and the comparatively upland area in the east away from Ravi. The low lands are generally inundated by the river water during monsoon floods. River Ravi flows in the west of Lahore District forming a boundary with Lahore District. The original physiographic features like channels remnants and levees have been destroyed or

changed by the construction of urban infrastructure. Flood plains have been confined by construction of embankments (bunds) and spurs. Sub-recent flood plain is 4 to 8 meters higher than the recent flood plain and can be identified at number of places i.e. Shalimar Garden, Moghalpura and Multan Road.

Terrain of the project site is predominantly flat. Lahore district is situated at an average elevation of 210 meters above mean sea level. The alluvial subsoils are of late Pleistocene and were formed by the flood plains of river Ravi. These consist of clay, silt and sand. The thickness of clay increases with distance from the river bed.

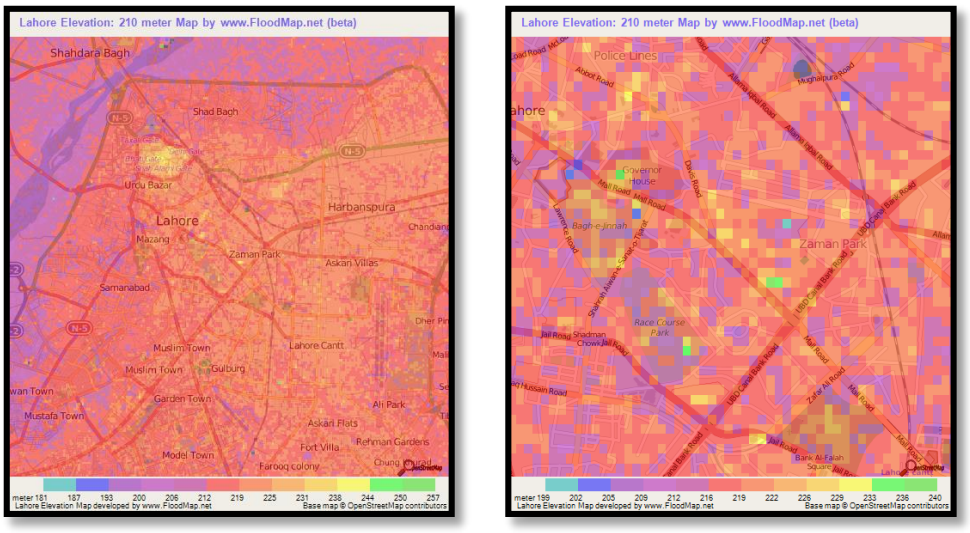

Figure 4: Topography of District Lahore

Lahore plains are most probably underlain by the Potwar stratigraphy, but it would be deeply eroded. Lahore is located just north of the NW-SE running Sargodha high, where the sedimentary rocks may also be truncating against the high. Moreover, very thick alluvial and older fluvial deposits (Recent to Miocene) before older eroded rocks are also encountered. The geotechnical properties and mineralogical composition of the soil, das established during various studies / boring of tube wells for water supply by WASA/LDA confirm that the Lahore soil is composed of silty clay. The major mineral composition for Lahore soil is Quartz, Muscovite and Clinochlore, which shows that the alluvial deposit received sediments from metamorphic origin. In general, subsurface stratigraphy at the site consists of three basic lithological units as given below:

- Lean Clay/Silty Clay
- Sandy Silt/Silt
- Silty fine Sand/fine Sand

These soils are the alluvial deposits of the recent geologic times. The subsurface stratigraphy is as discussed below:

• The first soil unit of brown silty clay/lean clay forms the topsoil cover at the site at all the locations and generally continues to a depth of 1 .0 m- 3.5m below top of ground. This stratum contains trace fine sand and trace to little concretions at places. It is present in a soft to a stiff state of consistency and has low to medium plasticity.

• The second soil unit of brownish grey sandy silt/silt underlies the upper silty clay/ lean clay stratum. This layer has a thickness of 1.0 to 3.0m and is present in a firm state.

• The third soil unit of brownish grey non-plastic fine silty sand underlies the silt/silty sand stratum. It is present in a loose to medium-dense state.

The lithological distribution of soils consists of slightly cohesive, generally firm to stiff silty clay lean clay from 1.0 to 3.5m depth, followed by firm to stiff sandy silt/silt of 1.0 to 3.0m thickness in turn followed by medium dense silty fine sand. Groundwater is present at a depth of 4.5 to 5.0m below top of ground. The subsurface generally appears suitable for supporting light to medium loads through spread foundations placed at 1.0 to 2.0m depth. Besides, some isolated weak spots are also expected, which will require special measures to be adopted.

4.4.2 Climate

Purposed project site is located in District Lahore and has distinct seasons marked by wide variation in temperature. The coldest month is January in which the mean maximum temperature is 19.4 °C and the mean minimum temperature is 6.6 °C. June is the hottest month with the mean maximum temperature near 39.8 °C and the mean minimum temperature as 27.4 °C.

The average annual rainfall from 2010-2018 in Lahore works out to be 126.16 mm. Nearly 70% of it received in the form of high intensity showers during the monsoon (July, August, September) and the remaining in winter. The yearly variations are considerable.

The most humid period is in month of February with average humidity of 53.125 % and the least humid period is in the month of May with average humidity of 18.875 %. The average monthly humidity of Lahore region form last 9 years (2010-2018) recorded is 35.25 %.

During cold seasons of the year northern winds prevail and during hot seasons southern winds. Monthly mean velocity of the wind (Knots) taken for the period 2010-2018 is 5.46.

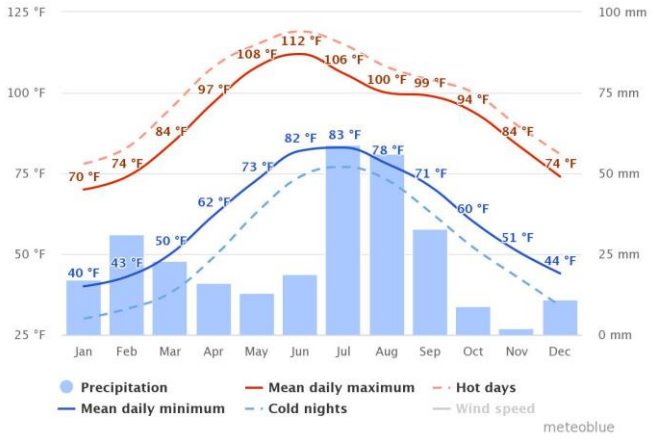

Figure 5: Average temperatures and precipitation

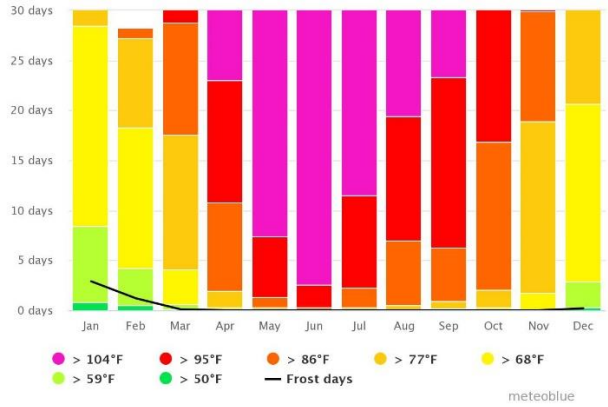

Figure 6: Maximum Temperature of Lahore

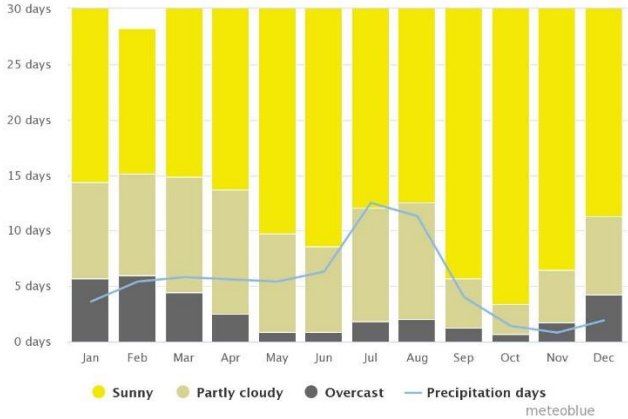

Figure 7: Cloudy, sunny, and precipitation days

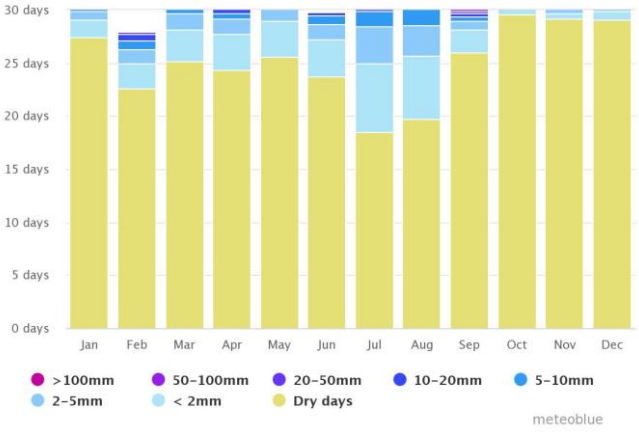

Figure 8: Average Precipitation of Lahore

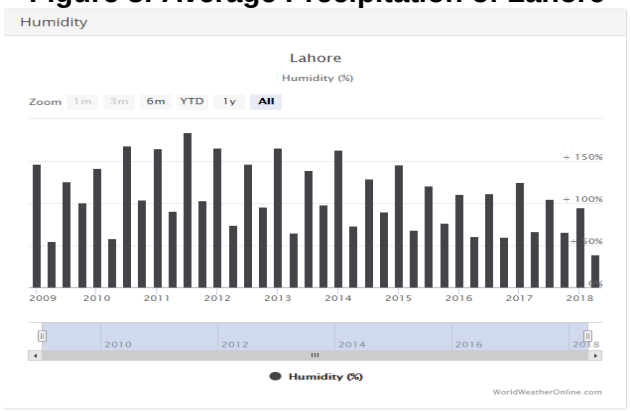

Figure 9: Average Humidity of Lahore Region

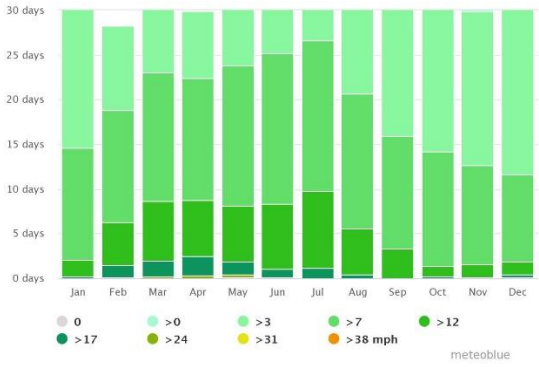

Figure 10: Average and maximum Wind Speed of Lahore Region

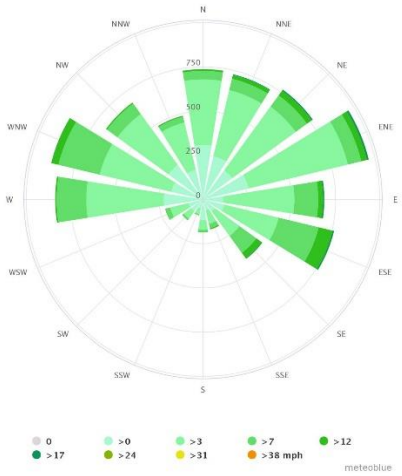

Figure 11: Wind Rose Diagram of Lahore

The wind rose for Lahore shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE).

4.4.3 Hydrology

The aquifer under Lahore area is composed of unconsolidated alluvial sediments, consisting of sand, silt and clay in different proportions. The chief constituent minerals are quartz, muscovite, biotite and chlorite, in association with a small percentage of heavy minerals. The sediments have been deposited by the present and ancestral tributaries of the Indus River during Pleistocene-Recent age. The sedimentary complex has a thickness of more than 400 meters. The shifting course of the tributaries in the area has impregnated the heterogeneous character to the thick sedimentary alluvium. Therefore, the geological strata have little vertical or lateral continuity. In spite of their heterogeneity, the alluvial sediments constitute a large aquifer, which on regional basis behaves as an unconfined homogeneous aquifer (Greenman et al., 1967). The individual lenses of silt and clay do not impede the flow of groundwater, considering long-term pumping. Lahore aquifer is highly transmissive, with hydraulic conductivity variation between 25 m/day to 70 m/day. In spite of heterogeneous nature of alluvial complex, groundwater occurs under
water table conditions.

Regional Flow Pattern and Condition of Groundwater

The regional groundwater flow in the area is from northeast, the Jammu and Kashmir foothills which are at higher elevation, towards the southwest along the general slope of the area. The previous studies and behavior of existing shallow and deep tube wells

in the area have shown that in spite of local variation, aquifer overall behaves as a single homogeneous water body and 73 % of the total consists of sand. This condition is during the monsoon season, when the water table is the high and the annual fluctuation is reported not more than 10 feet.

Before the introduction of controlled irrigation system in Punjab, the water table was deep towards the center of Doabs and was shallow along the rivers. After the introduction of controlled irrigation system in the region, water table started rising as a result of leakage/seepage from irrigation canals and infiltration from irrigation applications on crop fields. As a result, the area became water logged until about 1960 when a quasi-equilibrium state was reached, controlled in part, by evapotranspiration and drainage.

4.4.4 Groundwater

Ground water 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 water quality in the upper 50 meters zone of 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 city population is consuming groundwater for drinking purposes.

Groundwater is available at a depth ranging between 15 to 23m below the natural surface level. Deep groundwater from a depth of about 210m in the vicinity of the Project Area is being extracted for meeting the domestic and commercial water demands in nearby areas. Adequate quantity of good quality groundwater is available below a depth of 50m.

4.4.5 Geology / seismology

Lahore lies on the alluvial plain called Bari Doab. Doab is a local word for area between rivers. Bari Doab is a part of the Indo-Gigantic alluvial plain formed by the Indus River and its tributaries. It is bounded by Ravi and Chenab rivers in the northwest and west and by Sutlej River in the southeast. Northeastern boundaries of Doab lie near the foothills of the Himalayan Ranges. The Bari Doab is covered by Quaternary alluvium which overlies semi-consolidated Tertiary rocks or Metamorphic and igneous rocks of Precambrian age. Except for a small area in the northeastern part of Doab where basement rock was encountered no information is available at present regarding the distribution of Tertiary and Precambrian rocks in the Doab.

The project site is located in Punjab which is a vast plain of alluvial material, deposited by Indus basin and five main rivers crossing the Punjab Plain. Thickness of alluvial deposits is thought to be more than 300 m which are underlain by the basement rocks of the Indian shield. The project site falls in the Punjab plain which shows low to moderate level of seismicity. The project region has also been subjected to severe shaking in the past due to earthquakes in the Himalayas. The epicenters of low to moderate magnitude earthquakes recorded in the Punjab Plain are associated with the subsurface fractures in the basement rocks which are concealed by the thick alluvial deposits. The known main active fault near Lahore is the Main Boundary Thrust (MBT) which passes at a distance of about 180 km towards northeast along the Himalayan front.

The Project Area does not have any valuable minerals. Although, scientific/in depth, investigations haven't been carried out, yet the surveys conducted have failed to discover any minerals worth the name till to- date.

Probabilistic seismic hazard assessment recently carried out for Lahore area as part of the revision of seismic provisions of the Building Code of Pakistan shows that the project area falls in Zone 2A. Seismic zone of Pakistan is shown in figure 4.1. It is therefore recommended that the project structures should be designed to cater the requirements of Zone 2A of Building Code of Pakistan (2007). Based on the evaluation of tectonic setting and seismicity of the project region, the important project structures are designed to withstand a horizontal peak ground acceleration of 0.15g with 10% exceeding probability in 50 years.

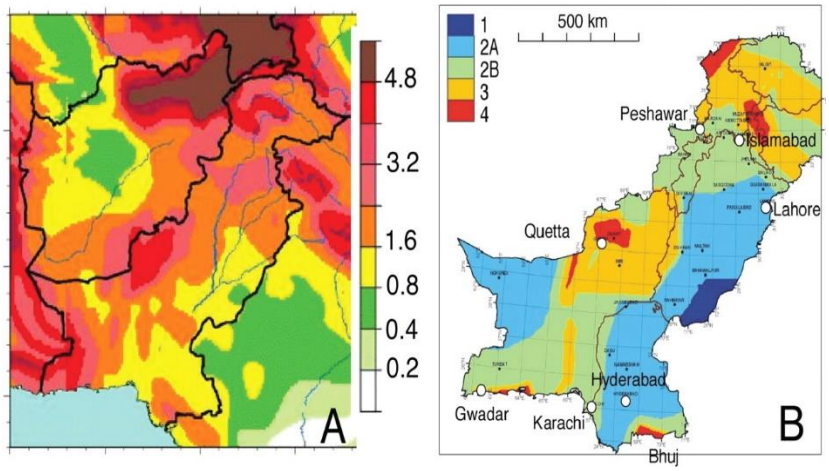

Figure 12: Seismic Zone of Pakistan (Geological Survey of Pakistan)

4.5 Description of the biological environment

The project area neither contain any forest nor falls in protected area or archaeological site and so no jurisdiction on the sire area of the relevant legislations.

4.5.1 Flora

The project area is surrounded by self-developed industrial land, and does not support rare, endangered or threatened plant species. Plant species present in the site are given in the following table

some plants are ornamental like Alastonia, Golden Ficus, green Ficus, Dronta Weeds, and Palms etc. these are the tree species that are generally planted along the margins of fields. Among the above-mentioned tree species mostly are used for landscaping purposes in houses some plants are used as biomass in homes near the selected site.

4.5.2 Fauna

Only few common animals are found near the project site like dogs, cats, rodents like squirrels, rats, mice and bats. Common species of birds found include the common house sparrow, crow, pigeon, dove, yellow and white eyed mynas.

4.6 Socioeconomic Resources and Quality of life values

In order to assess the present socio-economic and socio-cultural conditions of the project area, a survey was conducted. For this purpose, base line data was collected from few commercial and residential areas adjoining to the purposed site. Interviews and social surveys were conducted to assess the present socio-economic and cultural feature of the area.

4.6.1 Population and communities

Mostly community around the purposed project area is the semi-urban. Most of them have their own business. Some of them have private jobs in different industries present in the industrial Area, agriculture and livestock profession. Only a few are government employees. Punjabi is the predominant language being spoken near the purposed project site, representing 55 % of the population, followed by Urdu and Pashto spoken by 40 % and 4.8 %. Sindhi is spoken by 0.2%.

4.6.3 Educational institutions

Basic primary level education is available. The private education schools also exist near the project site. The project area has privileged of big colleges and universities.

4.6.4 Transportation

The project area is situated on Sharif Medical Complex - Manga Road which is approx. 60 feet wide and provides round the clock transportation access. Transport services include buses, trucks, vans, cars, pickups, motorcycles, rickshaws, and bicycles. For railway services, one can go to Lahore Railway station from where rail service is available throughout the Pakistan

4.6.5 Power sources and transmission

Electricity services are provided by Lahore electric power company to the area and it shall provide same services to the project as it is the only authority which deals with the electric power sources and their availability to the expected area.

4.6.6 Agricultural and mineral development:

The project area lies in the agricultural zone. Land holdings are very small. Agriculture mainly depends upon canal water. Underground water, where available of irrigation quality, is used for agriculture purpose through tube wells.

4.6.7 Public health

The medical facilities are available near the project site area as few very good hospitals are situated in nearby residential area, whole area is full of clinics and hospitals thus providing very good medical facilities to the people of area.

4.6.8 Archaeological and cultural sites

No Major archaeological sites are observed in the vicinity of project.

4.8 Quality of Life Values

Socio-Economic Questionnaire and Environmental Checklist were used as survey tools by the Central Environmental Services survey team to collect desired information. Most of the respondents had the basic social facilities such as; basic health facility, electricity, water supply, roads, rail, public and private transportation to sustain life. Most of the respondents were working with the agricultural, livestock, doing their own business, shopkeepers and working as the labor in the nearby industries. The common diseases observed in that area were Diarrhea, cough diabetics and heart diseases.

4.8.1 Occupation of Respondents

Majority of the respondents (26%) belongs to the business, 33% have their own business, 10% daily wagers, 13% attached with Govt. employee, 15% shopkeepers and remaining 18% are private employees. During survey, efforts were made to

interact with people representing all walks of life. The detailed graphic representation of occupational status is given below:

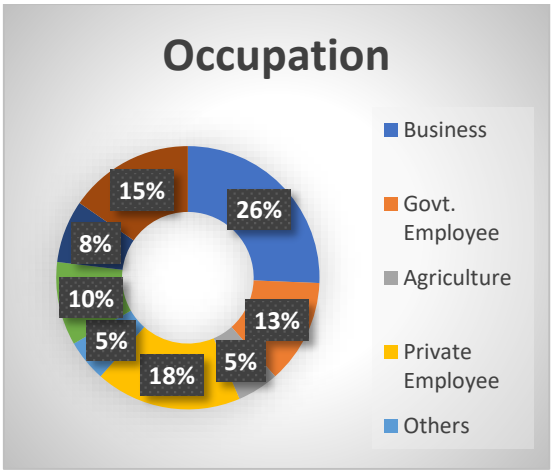

Figure 13: Occupation of Respondents

4.8.3 Facilities Available

Facilities available at the houses, shops and factories are depicted here. It shows that electricity, water supply, telecommunication, sewerage, gas supply and every other routine facility is available in study area.

4.9 Lab Reports of Environmental Analysis

Testing of different parameters was done from a certified laboratory named SEAL to check the quality of different environmental parameters. The copy of the lab reports of these parameters (ambient air analysis, water quality analysis and noise) is attached at Annexure of this EIA Report.

4.10 Suitability of Site:

Comprising all assessment of above baseline data there will be no significant ecological/ environmental impact expected in and around the present selected project site, hence it is suitable for the project.

5 IMPACT ASSESSMENT

This section discusses the potential environmental impact of project, methodologies for impact identifications and characteristics of impacts including nature, magnitude, extent and location, timing, duration, reversibility, risk The assessment carried out in this Section is based on potential impacts on overall environmental receptors within the project area.

5.1.1 Methodologies for impact identification

The potential impacts due to the Equestrian metal products manufacturing mill are mostly beneficial. It is anticipated that this project will have maximum positive impacts as it is environmentally friendly project to reduce pollution load.

Moreover, the project is expected to result in negative impacts of short-term duration and transient in nature. Having identified and characterized the potential significant impacts during operation phase of project an Environmental Impact Severity Matrix & checklist to summarize all the identified impacts as mentioned below in tables.

Table 6: Impact significance criteria

Impact	Criteria
No Impact	When the activity will have no impact
Long Term	When the impact is of high intensity with high spread and high duration or of high intensity with medium spread and medium duration
Moderate Term	When the impact is of moderate intensity with high spread and high duration or of high intensity with low/ moderate spread and low duration
Short Term	When the impact is of low intensity but with moderate spread and moderate duration or of moderate intensity
Insignificant	When the impact is of low intensity, low spread and low duration
Adverse	When the impact is of large intensity, spread easily and long-term
Beneficial	When the impacts are positive and improve the environmental conditions

5.1.2 Checklist

Table 7: Impact assessment checklist for operational phase

Environmental Sensitivities	Intensity of Impact						Impact Nature		Impact Significance				
	Low Intensity	Moderate Intensity	High Intensity	Local	Moderate	Regional	Beneficial	Adverse	Insignificant	No Impact	Short Term	Moderate	Long Term
Physical Parameters													
Noise													
Water Quality													
Odor													
Biological Parameters													
Land Environment													
Flora													
Fauna													
Physical Parameters													
Local Economy													
Social Impacts													

Health & Safety													

5.2 Characteristics of impacts (nature, magnitude, extent and location, timing, duration, reversibility and risk)

The impact characteristics are identified to screen out potentially insignificant environmental and social impacts from potentially significant adverse environmental and social impacts during planning & designing and operational phases of the project. The objective of impact screening process is to assess the significance of issues related to the air, water, noise, soil, transportation, civil work, communication, the hazards and external constraints. The beneficial and adverse impacts of project during planning & designing and operational phases are identified based on their duration, location, frequency, extent, significance and reversibility. The impact of each activity on various environmental parameters is given below:

Table 8: Impact assessment characteristics

Sr#	Environmental Component	Impact Characteristics												
		Duration		Location		Frequency		Extent		Significance			Reversibility	
		Long	Short	Direct	Indirect	Cont.	Intermittent	Wide	Local	Large	Moderate	Minor	Rev.	Irrev.
Beneficial Impacts														
1	Employment Opportunity	◙		◙		◙			◙		◙		◙	
2	Solid Waste Management	◙		◙		◙			◙		◙		◙	
3	Land Value	◙			◙	◙			◙			◙		◙

4	Tree Plantation	◙		◙		◙			◙		◙			◙
5	Wastewater		◙	◙		◙		◙			◙		◙	
Adverse Impacts														
1	Solid Waste	•		•		•			•		•		•	
2	Health and Safety		•		•		•		•			•		•
3	Physical Hazards		•	•			•		•			•		•
4	Security Risks		•		•		•		•		•		•	

6 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This Chapter identifies the potential impacts (positive and adverse) on the physical, biological and socio-economic environment of project area. It also identifies measures that will help to mitigate the adverse environmental and social impacts (if any) and it will enhance positive impacts of the project. Impacts are assessed by analyzing their magnitude and sensitivity, which is a legal requirement.

6.1 Impacts associated with project activities

- Environmental Impact - Operation Activity
- Socioeconomic Impact - Operation Activity

6.2 Project location

There will be no impacts due to project location as the land is owned by project proponent. The subject project is present at an industrial land. In the project area or its vicinity no ecologically, important area is present. However, no human settlement or infra-structure will be dislocated due to the establishment of project. So, no adverse impact is being envisaged. Hence, there is no need to change the design of project is required.

6.2.1 Compensation in money terms

There is no damage envisaged to fauna, flora or any other biological source. So, no compensation in monetary terms will be needed as the land is owned by the project proponent.

6.2.2 Replacement/relocation/rehabilitation

The project has already been constructed at an industrial land.

6.3 Project design

The unit have been constructed on modern lines, meeting international standards, with incorporation of imported technology. The design, if maintained and operated in an environment-friendly manner, is expected to cast positive impact on the environment and will not pose any adverse impact or threat on any component of the environment.

The design of the project is sustainable and following the principles of energy conservation. The design of the main public buildings follows the green building designs such as; maximum utilization of the sunlight, high roofs to keep the building

cool, etc. Moreover, the building is designed by keeping in consideration all the technical standards to avoid adverse impacts on the environment and society.

6.4 Construction phase

The unit is already constructed.

6.5 Operational phase

The environmental and socio-economic impacts associated with the operation phase are had been studied in detail. Following is the detailed description:

6.5.1 Water consumption

The increased withdrawal of surface water for the project may affect the water availability for the other users of the project area. A significant impact will be interpreted, if water extracted for the project directly affects the ability of the community and other users to meet their water needs. The water usage will be the water required for domestic use of workers, for floor cleaning.

6.5.2 Mitigation measures

Following mitigation measures will be adopted:

- Water conservation program will be initiated to prevent wastage of water
- The management will ensure maximum recycling of washing water, so that overall consumption could be reduced
- Reusing the water for sprinkling purpose after floor cleaning

6.5.3 Wastewater

The building operations will generate wastewater in the form of domestic and process wastewater. The wastewater can be a potential source of pollution to surface and groundwater resources of the area. Domestic wastewater generated during building operation is estimated to be approximately 1.4m^3/day. Implementation of the mitigation measures and regular monitoring is not likely to leave any significant impact of the wastewater from the facility.

6.5.4 Mitigation measures

Following mitigation measures will be adopted for effective management of wastewater:

- The grey water will be treated through settling tank which will be recycled to be re-used in irrigation purposes

- Waste segregation measures would be employed to minimize entry of solid waste into the wastewater stream
- Water conservation strategies will be employed to avoid wastage of water
- An ETP will be installed for the treatment of process wastewater.
- Periodic sampling and monitoring of key parameters for wastewater effluent into the receiving body (drain or sewerage system) and for this purpose samples will be collected at the discharge point to ensure effective treatment

6.5.5 Noise

Noise cause stressful effect on the ears, nervous system and heart; especially to people exposed to noise above 85 dB (A) for long period of time. Due to the operation of the project heavy machines can serve as the potential noise sources. This noise will depend upon the machine efficiency, their maintenance level and the nature of room housing it, and the atmospheric conditions. No significant increase in noise level in the community is envisaged under normal operation. Moreover, implementation of the below-stated mitigation techniques will also keep the noise impacts at minimum to the workers as well as to the community.

6.5.6 Mitigation measures

Noise management and mitigation plan should follow the underlying strategy:

For people working in noisy installations, ear-protection aids like ear-plugs, ear-muffs, noise helmets, headphones etc. must be provided to reduce occupational exposure. This is possible if working methods are improved by:

- Proper designing and fabrication
- Proper lubrication and better maintenance of machines
- Covering noise-producing machine parts with sound-absorbing materials to check noise production
- Reducing the noise produced from a vibrating machine by vibration damping i.e. making a layer of damping material (rubber, neoprene, cork or plastic) beneath the machine
- Using silencers to control noise from automobiles, ducts, exhausts etc. and convey systems with ends opening into the atmosphere
- Using glass wool or mineral wool covered with a sheet of perforated metal for the purpose of mechanical protection

Noise can also be controlled with barriers by enclosing the source of the noise, by placing sound-reducing barriers between the worker and the source, or by increasing the distance between the worker and the source

- Tree plantation helps to block the propagation of sound. Proponent has planned tree plantation in and around the unit premises
- During the project operation, it should be ensured that the noise level does not exceed prescribed limits as set by WHO or Pak-EPA; for which regular monitoring must be carried out.

6.5.7 Waste management

Improper disposal off the solid waste generated during the operational phase of project can pose a health hazard; pollute soil, surface and ground water. Proper implementation of the mitigation measures will ensure that the residual impact from improper management and disposal of the waste is minimal. Monitoring and inspection will be undertaken to ensure compliance and minimize any residual impact.

Following mitigation measures will be adopted:

- Waste generation will be minimized by adopting waste management strategy of reduce, reuses and recycle
- A waste management plan will be prepared, implemented and monitored for the safe collection, storage and treatment/disposal of the building waste
- Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register
- Records of all waste generated will be maintained
- Training will be provided to personnel for identification, segregation, and management of waste
- Various waste containers for waste collection should be placed at appropriate locations in the building
- Waste management inspections will be undertaken on a regular basis of onsite waste management and of waste disposal contractors to ensure that the waste management procedures are being followed

Monitoring measures will include:

- Record of all waste generated

- Quantities of waste disposed, reused at site or sold should be logged on the waste tracking register
- Audit of waste management on annual basis
- The areas around the project boundary and access roads should be periodically inspected to verify that no project related waste is scattered in these areas

6.5.8 Air emissions

The air emissions will be generated through the furnaces during process activities and by the movement of vehicles dust and particulate matter will be emitted in the environment. If these emissions are not handled may damage the health of workers, may be the cause of public nuisances and the wear& tear of the shelling machinery is fast.

6.5.9 Mitigation measures

Following mitigation measures will be adopted:

- PPEs such as; dust mask will be provided to the workers
- Pre-cleaning will be carried out to reduce the dust emission
- Emission control system will be installed
- Water sprinkling will be carried out as and when required

6.5.10 Emergency response

Incidents and accidents may take place unexpectedly during project operations no matter how effective, strong and efficient the mitigation measures for all adverse impacts; especially the safety issues may be adopted. These may include; fire hazard which may poses a serious threat.

6.5.11 Mitigation measures

Following mitigation measures will be adopted:

- Fire extinguishers should be properly maintained and checked periodically
- Adequate fire hydrant system should be installed
- Flammable materials should be prohibited in the premises
- Fire alarm systems should be maintained for detection and warning of fire
- Adequate training of workers on use of fire-fighting system to deal with the situation.

- Administration of the unit will make a proper evacuation plans for emergency escape from all halls
- Emergency call service must be made available
- Fire-fighting team must remain ready at all times

6.5.12 Occupational hazards

It includes occupational hazards like physical injuries arising from accidents such as being hit by falling weak structures, being overrun by heavy equipment. The major safety issues in operational phase are:

- Electrical Hazards
- Machine Guarding
- Eye, Head and Foot Protection
- Fire and Explosion Hazards
- House-Keeping Issues

6.5.13 Mitigation measures

Following mitigation measures will be suitable:

- Care will be taken to properly ground and insulate all equipment
- Proper machine guarding, which is critical for the prevention of injuries to workers by isolating them from moving machinery, will be provided
- Head, arms and foot PPE's will be provided
- Fire-fighting equipment will be available, and their locations will be clearly marked
- Exits from work places will be well marked and visible in dim light
- Fire water will be located throughout the plant in well-marked piping
- Housekeeping will be frequent and thorough to prevent slips, trips, and falls
- Workers will be told and encouraged to use PPEs as may be standardized
- Workers' awareness and safety wall chart showing safety symbols will be displayed.
- First Aid Box will be kept in easy approach of all in case of any injury or mishap.
- Basic medical and health facilities will be provided to all employees
- Safety and warning devices such as reflectors, lights, etc. shall be installed at designated spots

- Visual monitoring of hazards and accidents will be done in order to control the potential hazard

6.6 Potential environmental enhancement measures

Tree plantation within and outside the premises is a potential environmental enhancement measure. A large area will be reserved for tree plantation and among plants native flora like Peepal, Kikar and Amaltas will be planted in the specified green zone which will have the maximum capacity to reduce noise pollution and tolerance index of these species are more than 10. Some floral species like roses and other ornamental evergreen plants will also be introduced in the lawn which will enhance aesthetic beauty. In addition, trees like Amaltas will be planted as boundary wall inside the lawn which will look like green wall. The proponent will also make arrangements for protection and maintenance of trees

6.7 Building enhancement

The introduction of an ecologically effective and efficient design of the building is the environmental enhancement measures planned by the proponent to be incorporated into the design of the intended project.

6.7.1 Social enhancement measures

Following measures will be adopted to improve the socio-economic condition of the area:

6.7.2 Employment/poverty alleviation

The employment opportunities in the project area will be increased due to the establishment of project at the location. During establishment un-skilled workers will be required as labors, sanitary workers and sweepers as well as for the skilled workers such as; accounts and managers to run the administration office local community will be considered on the priority basis. In totality, the overall economic conditions of the area will be improved due to the establishment of the project.

6.7.3 Local economy

The employment opportunities and/or income sources generated by the project operation will be long term in nature. The local economy will experience a slight boom during development and operational period.

7 ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

The potential environmental impacts are identified from the planning stage of project through the Environmental Impact Assessment (EIA) process. The EIA has identified potential impacts that are likely to arise during the project. The EIA has examined in detail both negative and positive impacts at each stage of the project covering both operations phase. To minimize the effects of adverse impacts the EIA has recommended mitigation measures. The proposed mitigation measures have been based on the understanding of the sensitivity and behavior of environmental receptors in the project area, the legislative controls that apply to the project and a review of good industrial practices while operating in similar environments.

For effective implementation and management of the mitigation measures an Environmental Management Plan (EMP) has been prepared. The EMP satisfies the requirement of the Punjab Environmental Protection Department Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000.

The EMP is a tool that serves as to manage environmental impacts and specifically focuses on implementation of mitigation measures in its true sense against likely environmental impacts.

7.1 Purpose and objective of the EMP

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified in the EIA.
- Define legislative requirements, guidelines and best practices that apply to the project.
- Define the responsibilities of the project proponent.
- Define a monitoring mechanism and identify monitoring parameters in order to:
    - Ensure the complete implementation of all mitigation measures.
    - Ensure the effectiveness of the mitigation measures.
- Define requirements for environmental monitoring and auditing.
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.

7.2 Components of the EMP

The EMP consists of the following:

- Legislation and guidelines
- Organizational structure; roles and responsibilities
- Monitoring/Management plan
- Environmental monitoring
- Communication and documentation
- Change management Plan
- Training program/schedule

7.3 Legislation and guidelines

The EIA has discussed national and international legislation and guidelines that are relevant to the project; proponent will ensure that the project is conducted in conformance to the project proponent corporate environmental policy, national legislation and relevant international conventions and that guidance is sought from national and international guidelines. Project proponent will also ensure that its key project management staff and all its assigned contractors are aware of these legislation and guidelines prior to the start of project activities

7.4 Description of proposed mitigation actions

It lists all the mitigation measures identified in the EIA and the associated environmental or social aspect in line during operational phase with the administrative framework involving all the responsible implementing authorities who are required to take the planned actions/measures and monitor it accordingly. It enhances project benefits by reducing its impacts and making it environmentally friendly. The environmental management and monitoring plan is given below in table.

Table 9: Management and Monitoring Plan – Operation

Sr. No.	Project Activity	Impacts	Mitigation Measures	Responsibility	Environmental Budget
1	Water Use / Wastewater	▪ Surface water contamination ▪ Pollution risk from accidental spillage	▪ Wastewater from the activities will be contained in settling tanks and will be reused. ▪ Compliance of effluent with PEQS will be ensured prior to discharge in water body. ▪ Water conservation practices will be followed to minimize the water usage. ▪ Water use will be monitored periodically to ensure that water is not wasted. ▪ In case of any accidental spillage, emergency plan should be implemented.	Proponent & Company Management	100,000/-
2	Air Emissions	▪ Compliance with prescribed PEQS for ambient air	▪ Proper ventilation and exhaust system for air passages; ▪ Control of processing exhaust emissions by proper maintenance of production unit/equipment and emission control system; ▪ Proper maintenance of machinery is required to control emissions;	Proponent & Company Management	100,000/-

			▪ Daily maintenance of transport vehicles is required to control air emissions.		
3	Noise	▪ Noise Pollution ▪ Disturbance to the personnel handling the installations	▪ The noise generating area at the operations will be lined with boundary wall to reduce impact on the workers. ▪ Operators of machinery/equipment will wear ear protections while operating or working nearby high noise emission sources. ▪ Tree plantation to reduce the effect of noise pollution. ▪ The project will be placed such that the cumulative noise levels at walkways and worker locations will not exceed PEQS for noise.	Proponent & Company Management	100,000/-
4	Waste Management	If not managed properly; ▪ Surface and groundwater pollution ▪ Soil contamination ▪ Air pollution, odor ▪ Health hazards ▪ Aesthetic issues	Solid waste management plan will be implemented and following mitigation measures will be taken: ▪ Only municipal solid waste will be produced which will be segregated and disposed off using environment friendly techniques ▪ Area supervisor will mark the quantity/weight and nature of the material on the drums and logbook. ▪ Training will be provided to personnel for identification, segregation, and management of	Proponent & Company Management	100,000/-

			waste.		
5	Occupational Health and Safety	▪ Health problems or immediate risk may take place. ▪ Occupational health of workers and community may be affected.	▪ Providing basic medical training, safety training to work staff and basic medical service during operations. ▪ Firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents. ▪ Provision of adequate sanitation, washing, cooking and dormitory facilities including light up to satisfaction; ▪ Adequate signage, safety cones, lightning devices, barriers, yellow tape and persons with flags. ▪ Adequate signage, safety cones, lightning devices, barriers, yellow tape and persons with flags during operations.	Proponent & Company Management	100,000/-
6	Tree Plantation				200,000/-

7.5 Schedule of implementation and environmental budget

7.5.1 Schedule of implementation

This project will be completed in 05-06 months after getting Environmental Approval. The total cost of the project is **PKR 80 million approx**. which includes; the cost of civil work, purchase of machinery and its installation, implementation of mitigation measures, site rehabilitation, etc.

7.5.2 Environmental budget

Environmental budget will be allocated for protection of environment. PKR 2.0 million will be allocated as environmental budget in operational phase of project.

Table 10: Schedule for Implementation of Environmental Budget

Schedule for Implementation of Environmental Budget			
Operational Phase			
Parameter	**Frequency**	**Schedule for Implementation**	**Responsibility**
Air Quality	Quarterly	Ambient air quality and Scrubber Maintenance	Administration of project and Reporting to EPA
Noise	Quarterly	Noise by activities in the multi-purpose building	Administration
Surface and ground water	Bi-Annually	Monitoring of water and wastewater parameters defined by EPA	Administration and Reporting to EPA
Solid waste	Quarterly	Waste generation	Administration of the project

7.6 Environmental management team along with their roles and responsibilities

Proponent shall hire environmental management team in operational phase of project. The roles and responsibilities of environmental management team are given below in table.

Table 11: Roles & responsibilities of environmental management team

Roles and Responsibilities

Sr#	Concerned Persons	Duties
1	The Project Manager	Following will be the responsibilities of the Project Proponent: ▪ Ensure that the contractor is aware of all specifications, legal constraints, standards and procedures pertaining to the project specifically with regards to environment. ▪ Ensure that all stipulations within the EMMP are communicated and adhered to by contractor(s) ▪ Monitor the implementation of the EMMP throughout the project by means of site inspections and meetings. This will be documented as part of the minutes of the site meeting documents ▪ Ensuring project execution within defined budget and timelines ▪ Conducting regular check of the project status and meetings with project team ▪ Provide support and guidance to project team as and when needed ▪ Project proponent is expected to continually monitor and improve the overall performance of their operation
2	HSE Manager	In addition to the health and safety responsibilities held by staff, managers and supervisors must do whatever is reasonably practical to ensure that both the workplace and the work itself are safe. This includes: ▪ Ensuring that staff are appropriately trained and supervised ▪ Identifying, assessing and managing health and safety risks ▪ Consulting with workers (including staff, affiliates and contractors ▪ Health and safety risk assessments ▪ Decisions are made about the measures to be taken to eliminate or control these risks ▪ Health and safety risk assessments ▪ Implementing health and safety risk management programs relevant to their operations, teaching, research and consulting functions and work environment ▪ Reporting investigating and responding to all hazards, accidents, incidents and taking action to control the risk ▪ Assisting with the development, implementation and maintenance of a return to work program for injured staff. ▪ Be fully conversant with the EIA and conditions of its approval ▪ Be fully conversant with the EMMP ▪ Be fully conversant with all relevant environmental legislation, policies and procedures, and ensure compliance ▪ Convey the contents of this document to the contractor site staff and discuss the contents in detail with the Project Manager and Contractor

		▪ Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMMP ▪ Take appropriate action if the specifications contained in the EMMP are not followed ▪ Monitor and verify that environmental impacts are kept to a minimum, as far as possible ▪ Review and approve construction methods, with input from the Site Manager, where necessary ▪ Ensure that activities on site comply with all relevant environmental legislation ▪ Compile progress reports on regular basis, with input from the Site Manager, for submission to the Project Manager, including a final post excavation audit ▪ Liaise with the Site Manager regarding the monitoring of the site ▪ Report any non-compliance or remedial measures that need to be applied ▪ All environmental problems arising on the operational area will be reported to the Site Manager by the Environmental Manager. Reports on such problems will be submitted to the Project Manager by the Site Manager

7.7 Proposed monitoring program to assess performance or output of EMP

For effective monitoring, management and documentation of the environmental performance during the operational phase of the project, environmental matters will be discussed during meetings held on-site. Environmental concerns raised during the meetings will be mitigated after discussions between project proponent and the contractors. Any issues that require attention of project proponent higher management will communicate to them for action. Project proponent & Company Management will ensure that the communication and documentation requirements specified in the EMP are fulfilled during the project.

Environmental monitoring can be categorized into two types; 1) compliance monitoring and 2) effects monitoring. The environmental monitoring program is summarized in **Table 11** which identify the roles and responsibilities of project monitoring, further described in detail in following section

7.8 Compliance monitoring

Compliance monitoring will be carried out to ensure compliance with the

requirements of the EIA. The objectives of the EIA compliance monitoring will be to:

- Systematically observe the activities undertaken by the contractors or any other person associated with the project.
- Verify that the activities are undertaken in compliance with the EIA and other conditions identified by project proponent.
- Document and communicate the observations to the concerned person(s) of project proponent so that any corrective measures, if required, can be taken timely.
- Maintain a record of all incidents of environmental significance and related actions and corrective measures.

Compliance monitoring will be the responsibility of all teams involved in the project activities i.e. project proponent and the contractors. Project proponent staff and contractors will carry out the inspections on a set frequency.

7.9 Effects monitoring

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

Considering the environmental conditions of the project area and the assessment of potential impacts of the project made in the EIA, the following environmental parameters will be monitored at identified locations.

Air Quality Monitoring – Air quality monitoring will be done during the operation phase of the project at the representative locations. Ambient air quality parameters will include NOX, SOX, CO, PM10, and Smoke.

Water Quality Monitoring – Ground and surface water quality monitoring will be done during the operation phase of the project at the representative locations.

Groundwater Quality Parameters: Total Coliforms, Total Colonial Count, E-Coli, pH, TDS, Total Hardness, Nitrate, Chloride, Fluoride, Colour, Manganese, Aluminium, Chromium, Cadmium, Boron, Barium, Antimony, Arsenic, Cyanide, Mercury, Nickel.

Wastewater Quality Parameters: pH, DO, TSS, Alkalinity, BOD5, COD, Turbidity.

Noise Monitoring - The monitoring will be carried out at key locations covering all receptors

Table 12: Environmental monitoring plan

Component	Parameters	Monitoring Frequency	Responsibility
		Operation	Operation
Ambient Air Quality	SOx , NOx, CO, PM_{10}, Smoke	As per EPA, Punjab Guidelines	Proponent
Ground Water Quality	pH, TDS, Chloride, Fluoride, Colour, NO_3^-, Selenium, Residual chlorine, Lead, Total hardness, Turbidity, Zinc, Manganese, Aluminium, Chromium, Cadmium, Boron, Barium, Antimony, Aresenic, Cyanide, Mercury, Nickel, Total Coliform, E.Coli, Total count.	As per EPA, Punjab Guidelines	Proponent
Surface & Waste Water Quality	pH, DO, TSS, Alkalinity, BOD_5, COD, Turbidity.	As per EPA, Punjab Guidelines	Proponent
Noise Level	Using noise level meter (minimum dB and maximum dB)	As per EPA, Punjab Guidelines	Proponent
Occupational Health & Safety	Proper provision of PPEs to workers	Daily	Proponent

7.10 Proposed EMP reporting and reviewing procedures

Regular monitoring will be done and reports will be submitted in EPA as per condition of Environmental Approval of construction phase.

- Monitoring reports will be reviewed by EMP team and HSE department
- Photographic records will also be maintained
- Recorded data will be reviewed by supervisory contractor/proponent so that it can be further improved if required.

7.11 Training needs

Environmental training will help to ensure that the requirements of the EIA and EMP are clearly understood and followed by all project personnel throughout the project period. Environmental training will form part of the environmental management system. The training will be directed towards all personnel for general environmental awareness

7.12 Objectives of the training program

The key objective of training program is to ensure that the requirements of the EMP are clearly understood and followed throughout the project. The trainings to the staff will help in communicating environmental related controls specified in the EIA and EMP.

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The key objective of training program is to ensure that the requirements of the EMP are clearly understood and followed throughout the project. The trainings to the staff will help in communicating environmental related controls specified in the EIA and EMP.

7.14 Training schedule

The training modules will include air, noise and water pollution monitoring, social awareness, Environmental Laws, Environmental Quality Standards usage of personal protection equipment, and health and safety related issues on the construction site.

The contractor will train all construction workers in basic sanitation and health care issues and in general health and safety matters, and on the specific hazards of their work. Training should also consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation. A generic scope of the training which covers the requirements of the EIA and the EMP is discussed below in **Table 13** while site contractor will prepare site specific training plan

considering these training contents.

Table 13: Training needs

Target Audience	Contents	Schedule
Selected management staff of contractor and selected staff	▪ Introduction to project EIA and EMP. Key findings of EIA ▪ Mitigation measures ▪ EMP ▪ Social and cultural values of the area.	Prior to the start of project activities
All site personnel (including locally hired staff)	▪ Environmental sensitivity of the project area ▪ Waste disposal ▪ Community issues/ Social and cultural ▪ values	Prior to the start of project activities
Drivers	▪ Safety provision ▪ Road access restrictions ▪ Dust reduction ▪ Waste disposal ▪ Emergency response preparedness	Before and during field operations
Selected staff	• Safety provision Hazardous waste disposal • Emergency response preparedness	Prior to start of project operations

8 STAKEHOLDER'S CONSULTATION

Public consultation refers to the process by which the concerns of local affected persons and others who have plausible stake in impacts assessment of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. According to the EIA and EIA Review Regulations, 2022 public consultation is mandatory for any socio-environmental study. For this purpose, assessment survey and public consultation sessions held with different stakeholder groups that may be impacted. The consultation process was carried out in accordance with the guidelines laid by EPA, Punjab. The objectives of this process were to:

- To access the impacts on the physical, biological, and socio-economic environment.
- Understand stakeholder concerns regarding various aspects of the project.
- Understand the perceptions, assessment of social impacts and concerns of the communities of the project area.
- Find out the awareness level and situation of acceptability to identify any issues for the implementation of said project.
- To invite people to express their views about the positive/negative impacts on their life styles and environment.

This report includes all the comments, which were taken into account in preparing the definitive development concept for the unit.

8.1.1 Consultation mechanism

Primary stakeholders were consulted during informal and formal meetings. The consultation process was carried out in the Urdu language. During these meetings a simple, non-technical, description of the project was given, with an overview of the project's likely human and environmental impact. This was followed by an open discussion allowing participants to voice their concerns and opinions. In addition to providing communities with information on the project, their feedback was documented during the primary stakeholder consultation. The issues and suggestions raised were recorded in field notes for analysis, and interpretation.

By reaching out to a wider segment of the population and using various communication tools such as participatory needs assessment, community

consultation meetings, focus group discussions, in-depth interviews, and participatory rural appraisal EIA involved the community in active decision-making. This process will continue even after this EIA has been submitted, as well as during future EIA in which similar tools will be used to create consensus among stakeholders on specific environmental and social issues.

Secondary stakeholder consultations were more formal as they involved government representatives and local organizations, consulted during face-to-face meetings. They were briefed on the EIA process, the project design, and the potential negative and positive impact of the project on the area's environment and communities. It was important not to raise community expectations unnecessarily or unrealistically during the stakeholder consultation meetings in order to avoid undue conflict with community's leaders or local administrators. The issues recorded in the consultation process were examined, validated, and addressed in the EIA report. This section involves communication of possible impacts and concerns with

- Proponents Environmental Management Team
- The responsible authority
- Other departments and agencies
- Environmental Practitioners and experts
- Affected and wider community

8.2 Proponent's environmental management team

Consultation regarding Ahmed Corporation (Pvt) Limited was done with stakeholders and anticipated impacts were discussed. Concerns of locals, Environmental Practitioners & experts and Government departments were discussed and asked to consider them while construction of above-said project. Locals will be preferred for employment after providing proper training. Mitigations measures mentioned in EMP will be truly implemented.

8.3 The responsible authority

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

8.4 The other departments and agencies

Different Government departments were consulted regarding subject project. Government officer were consulted by the socio-environmental team of the

consultants and concerned details about the project were noted down through personal interviews, group meetings, etc., in their offices.

8.5 Environmental practitioners and exerts

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

Table 14: Consultation with environmental practitioners and experts

Name	Qualification	Comments/suggestions
Dr. Sabiha Khurram	Ph.D. Environmental Sciences	Following comments are summarized: ▪ Latest technology must be preferred ▪ Regular monitoring should be conducted
Ms. Nusrat Ehsan	Ph.D. (scholar) Environmental Sciences	▪ She said that current project must be installed as : ▪ Quality Equestrian metal products will be available ▪ Import cost will be reduced ▪ Good household practices must be practiced
Mr. Danial Zaib	BS Environmental Sciences	He said that: ▪ Locals should be preferred for employment. ▪ In case of outsider's residence must be provided ▪ Proper mitigation measures must be adopted while construction and operation of this project

8.6 Affected and wider community

Social survey was conducted to consult with local community. Their concerns were noticed and discussed with proponent and their team. Majority was in favor of project their details are given below in table.

9 CONCLUSION AND RECOMMENDATION

M/S Ahmed Corporation (Pvt) Limited respects the environment, supports sustainable development and is committed to environmentally sound business practices. The project will provide affordable and high-quality Equestrian metal products to consumers. This study was carried out to assess the environmental and socioeconomic impacts of the proposed project. The assessment was carried out in keeping with the legislation of Pakistan, as well as national and international guidelines.

Baseline environmental and socioeconomic information was collected from a variety of sources, including reports of previous studies, published literature, and field surveys. The information collected was used to compose profiles of the natural, socioeconomic, and cultural environment likely to be affected by the project.

The activities were reviewed, and an assessment was made of the potential impacts of these activities on the area's natural and socioeconomic environments, using both qualitative and quantitative assessment methods. Where appropriate, mitigation measures were recommended to keep the environmental impacts within acceptable limits.

It was analyzed that most of the aspects related with the project have very minor impacts. It is therefore concluded that if the implementation of all mitigation measures is carried out as described in this report, the anticipated impact of the project on the area's natural and socioeconomic environment will be well within acceptable limits.

Proponent of subject project has expressed strong commitment to protection of the social and natural environment from any potential adverse impact of the project. A preventive maintenance philosophy supported by robust inspection plans and sound operational practices will be adopted to ensure sustainable and sound functioning of the project. Therefore, it is recommended that the competent authority may please be issues Environmental Approval for the operation of this project.

10 APPENDICES

10.1 Glossary

Air Quality	Measurement of the pollutants in the air; a description of healthiness and safety of the atmosphere.
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.
Closure	The action of making new or secret information known.
Env. Management	Attempt to control human impact on and interaction with the environment in order to preserve natural resources
Effluent	Wastewater - treated or untreated - that flows out of a treatment plant, sewer, or industrial outfall. Generally, refers to wastes discharged into surface waters.
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.
Household	People residing under one roof, using the same hearth and operating as a single economic unit.
Impact	Effect on someone or something
Jurisdiction	The extent of the power to make legal decisions and judgments.

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
Occupational Health	Maintenance of the highest degree of physical, mental and social wellbeing 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.
Capacity	The volume of products or services that can be produced by an enterprise using current resources.
Quality Control	A system of maintaining standards in manufactured products by testing a sample of the output against the specification.
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.
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.

10.2 LIST OF ABBREVIATIONS

EIA	Environmental Impact Assessment
EMMP	Environment Mitigation and Monitoring Plan
EMP	Environmental Management Plan
EPAs	Environmental Protection Agencies
PEPC	Pakistan Environmental Protection Council
NEP	National Environmental Policy
IEE	Initial Environmental Examination
NGO's	Non–Government Organizations
NOC	No Objection Certificate
O&M	Operation and Maintenance
PEPA	Pakistan Environmental Protection Act 1997
PEQS	Punjab Environmental Quality Standards
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species
IUCN	International Union for Conservation of Nature
UNDP	United Nations Development Programme
DO	District Officer
PKR	Pak Rupees
hr	Hour
mg/l	Milligram per Litre
mg/m^3	Milligram per Cubic Meter
PPE	Personal Protective Equipment
MEPCO	Multan Electric Power Company
QC	Quality Control
SEO	Site Environment Officer
SH&E	Safety Health & Environment
APHA	American Public Health Association

BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
SPM	Suspended Particulate Matter
WWTP	Wastewater Treatment Plant
SMART	Self-Monitoring and Reporting Tool
NOX	Oxides of Nitrogen
SOX	Oxides of Sulphur
NCS	National Conservation Strategy
PM	Particulate Matter

10.3 LIST OF INDIVIDUALS AND ORGANIZATIONS CONSULTED ALONG WITH THEIR WRITTEN FEEDBACK

Sr No.	Interviewer's Name	Contact
1.	MUHAMMAD IRFAN	34101-8754734-1
2.	AHMAD	34101-7035024-1
3.	BABAR BUTT	34601-3184932-1
4.	AZAM JAVED	34101-3118065-9
5.	MUHAMMAD IDREES	34101-2626672-1
6.	AHSAN IQBAL	34101-7304213-5
7.	MUHAMMAD DILAWAR	31201-7314614-9
8.	UMAR FAROOQ	14201-9275846-5
9.	HAMMAD WAHEED	36302-4205109-3
10.	JAMSHAID YOUSAF	34101-7683748-9
11.	MUHAMMAD JUNAID	34101-3402766-3
12.	MUZAMMAL AMIN	34101-2240239-9
13.	MUZAMMIL AKBAR	34101-8171975-5
14.	ISHTIAQ RASHEED	34101-6266509-9
15.	MUHAMMAD NOUMAN KHAN	34101-9621287-7
16.	MUHAMMAD SUFYAN	34101-0775011-5
17.	IFTIKHAR ALI	35404-7212533-9
18.	MUHAMMAD KHALID MAHMOOD	34101-1992191-3

The survey in the study area following concerns of the local community were noted:

- Wastewater should be properly treated prior to final disposal in nearby drain.
- Solid waste should be managed effectively by adopting the standard practices of the area.
- Cleanliness of the area should be ensured.
- An effective EMMP should be designed and enforced with true spirit.
- Health of the workers should be ensured.
- Plantation should be carried out at extensive scale.
- Construction activity should be carried out during day hours.
- Noisy activities should be confined.
- Workers should be hired from local community.

19.	CH. MUHAMMAD YOUSAF	35401-6595576-7	▪ PPE's must be provided to workers ▪ Indigenous trees around the facility should be planted to control air pollution. ▪ Safeeda can be planted in the project area as the area in known to be affected by the logging and salinity. ▪ Removal of shrubs and bushes should be avoided to the extent possible.
20.	ZAKA ULLAH	34104-2235142-7	
21.	ZEESHAN MUJAHID	34101-4175822-3	
22.	ALI RAZA	34101-1054833-1	
23.	SUFIAN AHMAD	34101-7432307-9	
24.	MUBASHAR KHALID	34101-2733211-5	
25.	FALAK SHER	34101-5490755-3	

10.4 SOURCES OF DATA AND FULL LIST OF ALL REFERENCE MATERIAL USED

Data was collected by:

- Field visits
- Published articles
- Stakeholder's consultation
- Client meetings'

10.5 TERMS OF REFERENCES

The consultants is required to carry out an environmental impact assessment study of the project under Section-12 of Pakistan Environmental Protection Act 1997/ Punjab Environmental Protection (Amendment) Act 2012.

The Study should be comprehensive and should cover all aspects which are envisaged under the relevant national and provincial laws & regulations including but not limited to:

- Identification and recommendation for suitable solution/treatment/mitigation measures for emissions and effluents such as wastewater 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.

10.6 LIST OF NAME, QUALIFICATION AND ROLES OF TEAM MEMBERS CARRYING OUT IN IEE/EIA STUDY

Sr.No.	Name	Designation	Role and Responsibility
1.	Dr. Mateen Shafqat		Technical Peer Review
2.	Mr. Kamal Ahmed Cheema	Lead Environmentalist	Technical Peer review
3.	Ms. Maham Ayesha	Manager Operations	Legal framework review and Stakeholder consultation IEE/EIA Expert, Environmental & Social Baseline, Report Writing.
4.	Ms. Amna Hafeez	Manager Environmental Compliance	Legal framework review and Stakeholder consultation, IEE/EIA Expert, Environmental & Social Baseline, Report Writing. Project GIS Mapping
5.	Arslan Iqbal	Environmentalist	Project Coordination and management, Impact Assessment and Mitigation Measures, Environmental Management Plan, Technical Report Writing.
6.	Mr. Jawad Shafiqe	Zoologist	Legal framework review and Stakeholder consultation, IEE/EIA Expert, Environmental & Social Baseline, Report Writing.
7.	Huda Ashfaq	Environmental	IEE/EIA Expert, Environmental & Social Baseline, Report Writing
8.	Ms. Rahma Butt	Environmentalist	Stakeholder consultation, IEE/EIA Expert, Environmental & Social Baseline, Report Writing.