

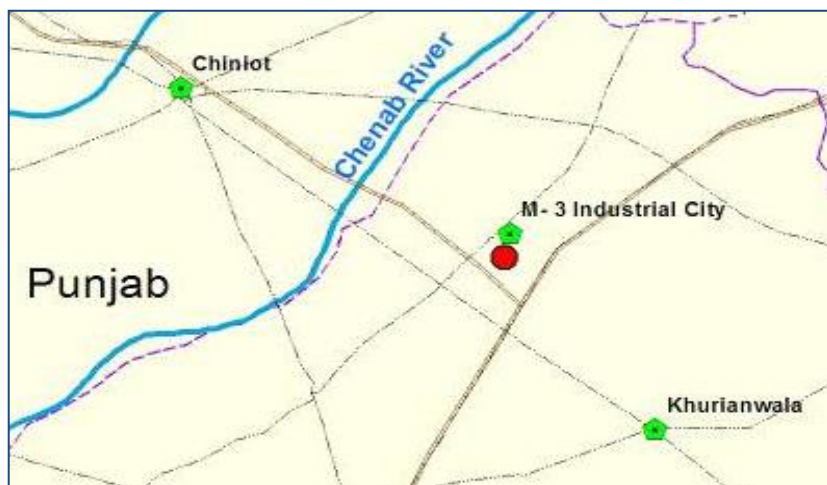


## TREET CORPORATION LIMITED

### ENVIRONMENTAL IMPACT ASSESSMENT (ELA)

For Installation of Lead-Acid  
Battery Unit at FIEDMC, M3  
Industrial City, Faisalabad.

## Final Report



**Date:**

January 2016

**Division:**

Environmental,  
Health and Safety (EHS)  
Services

**SGS**

SGS PAKISTAN (PVT) LIMITED



## EXECUTIVE SUMMARY

The project proponent “First Treet Manufacturing Modaraba (FTMM)- Battery Division” aimed to install Lead-Acid battery unit at FIEDMC, M3 industrial City, Faisalabad, Punjab Province. Considering potential and massive opportunities for Pakistan, to tap into and network with international and national distributors, to cater the demand for batteries. The facility will be capable to produce batteries of different types and capacities.

This EIA has been prepared to conform with the requirements of the Punjab Environmental Protection (Amendment) Act 2012, the Pakistan Initial Environmental Examination and Environmental Impact Assessment Review Regulations 2000 and the guidelines provided in the Pakistan Environmental Assessment Procedures, 1997. FTMM has involved SGS Pakistan (Private) Limited to undertake the required assessment. This report presents the EIA process and its findings, project alternatives, project impacts, and mitigation measures to be implemented during the execution of the proposed activities.

## ASSESSMENT METHODOLOGY

This study has been conducted using standard environmental assessment methodology, in accordance with national and international environmental guidelines. The study evaluates the proposed project according to the environmental assessment requirements of the Pakistan Initial Environmental Examination and Environmental Impact Assessment Review Regulations 2000. In addition, the environmental international guidelines such as the World Bank environmental guidelines and International Finance Corporation (IFC) guidelines have been consulted.

## PROJECT LOCATION

The proposed project is located in FIEDMC M3 Industrial City district Faisalabad, Punjab, Pakistan. The M3 Industrial Area lies adjacent to M3 Motorway and Chiniot Road in Chak Jhumra district Faisalabad.

## PROPOSED PROJECT ACTIVITIES

The proposed project will entail the following activities:

- Construction and Commissioning Activities
- Operation Activities

## PURPOSE AND SCOPE OF THE STUDY



The purpose of this EIA is to evaluate the activities associated with the proposed project according to the Pakistan Initial Environmental Examination and Environmental Impact Assessment Review Regulations 2000 and international environmental guidelines. **Chapter 2** outlines the applicable statutory environmental requirements and guidelines.

The specific objectives of this EIA are to:

- Assess the existing conditions in the project area and develop a baseline of its current environmental and socioeconomic conditions;
- Assess the proposed activities of the project to identify their potential impact, evaluate these effects, and determine their significance;
- Propose appropriate mitigation and monitoring measures that can be incorporated into the project's design to remove or reduce negative impact as far as possible, and to control and monitor any residual impact (i.e. the effects that remain after mitigation measures are implemented);
- Prepare an EIA report for submittal to Punjab Environmental Protection Agency.

## **PROJECT ALTERNATIVES**

A number of alternatives to the main technology/philosophy proposed for the project were considered. It includes a discussion of the alternatives, their criteria for selection, comparison and selection of the preferred option that is most practicable within the defined economic, social, environmental and safety constraints. Project Alternatives were evaluated taking into consideration the principles of sustainable development and other defined criteria. In particular it outlines the following project options:

1. The "No Development Option";
2. Preferred and alternative Site Options

All the alternatives were analyzed and most feasible option was adopted.

## **ENVIRONMENTAL AND SOCIO-ECONOMICAL BASELINE STUDIES**

The project area is defined as 'the areas where the project related activities to be carried, include the proposed project site and surroundings and the areas that can interact with various aspects of the project. The environmental impact of any activity or process is assessed on the basis of a deviation from the baseline or normal situation. Following are the main components of the baseline:

- Physical Environment
- Biological Environment
- Socioeconomic Environment



The baseline data on above components were collected through desk-top surveys, literature review; field surveys; existing information sources and data purchase. Meetings and data gathering from various organizations including, but not limited to:

- District Faisalabad Agriculture Department
- District Faisalabad Health Department
- District Faisalabad Irrigation Department
- District Faisalabad Livestock Department
- FIDMEC

## **DESCRIPTION OF THE ENVIRONMENT**

### **Topography and Soil**

District Faisalabad is situated in the center of the lower Rachana Doab, the area between Chenab and Ravi rivers, which has a mild slope from North-East to South-West with an average of about 0.2 to 0.3 meter drop per kilometer. The city is situated at an elevation of about 183.35 meters above the Sea level. The topography is however marked by valleys, local depression and relatively high ground. The city is located on the “Bar Upland” which is relatively older alluvium deposit.

### **Water Resources**

Surface waters resources are usually exposed to the surface of earth in the form of mobile and immobile situation which includes snow-clad mountains, rivers, non-river streams, rain, sleet, wetlands and oceans.

Among surface waters in district & near the project extremities there is a distributory canal of Jhang Branch which is used for the irrigation purpose and etc.

The project area lies in the district Faisalabad; the groundwater table normally exists 25 to 30 meter below the ground level and contains high level of salinity.

### **Climate**

The proposed project situated in District Faisalabad. The proposed project lies in arid climate region which has hot summers and moderately cold in winter. It is located in the region that encounters four seasons, the hot summer starts from May and continues till July, monsoon starts from July and continues to September while winter season end in February starting from November and spring season lasts for two months from March and April.

### **Floral Attributes of the Project Area**





Biological diversity of project area, specifically flora of the microenvironment is significantly governed by the type of soil i.e. clay loam soil with amount of moisture available due to metrological conditions; because both soil and weather conditions are regarded as direct function of foliage growth and propagation.

The vegetation of project area is very rich and consists of rice, wheat and sugar cane. Trees commonly found in the district are *Albizzia lebbek* (Sharin), *Alhaji maurorum* (Kandero), *Dalbergia sissoo Roxb* (Talhi), *Acacia nilotica* (Kikar), *Azadirachta indica* (L.) *Adelb* (Neem).

#### **Faunal Attributes of the Project Area**

Project area has variety of ecosystem including plain and agriculture fields. The ecologist and wildlife experts have covered a 5km radius area of project site to observed and monitor faunal existence in the project area Project site falls in non protected area. During field visit 10 mammalian species were observed.

Based upon observations during the field visit many species of birds were directly observed in the project area. Most common species includes House sparrow, House crow, Red vented Bulbul, Bank Myna and Chiffchaff.

None of the reptiles and mammalian species found here is listed under any category of the IUCN Red List. Ten species of reptiles were also recorded including snakes, lizards and agamas. Only one species i.e. Indian cobra is listed as Data Deficient in the IUCN Red List. .

#### **SOCIOECONOMIC ENVIRONMENT**

A detailed socioeconomic survey was carried out in and around the project area. The purpose of the survey was to enumerate, evaluate and assess the existing social, cultural and economic conditions and to determine the communities' requirements.

A team comprising environmental assessment specialist, cultural anthropologist and gender specialist carried out the study of socio economic and cultural environment of the project area. The approach and methodology during data collection was a combination of qualitative and quantitative data gathering techniques. The data collection addresses the primary requirements of an Environmental Impact Assessment (EIA), incorporating the Pakistan Environmental Assessment Procedures 1997. A participatory rural assessment was combined with the extensive qualitative data collection of socio-economic and cultural data through short structured questionnaires and focus group interviews with communities including men, women and key male informants in the nearby villages in the project area. The relevant and accurate information was obtained through professionally competent surveyors. The required information collected efficiently in terms of time and villages covered by rapid cycles of interaction with team members, communities and village elders. The specific tools used for collection of data include i.e. direct observation, short questionnaire, focus groups and semi-structured interviews.



Focused group discussions revealed a high satisfaction for the proposed project of FTMM. The communities member also hoped that the new project activities will provide jobs for local community.

## **POTENTIAL PROJECT IMPACT AND MITIGATION**

The potential impacts associated with the proposed project construction and operation activities included: soil erosion due to earthwork, vehicle movement; minimal soil contamination; increase in water consumption, air pollution from vehicle, generator exhausts and fuel combustion, waste generation, noise and disturbance; loss of vegetation and habitat; increased pressure on the wildlife of the area.

The physical scarring caused by clearing and levelling during plant site construction activities could lead to alteration of soil quality by removal of topsoil, loss of plant cover and limited soil erosion induced by disturbance to native soil.

Water will be required during proposed project activities. Water will be procured from ground water resources. The water in the area is abundant due to the project area's proximity to different canals.

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

The ambient air quality of the area can be affected by exhaust emissions from the generators and vehicles. 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 (which may contain trace metals). The emission levels depend on the type and size of facility, the type and quality of fuel and the manner in which it is burned.

FTMM will implement a thorough waste management plan to ensure that any impact resulting from waste generation and management 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..

Records of all waste generated during the project activity period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a waste tracking register. Audits of the waste disposal contractors and waste disposal facilities will be undertaken on a regular basis to ensure the implementation of waste handing and disposal procedures.

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 generators, vehicles and other



potentially noisy equipment used are in good condition. All on-site personnel will use required personal protective equipment (PPE) in high noise areas that will be clearly marked

To mitigate the project's impacts on the already stressed biological resources of the area, following measures will be incorporated into its design;

- Clearing of vegetation will be kept to an absolute minimum.
- A 'no-hunting, no-trapping, no-harassing' policy will be strictly enforced.
- All the wastes will be properly handled, stored and disposed through implementation of an effective waste management plan.

A summary of potential impacts and proposed mitigation measures is provided in **Table ES-1.**

**TABLE ES-1: SUMMARY OF IMPACTS AND MITIGATION MEASURES**

| <i>Environmental Aspects</i> | <i>Potential Impact</i>   | <i>Recommended Mitigation Measures</i>  |
|------------------------------|---|---|
| <b>Geology and Soils</b>     | Soil erosion, loss of top soil, fuel and oil spills/contamination   | <ul style="list-style-type: none"><li>❑ Avoid unnecessary vegetation clearing.</li><li>❑ Locate campsite in existing clearings and levelled areas.</li><li>❑ Avoid off-road travel.</li><li>❑ Maintain vehicle speeds.</li><li>❑ Avoid cluster vegetation clearing.</li><li>❑ Avoid and control major spills.</li></ul>   |
| <b>Water Resources</b>       | Depletion of ground water table due to over exploitation, contamination of water resources by the spillage of fuel, oil and chemicals | <ul style="list-style-type: none"><li>❑ The water in the area is abundant due to the project area's proximity to the Jhang Branch. Groundwater is available in the majority of the area.</li><li>❑ Fuels and lubricants will be stored in areas with impervious layers that can contain spills.</li><li>❑ All types of solid and liquid wastes will be handled as per waste management plan.</li><li>❑ A complete record of water will be maintained.</li></ul> |
| <b>Air Quality</b>           | Vehicular emission, dust, combustion emission, GHG  | <ul style="list-style-type: none"><li>❑ Properly tune and maintain equipment to minimize air emissions.</li><li>❑ Monitoring of Ambient air parameters (PM<sub>10</sub>, SO<sub>2</sub>,</li></ul>  |



|                  |   |   |
|------------------|---|---|
|                  | Emissions, Ozone depletion  | <p>and Nox) emissions should be carried out to ensure compliance with the NEQS and World Bank emission guidelines</p> <ul style="list-style-type: none"><li>❑ No use of equipment and material containing asbestos, poly-chlorinated biphenyls (PCBs), and ozone depleting substances (ODSs).</li></ul>   |
| Noise            | Impacts at nearest community, Disturbance to the wildlife.  | <ul style="list-style-type: none"><li>❑ All on-site personnels will use required personal protective equipment (PPE) in high noise areas that will be clearly marked.</li><li>❑ Restrict movement of project vehicles and personnel within work areas.</li><li>❑ Apply proper engineering control to noise producing sources like generator (Canopy and muffler will be installed to reduce the noise impact on the surrounding).</li><li>❑ Ensure that generators, vehicles and other potentially noisy equipment used are in good condition.</li></ul>  |
| Waste Discharges | <p><u>Liquid Waste:</u> risk of liquid waste contaminating aquifer, contaminating surface water</p> <p><u>Solid Waste (Non-hazardous):</u> Aesthetic issues</p> <p><u>Hazardous waste:</u> soil, surface and aquifer contamination, contamination of surface and ground water, soil contamination, aesthetic issues</p> | <ul style="list-style-type: none"><li>❑ A waste management plan will be developed before the start of the project activities.</li><li>❑ No untreated wastewater will be discharge into open environment</li><li>❑ All hazardous waste will be separated from other wastes.</li><li>❑ Records of all waste generated during the project activity period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register.</li><li>❑ An emergency response plan will be developed for the hazardous waste (and substances).</li><li>❑ On-site audits of the waste management will be undertaken on a regular basis during the project activity.</li><li>❑ Audits of the waste disposal contractors and waste disposal facilities will be undertaken on a regular</li></ul> |



|                                     |  |  |
|-------------------------------------|--|--|
|                                     |  | basis to ensure the implementation of waste handing and disposal procedures.   |
| <b>Wildlife and Habitat</b>         | habitat loss and temporary disturbance to fauna, hunting, accidental killing of wildlife   | <ul style="list-style-type: none"><li>❑ Minimize clearing of vegetation.</li><li>❑ Follow all mitigation measures recommended in the EIA to avoid or minimize noise levels, dust emissions, air emissions, and improper disposal of wastes.</li><li>❑ Do not dispose off food wastes in the open.</li><li>❑ Minimize total duration of activities by good management.</li><li>❑ Prohibit hunting, trapping, feeding or harassment of wildlife.</li><li>❑ Physical disturbance to areas outside the work corridors will be avoided;</li></ul> |
| <b>Natural Vegetation</b>           | Clearing of vegetation proposed project  | <ul style="list-style-type: none"><li>❑ Avoid un-necessary damage to vegetation during construction activities.</li><li>❑ Where possible, set-up campsites in existing clearings.</li><li>❑ Minimize off road travel.</li><li>❑ Prohibit use of local firewood for cooking.</li></ul>  |
| <b>Socio – Economic Environment</b> | Local procurement of goods and services, improper disposal of wastes, dust and exhaust emissions, noise from project activities, Local employment. | <ul style="list-style-type: none"><li>❑ Limit the social interaction between the workforce and the local communities.</li><li>❑ Dispose off all waste following the requirements of the EIA.</li><li>❑ Residents of the area will be informed at least two weeks before project activities commence.</li><li>❑ Maximum number of unskilled and semi-skilled jobs will be reserved for the local communities.</li></ul>   |

## ENVIRONMENTAL MANAGEMENT PLAN (EMP)

For effective implementation and management of mitigation measures, an Environmental Management Plan has been prepared. The EMP provides a delivery mechanism to address potential impacts of project activities, to enhance project benefits and to introduce



standards of good practice in all project activities. The EMP has been prepared with the objective of:

- Defining legislative requirements, guidelines and best industry practices that apply to the project;
- Defining mitigation/ monitoring plan required for avoiding or minimizing potential impacts assessed by the EIA;
- Defining roles and responsibilities of the project proponent and the contractor;
- Defining requirements for environmental monitoring and reporting;
- Defining the mechanism with which training will be provided to the project personnel.

Environmental sensitivities and impacts, as well as the associated mitigation plan have been addressed in the EMP. FTMM will ensure that the project staff will be adequately trained in HSE sensitivities and operational management procedures, so that all levels of staff effectively contribute to impact prevention and mitigation at all times.

An Environmental Management Plan (EMP), providing:

- A systematic approach to ensure that mitigation strategies prepared in this EIA are implemented during project activities.
- An appropriate monitoring plan is devised to ensure strict adherence to the environmental mitigation and control measures.
- A training program is devised to provide awareness training on all potential environmental issues of the project to all personnel at site.
- A waste management plan, identifying the most suitable waste disposal and pollution control options throughout the project lifecycle.





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## ANNEXURE

- Annexure A: Project Team for EIA  
Annexure B: Environmental Monitoring Results of Project Site  
Annexure C: Meteorological Data



## ACRONYMS

|                   |  |
|-------------------|--|
| APHA              | American Public Health Association       |
| BAT               | Best Available Technology                |
| BPT               | Best Practicable Technology              |
| BOD               | Biological Oxygen Demand                 |
| BPEO              | Best Practicable Environmental Option    |
| CBD               | Convention on Biological Diversity       |
| CFC's             | Chlorofluorocarbons                      |
| COD               | Chemical Oxygen Demand                   |
| dB                | Decibel – Noise level unit               |
| EIA               | Environmental Impact Assessment          |
| EMP               | Environmental Management Plan            |
| EPA               | Environmental Protection Agency          |
| FTMM              | First Treet Manufacturing Modaraba       |
| GHG               | Green House Gases                        |
| HCFC              | Hydrochlorofluorocarbons                 |
| hr                | Hour                                     |
| HSE               | Health, Safety and Environment           |
| IEE               | Initial Environmental Examination        |
| IFC               | International Finance Corporation        |
| kg                | Kilogram                                 |
| Km <sup>2</sup>   | Square Kilometer                         |
| m                 | Meter                                    |
| million cu m      | Million Cubic Meter                      |
| mg/kg             | Milligram per Kilogram                   |
| mg/l              | Milligram per Litre                      |
| mg/m <sup>3</sup> | Milligram per Cubic Meter                |
| µg/m <sup>3</sup> | Microgram per cubic meter                |
| MW                | Megawatt                                 |
| NEQS              | National Environmental Quality Standards |
| NOX               | Nitrogen Oxides                          |
| PM                | Particulate Matter                       |
| PPE               | Personal Protective Equipment            |
| ppm               | Parts per Million                        |
| SEMS              | Social & Environmental Management System |



|       |                              |
|-------|------------------------------|
| SOx   | Oxides of Sulphur            |
| sq km | Square Kilometer             |
| TDS   | Total Dissolved Solids       |
| TSP   | Total Suspended Particulates |
| WHO   | World Health Organization    |



## 1 INTRODUCTION

This chapter presents the data relevant to the process of the Environmental Impact Assessment Examination (EIA) carried out by SGS Pakistan (Pvt) Limited for the installation of Lead-Acid Battery Unit at FIEDMC M3 industrial Area, Faisalabad and details of the project title and project proponent, EIA consultants, the project rationale and the approach taken to the EIA study.

### 1.1. PROJECT TITLE, NATURE, SIZE AND PROPONENTS

#### 1.1.1 PROJECT TITLE

The proposed project to which this Environmental Impact Assessment relates is entitled as “EIA for Installation of Lead-Acid Battery Unit at FIEDMC M3 Industrial City, Faisalabad” in Faisalabad District, Punjab Province. A key map showing the location of the project area is shown in **Figure 1-1**.

#### 1.1.2 PROJECT PROPONENT

The proponent for the proposed project is “First Treet Manufacturing Modaraba (FTMM)- Battery Division”. The project proponent refers to the organization which will propound and be liable for the project instigation and safe operation.

FTMM is part of Treet Group. The history of Treet Group dates back to pre-independence days, almost a century ago, when the highly dynamic personality of Sir Syed Maratib Ali envisioned the importance of trade and industry in the sub-continent. He expanded his agricultural business into trading and industrial partnerships. This expansion saw no bounds and soon after the 'Divide' in 1947, new business opportunities were successfully explored in the fields of Textile, Automobiles, Trucks and Tractors, Soap, Ghee and Razor manufacturing. Treet was among the first ten companies in Pakistan to obtain ISO 9001–2000 certification in 1997 for its outstanding attainment. Treet Corporation was setup in 1952 and is almost as old as the country itself. It was incorporated as a public limited company in Pakistan in 1977 under companies act, 1913 (now Companies Ordinance, 1984). Treet Corporation is a sole manufacturer and marketer of conventional shaving blades, razors and soaps. The company was quoted as one of the best 25 industries on Karachi Stock Exchange in the year 2004. Companies within Group are Semi-Autonomous units responsible for their own budgeting, new products launch, market decisions and new venture exploration and pricing. Operating as strategic business units, they are treated as internal profit centers by the corporate headquarter i.e. Treet Corporation limited, the holding company. These business units develop their business strategies though independently from other businesses but are trained to remain in-tune with broader



corporate business policies. Corporate strategy (by the Parent Company) seeks to develop synergies across business units by sharing and coordinating staff, making investments in these units and using them to complement other corporate business activities.

The business of the Treet Group is as follows:

- Manufacturing and selling of shaving blades/disposable razors;
- Manufacturing and selling of corrugated packaging;
- Manufacturing and selling of soaps;
- Assembling and selling of motorcycles (including Rickshaws);
- Labor-Hire Services;
- Floatation and control of Modarabas;
- Educational Projects – under process;
- Manufacturing and selling of lead acid batteries – under process;

## **1.2. EIA CONSULTANTS**

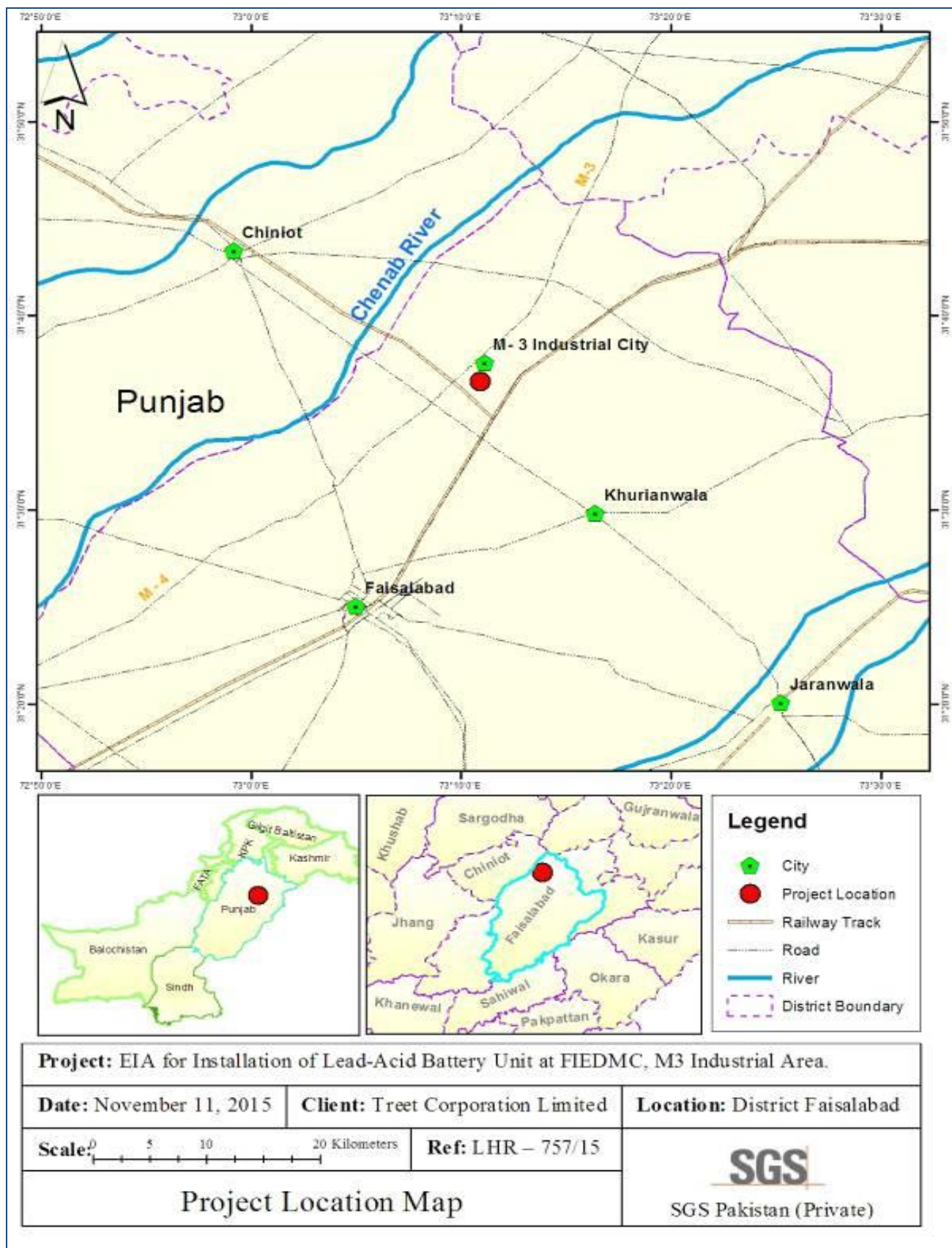
The EIA study was carried out by the team of SGS Pakistan (Pvt) Limited comprising of environmentalist, sociologist, environmental chemist, geologist, and ecologist and sector experts with diversified experience on local and international assignments. The detail of the project team deputed on this assignment is given in **Annex-A**.

## **1.3. EIA REQUIREMENT**

The EIA has been prepared to conform with the requirements of the Pakistan Environmental Protection Act 1997 (PEPA), the Pakistan Initial Environmental Examination and Environmental Impact Assessment Review Regulations 2000 and the guidelines provided in the Pakistan Environmental Assessment Procedures, 1997.



Figure 1-1: Project Location





## 1.4. EIA PROCESS

### 1.4.1 OVERVIEW OF EIA

Environmental Impact Assessment is a systematic process encompasses the collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations. The process is applied prior to major decisions and commitments being made. Wherever appropriate, social, cultural and health effects are considered as an integral part of EIA. Particular attention is given to practical implementation of EIA to prevent and mitigate significant adverse effects of the proposed undertakings.

### 1.4.2 OBJECTIVE OF EIA

The overall objective of the EIA is as follows:

- Identifying possible environmental impacts;
- Screening of impacts to identify more significant impacts;
- Evaluating those impacts;
- Discussing appropriate mitigating methods;
- Finding out alternatives;
- avoid serious and irreversible damage to the environment;
- protect human health and safety

### 1.4.3 SCOPE OF EIA

This EIA covers the construction and operation of Lead-Acid Battery Unit, at FIEDMC M3 Industrial City, Faisalabad district, Punjab. The scope of the EIA includes:

- Construction of the proposed project infrastructure
- Relevant off site activities
- Operation of the installed facility

### 1.4.4 SPATIAL SCOPE

Impacts will be assessed within the area of influence of the project defined as:

- *Immediate Area of Influence: at immediate foot print of the proposed project locations.*
- *Direct Area of Influence: within the proposed project site boundary and 5 km radius of surrounding area.*



#### **1.4.5 TEMPORAL SCOPE**

The assessment of impacts in terms of duration is as follows:

- Effects on environmental and socioeconomic receptors and resources are assessed for the entire construction activity.
- Effects on environmental and socioeconomic receptors and resources are assessed for the operation activity.

### **1.5. EIA METHODOLOGY**

The EIA project passes through series of stages prior to report preparation. The EIA process and the approach followed for the proposed project is defined below:

#### **1.5.1 SCOPING**

Scoping is an early stage of the process and is designed to ensure that the environmental studies provide all the relevant information on:

- The impacts of the project, in particular focusing on the most important impacts;
- The alternatives of the project;
- Other environmental sensitivities to be addressed at early stage.

The EIA process started with the scoping. The purpose of scoping was to identify:

- The important issues to be considered in an EIA;
- The appropriate time and space boundaries of the EIA study;
- The information necessary for decision-making;
- The significant effects and factors to be studied in detail.

The scoping was followed by data collection describes in subsequent sections.

#### **1.5.2 DATA COLLECTION**

Following literature reviews and data collection was carried out for EIA:

- A generic description of the proposed project and its related activities were collected from FTMM.
- Legislative review of the applicable laws, regulations, guidelines and standards from various organizations and literature search.
- Baseline of the area's environmental and socio-economic settings was collected through literature search and field surveys.
- Primary and secondary stakeholder consultation.



### 1.5.3 BASELINE

The environmental impact is measured through a change in the environment, resulting from a designated action or activity. In order to identify such a change, it is essential to have as complete as practicable understanding of the nature of the existing environment, prior to its interaction with the proposed activity. This translates into the need to characterize the existing baseline environmental condition, including establishing prevailing conditions for a range of environmental media, notably air, water, soil and groundwater, flora and fauna and the human environment.

This was achieved through a detailed review of all secondary resources (i.e. existing documentation and literature); and the undertaking of project specific baseline studies and surveys to collect supplementary data in the following areas:

- Terrestrial ecology;
- Geology;
- Flora and fauna;
- Water quality characteristics;
- Soil quality;
- Traffic;
- Ambient air quality;
- Noise conditions;
- Socio-economic conditions;
- Archaeology.

Both the existing secondary sources and literature studies were conducted and integrated into one coherent description of baseline characteristics.

### 1.5.4 EVALUATION OF ALTERNATIVES

To establish an environmentally sound preferred option for achieving the objectives of the proposed project, project site and technology alternatives were studied in collaboration with the project proponent. Technology selection was made taking by considering environment, economics and social suitability as well as technically feasible options.

### 1.5.5 IMPACT ASSESSMENT AND MITIGATION

The information collected in the previous phases was used to assess the potential environmental impacts of the proposed project activities. The impact assessment approach is provided in **Table 1-1**. Detailed methodology is included in **Chapter 7** of the report.



Mitigation measures were evaluated to reduce the impacts of project activities on environment. The issues studied during impact assessment include potential impacts on:

- Physical environment of the area
- Biological environment of the area
- Socio-economic environment of the area

**Table 1-1. Impact Assessment Approach**

| <i>Impact Characteristics</i>              | <i>Categories</i>  |
|--|--|
| <i>Nature of the Impact</i>                | <b>Direct:</b> The environmental parameter is directly changed by the project.<br><b>Indirect:</b> The environmental parameter changes as a result of change in another parameter.   |
| <i>Duration of the impact</i>              | <b>Short term:</b> Lasting only till the duration of the project such as noise from the construction activities.<br><b>Medium term:</b> Lasting for a period of few months to a year after the project before naturally reverting to the original condition.<br><b>Long term:</b> Lasting for a period much greater than medium term impacts before naturally reverting to the original condition. |
| <i>Geographical Location of the impact</i> | <b>Local:</b> Within the area of project i.e. operation site and access road.<br><b>Regional:</b> Within the boundaries of the project area.<br><b>National:</b> Within the boundaries of the country.<br><b>Global:</b> Trans-boundary impacts  |
| <i>Duration</i>                            | Construction and Operation   |
| <i>Likelihood of the impact</i>            | <b>High:</b> High likelihood of occurrence during lifetime of operation, Regular/continuous part of operations.<br><b>Moderate:</b> Moderate possibility of occurrence during lifetime of operation, Periodic/occasional part of operations.<br><b>Low:</b> Unlikely to occur during lifetime of operation.  |
| <i>Reversibility of the impact</i>         | <b>Reversible:</b> When a receptor resumes its pre-project condition.<br><b>Irreversible:</b> When a receptor does not or cannot resume its pre-project condition.   |
| <i>Significance of the impact</i>          | Major, Moderate, Minor, Negligible and Beneficial<br>Based on the consequence, likelihood, reversibility, geographical extent, duration, level of public concern and conformance with legislative or statutory requirements.   |





|   |   |
|---|---|
| <i>Consequence<br/>severity of impact</i> | <b>High:</b><br>Serious/catastrophic damage to environment<br>Direct legislative requirement<br>Corporate requirement<br>Serious threat to corporate reputation/profitability/ability to do business. |
|   | <b>Medium:</b><br>Measurable damage to the environment<br>Subject to potential future legislation<br>Potential to affect reputation/cost<br>Implication/reduced efficiency                            |
|   | <b>Low:</b><br>Negligible damage to the environment<br>No risk to business  |

## 1.6. ORGANIZATION OF THE REPORT

This report has been structured in the following manner:

**Chapter 2 (Legal Framework)** gives an overview of policy and legislation along with international guidelines relevant to EIA.

**Chapter 3 (Project Description)** provides the description of the proposed project, its layout plan and associated activities, raw material details and utility requirement.

**Chapter 4 (Project Alternatives)** this chapter provides site and technology options assessed for the project.

**Chapter 5 (Description of Baseline Environment)** provides a description of the micro-environment and macro-environment of the proposed project site. This chapter describes the physical, ecological and socioeconomic resources of the project area and surroundings.

**Chapter 6 (Stakeholder Consultation)** describes the consultation process of primary and secondary stakeholders consulted for this project to note their concerns.

**Chapter 7 (Impact Prediction and Evaluation)** describes the potential environmental and social impacts of proposed project on the different features of the micro and macro-environment using the matrix method and it explains the mitigation measures proposed for the project in order to minimize the impacts to acceptable limits.

**Chapter 8 (Environmental Management Plan)** it describes implementation of mitigation measures for the proposed project activities and monitoring of environmental parameters against likely environmental impacts.





Chapter 9 (Conclusion) summarizes the report and presents its conclusions.

The last Chapter is followed by the **references** and series of **Annexes** that provide supporting information.

## **1.7. CONTACT DETAILS – PROJECT PROPONENT**

### **NAME OF PROPONENT:**

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### **NAME OF MANAGER TO FOLLOW UP AND COMPLIANCE OF ENVIRONMENTAL CONCERNS:**

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HSE- Manager

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## 2 LEGAL FRAMEWORK

This chapter provides an overview of the environmental Policies, legislation, and guidelines that may have relevance to the proposed project. These include national environmental Policy, legislation and guidelines; and international conventions and guidelines. FTMM will be required to adhere to the relevant requirements of the Policies and legislation during the construction and operation of the proposed activities; which has also been incorporated in the mitigation measures and the EMP provided in the EIA.

### 2.1. CONSTITUTIONAL PROVISION

According to the Constitution of Pakistan, the legislative powers lie with the federal parliament and the legislative assemblies of the four provinces of Pakistan. The Fourth Schedule of the constitution provides two lists of issues. One list, the Federal Legislative List, includes issues on which only the federal government has legislative powers. The second list, the Concurrent Legislative List includes issues on which both the federal and the provincial governments have legislative powers. If a particular legislation passed by a provincial assembly comes into conflict with a law enacted by the national assembly, then according to the constitution, the federal legislation will prevail over the provincial legislation to the extent of the inconsistency. The subject of ‘environmental pollution and ecology’ is included in the concurrent list of the constitution. Thus, allowing both the federal and provincial governments to enact laws on the subject. To date, only the federal government has enacted laws on environment, and the provincial environmental institutions derive their power from federal law. Article 9 of the constitution defines the right to life as a fundamental right in these words “No person shall be deprived of life or liberty save in accordance with law”.

### 2.2. NATIONAL POLICIES RELATED TO ENVIRONMENT

#### 2.2.1 NATIONAL ENVIRONMENT POLICY, 2005

The National Environmental Policy (NEP) was approved by the Pakistan Environmental Protection Council (PEPC) in its 10<sup>th</sup> meeting on 27<sup>th</sup> December, 2004 under the chairmanship of the Prime Minister of Pakistan and thereafter approved by the Cabinet on 29<sup>th</sup> June 2005. NEP is the primary policy of Government of Pakistan that addresses the environmental issues of the country. The broad Goal of NEP is, “To protect, conserve and restore Pakistan’s environment in order to improve the quality of life of the citizens through sustainable development”. The NEP identifies the following set of sectoral and cross-sectoral guidelines to achieve its Goal of sustainable development.



### *Sectoral Guidelines:*

Water and sanitation, Air quality and noise, Waste management, Forestry, Biodiversity and Protected areas, Climate change and Ozone depletion, Energy efficiency and renewable, agriculture and livestock, and Multilateral environmental agreements.

### *Cross Sectoral Guidelines:*

Poverty, Population, Gender, Health, Trade & Environment, Local governance & Environment and Natural disaster management.

The NEP suggests the following policy instruments to overcome the environmental problems throughout the country:

- Integration of environment into development planning,
- Legislation and regulatory framework,
- Capacity development,
- Economic and market based instrument,
- Public awareness and education, and
- Public private civil society partnership.

NEP is a policy document and does not apply to projects. However, FTMM should ensure that the project should not add to the aggravation of the environmental issues identified in NEP and mitigation measures should be adopted to minimise or avoid any contribution of the project in these areas.

## **2.2.2 NATIONAL CONSERVATION STRATEGY**

Before the approval of National Environmental Policy (NEP) the National Conservation Strategy (NCS) was considered as the Government's primary policy document on national environmental issues. The Strategy approved by the Federal Cabinet in March 1992 and was also recognized by International Financial Institutions, principally the World Bank. At the moment this strategy just exists as a national conservation program. The NCS identifies 14 core areas including conservation of biodiversity; pollution prevention and abatement; soil and water conservation; and preservation of cultural heritage, and recommends immediate attention to these core areas in order to preserve the country's environment.

NCS does not directly apply to projects. However, FTMM should ensure that the project should not add to the aggravation of the 14 core environmental issues identified in the NCS and mitigation measures should be adopted to minimise or avoid any contribution of the project in these areas.



### 2.2.3 NATIONAL ENVIRONMENTAL ACTION PLAN-SUPPORT PROGRAMME (NEAP-SP)

The Government of Pakistan and United Nations Development Programme (UNDP) have jointly initiated an umbrella support programme called the “National Environmental Action Plan-Support Programme (NEAP-SP)” signed in October 2001 and implemented in 2002. The development objective supported by NEAP-SP is environmental sustainability and poverty reduction in the context of economic growth.

### 2.2.4 POLICY & PROCEDURES FOR THE FILING, REVIEW AND APPROVAL OF ENVIRONMENTAL ASSESSMENTS

The Policy & Procedures for the Filing, Review and Approval of Environmental Assessments, prepared by the PEPA under the powers conferred upon it by the Pakistan Environmental Protection Act, provide the necessary details on the preparation, submission, and review of the initial environmental examination (IEE) and the environmental impact assessment (EIA). It provides schedules of proposals that require either an initial environmental examination (IEE) or an environmental impact assessment (EIA).

## 2.3. NATIONAL ENVIRONMENTAL LEGISLATION

The definition of environmental law can be derived from the legal definition of ‘environment’. In Section 2(x) of the Punjab Environmental Protection (Amendment) Act 2012 environment is defined to include air, water, land and layers of the atmosphere; living organisms and inorganic matter; the ecosystem and ecological relationships; buildings, structures, roads, facilities and works; social and economic conditions affecting community life; and the interrelationship between these elements. From this definition, an environmental law can be considered to include all laws that are designed to, or that directly or indirectly affect, the management of natural resources including the control of pollution of these natural resources.

By this definition, environmental laws include a) laws that have been specifically enacted to protect the environment such as the PEPA (Amended 2012), and b) laws relating to subject such as forest, water resources, wildlife, land, agriculture, health, and town planning. Table 2.1 shows key environment, health and safety related legislative powers of federal and provincial government, enforcing agencies and pertinent laws.



Table 2-1: Relevant Environmental Laws and their Applicability

| <i>Subject</i>   | <i>Legislative Power</i> | <i>Enforcing Agencies</i>  | <i>Pertinent Laws</i>   |
|--|--------------------------|--|---|
| <i>Environmental Pollution and Ecology</i>                       | Federal and Provincial   | Ministry of Environment, Pakistan<br>Environmental Protection Agency, Punjab<br>Environmental Protection Agency, | Pakistan Environmental Protection Act, 1997<br>National Environmental Quality Standards (NEQS), National Environmental Quality Standards (NEQS), Environmental Laboratories 2000, NEQS (Self-Monitoring and Reporting by Industry) Rules 2005 (Amended) |
| <i>Regulation of Labour and Safety in Factories</i>              | Federal and Provincial   | Chief Inspector of Industries  | Factories Act, 1934<br>Punjab Factories Rules, 1978   |
| <i>Ancient and historical Monuments and Archaeological Sites</i> | Federal and Provincial   | Department of Museum   | Antiquities Act, 1975   |
| <i>Wildlife</i>  | Federal and Provincial   | Wildlife Department Punjab   | Wildlife Protection Ordinance 1972  |
| <i>Forestry</i>  | Federal and Provincial   | Forest Department Punjab   | Forest Act, 1927  |

### 2.3.1 PUNJAB ENVIRONMENTAL PROTECTION (AMENDMENT) ACT 2012

The Pakistan Environmental Protection Act, 1997 (PEPA, Amended 2012) is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The PEPA is broadly applicable to air, water, soil, marine and noise pollution. Penalties have been prescribed for those contravening the provisions of the Act. The powers of the federal and provincial Environmental Protection Agencies (EPAs) were



also considerably enhanced under this legislation and they have been given the power to conduct inquiries into possible breaches of environmental law either of their own accord, or upon the registration of a complaint.

Under section 12 of PEPA, no project involving construction activities or any change in the environment can be taken unless an IEE or EIA as required is conducted and a report submitted to the federal or provincial EPA.

### **2.3.2 PAKISTAN ENVIRONMENTAL PROTECTION AGENCY REVIEW OF IEE AND EIA REGULATIONS, 2000**

The Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 (the 'Regulations'), prepared by the Pak-EPA under the powers conferred upon it by the PEPA, provide the necessary details on the preparation, submission, and review of the initial environmental examination (IEE) and the environmental impact assessment (EIA).

The Regulation classifies projects on the basis of expected degree of adverse environmental impacts and lists them in two separate schedules. Schedule I lists projects that may not have significant environmental impacts and therefore require an IEE. Urban development projects are included in Schedule I. Schedule II lists projects of potentially significant environmental impacts requiring preparation of an EIA. The Regulations also require that all projects located in environmentally sensitive areas require preparation of an EIA. As the proposed project falls under the category defined in schedule II (as per IEE/EIA Regulations, 2000) so EIA study is conducted for this project.

### **2.3.3 THE NATIONAL ENVIRONMENTAL QUALITY STANDARDS (NEQS)**

The NEQS promulgated under the PEPA (Amended 2012) specify standards for industrial and municipal effluents, gaseous emissions, vehicular emissions, and noise levels. The PEPA 2012 empowers the EPA's to impose pollution charges in case of non-compliance to the NEQS.

On November 26<sup>th</sup> 2010, the SRO 1062(1)/2010 was issued which defines the standards for drinking water air and noise. The tables of various standards are reproduced here.

During the construction and post development phase of the project, NEQS will apply to all type of effluents and emissions. NEQS for municipal and industrial effluents, motor vehicle exhaust and noise and selected gaseous pollutants from industrial source are provided from **Table 2.2 to 2.7** below.



Table 2-2: NEQS for Municipal and Industrial Effluents a

| Parameters  | Existing Standards | Revised Standards  |                         |          |
|---|--------------------|--------------------|-------------------------|----------|
|   |                    | Into Inland Waters | Into Sewage Treatment b | Into Sea |
| Temperature <sup>c</sup>                              | 40°C               | ≤3°C               | ≤3°C                    | ≤3°C     |
| pH Value  | 6-10               | 6-9                | 6-9                     | 6-9      |
| Biochemical Oxygen Demand (BOD5) at 20°C <sup>d</sup> | 80                 | 80                 | 250                     | 80       |
| Chemical Oxygen Demand (COD) <sup>d</sup>             | 150                | 150                | 400                     | 400      |
| Total Suspended Solids (TSS)                          | 150                | 200                | 400                     | 200      |
| Total Dissolved Solids (TDS)                          | 3500               | 3500               | 3500                    | 3500     |
| Grease & Oil  | 10                 | 10                 | 10                      | 10       |
| Phenolic Compounds (as phenol)                        | 0.1                | 0.1                | 0.3                     | 0.3      |
| Chlorides (as Cl')                                    | 1000               | 1000               | 1000                    | SC       |
| Fluoride (as F')                                      | 20                 | 10                 | 10                      | 10       |
| Cyanide (CN') total                                   | 2                  | 1.0                | 1.0                     | 1.0      |
| An-ionic detergents (as MBAS) <sup>e</sup>            | 20                 | 2.0                | 20                      | 20       |
| Sulphate (SO'')                                       | 600                | 600                | 1000                    | SC       |
| Sulphide (S')   | 1.0                | 1.0                | 1.0                     | 1.0      |
| Ammonia (NH3)   | 40                 | 40                 | 40                      | 40       |
| Pesticides <sup>f</sup>                               | 0.15               | 0.15               | 0.15                    | 0.15     |
| Cadmium <sup>g</sup>                                  | 0.1                | 0.1                | 0.1                     | 0.1      |
| Chromium (trivalent & hexavalent) <sup>g</sup>        | 1.0                | 1.0                | 1.0                     | 1.0      |
| Copper  | 1.0                | 1.0                | 1.0                     | 1.0      |
| Lead  | 0.5                | 0.5                | 0.5                     | 0.5      |





|                           |      |      |      |      |
|---------------------------|------|------|------|------|
| <i>Mercury</i>            | 0.01 | 0.01 | 0.01 | 0.01 |
| <i>Selenium</i>           | 0.5  | 0.5  | 0.5  | 0.5  |
| <i>Nickel</i>             | 1.0  | 1.0  | 1.0  | 1.0  |
| <i>Silver</i>             | 1.0  | 1.0  | 1.0  | 1.0  |
| <i>Total Toxic Metals</i> | 2.0  | 2.0  | 2.0  | 2.0  |
| <i>Zinc</i>               | 5.0  | 5.0  | 5.0  | 5.0  |
| <i>Arsenic</i>            | 1.0  | 1.0  | 1.0  | 1.0  |
| <i>Barium</i>             | 1.5  | 1.5  | 1.5  | 1.5  |
| <i>Iron</i>               | 2.0  | 8.0  | 8.0  | 8.0  |
| <i>Manganese</i>          | 1.5  | 1.5  | 1.5  | 1.5  |
| <i>Boron</i>              | 6.0  | 6.0  | 6.0  | 6.0  |
| <i>Chlorine</i>           | 1.0  | 1.0  | 1.0  | 1.0  |
|                           |      |      |      |      |

**Source:** SRO 549 (I)/2000 Dated August 10, 2000, Ministry of Environment, Local Govt. & Rural Development, Pakistan

**Notes**

a All values are in mg/l, unless otherwise defined

b Applicable only when and where sewage treatment is operational and BOD<sub>5</sub>=80 mg/L is achieved by the sewage treatment system

c The effluent should not result in temperature increase of more than 3°C at the edge of zone where initial mixing and dilution take place in the receiving body. In case zone is defined, use 100 meters from the point of discharge

d Assuming minimum dilution 1:10 on discharge, lower ratio would attract progressively stringent standards to be determined by the Federal Environmental Protection Agency. By 1:10 dilution means, for example that for each one cubic meter of treated effluent, the recipient water body should have 10 cubic meter of water for dilution of this effluent

e Modified Benzene Alkyl Sulphate; assuming surfactant as biodegradable

f Pesticides include herbicide, fungicides and insecticides

g Subject to the total toxic metals discharge should not exceed level of total toxic metals





Table 2-3: NEQS for Drinking Water, 2010

| Parameters                                  | Standards value for Pakistan         | WHO Standards                        |
|---|--------------------------------------|--------------------------------------|
| <i>Physical &amp; Bacterial</i>             |                                      |                                      |
| <i>E. Coli</i>                              | Must not Detectable in 100 ml sample | Must not Detectable in 100 ml sample |
| <i>Colour</i>                               | ≤15 TCU                              | ≤15 TCU                              |
| <i>pH</i>                                   | 6.5-8.5                              | 6.5-8.5                              |
| <i>Taste</i>                                | Non Objectionable/Acceptable         | Non Objectionable/Acceptable         |
| <i>Odour</i>                                | Non Objectionable/Acceptable         | Non Objectionable/Acceptable         |
| <i>Turbidity</i>                            | <5                                   | <5                                   |
| <i>Total Hardness as CaCo<sub>3</sub></i>   | <500 mg/l                            | ---                                  |
| <i>Total Dissolved Solids (TDS)</i>         | <1000                                | <1000                                |
| <i>Chemical - Essential Inorganic(mg/l)</i> |                                      |                                      |
| <i>Aluminium (Al)</i>                       | ≤0.2                                 | 0.2                                  |
| <i>Antimony (Sb)</i>                        | ≤0.005 (p)                           | 0.02                                 |
| <i>Arsenic (As)</i>                         | ≤0.05 (p)                            | 0.01                                 |
| <i>Barium (Ba)</i>                          | 0.7                                  | 0.7                                  |
| <i>Boron (B)</i>                            | 0.3                                  | 0.3                                  |
| <i>Cadmium(Cd)</i>                          | 0.01                                 | 0.003                                |
| <i>Chloride (Cl)</i>                        | <250                                 | 250                                  |
| <i>Chromium (Cr)</i>                        | ≤0.05                                | 0.05                                 |
| <i>Copper (Cu)</i>                          | 2                                    | 2                                    |
| <i>Toxic Inorganic mg/l</i>                 |                                      |                                      |
| <i>Cyanide (CN)</i>                         | ≤0.05                                | 0.07                                 |



|  |  |   |
|--|--|---|
| Fluoride (as F)  | $\leq 1.5$                                   | 1.5   |
| Lead (Pb)  | $\leq 0.05$                                  | 0.01  |
| Manganese (Mn)   | $\leq 0.5$                                   | 0.5   |
| Mercury (Hg)   | $\leq 0.001$                                 | 0.001   |
| Nickel (Ni)  | $\leq 0.02$                                  | 0.02  |
| Nitrate (No3)*   | $\leq 50$                                    | 50  |
| Nitrite (No3)*   | $\leq 3$ (p)                                 | 3   |
| Selenium (Se)  | 0.01(p)                                      |   |
| Residual Chlorine  | 0.2-0.5 at consumer end<br>0.5-1.5 at source | ---   |
| Zn (Zn)  | 5.0  | 3   |
| <b>Organic</b>   |  |   |
| Pesticide mg/  | ---  | PSQCA No.4639-2004<br>Page No. 4 Table No. 3<br>Serial No. 20-58 may be<br>consulted*** |
| Phenolic Compounds(as Phenols)<br>mg/l   | ---  | $\leq 0.002$  |
| Polynuclear aromatic<br>hydrocarbons(as PAH g/l)   | ---  | 0.01 (By GC/MS Method)  |
| <b>Radioactive</b>   |  |   |
| Alpha Emitters bq/L or pCi   | 0.1  | 0.1   |
| Beta Emitters  | 1  | 1   |
| * Indicates priority health related inorganic constituents which need regular monitoring |  |   |
| *** PSQCA Pakistan Standards Quality Control Authority                                   |  |   |



Table 2-4: NEQS for Ambient Air Quality

| Pollutants                                      | Time-weighted average | Concentration in Ambient Air    |                                 | Method of measurement  |
|---|-----------------------|---------------------------------|---------------------------------|--|
|   |                       | Effective from 1st January 2009 | Effective from 1st January 2012 |  |
| Sulphur Dioxide (SO <sub>2</sub> )              | Annual Average*       | 80 µg/m <sup>3</sup>            | 80µg/m <sup>3</sup>             | Ultraviolet Fluorescence method  |
|   | 24 hours**            | 120 µg/m <sup>3</sup>           | 120 µg/m <sup>3</sup>           |  |
| Oxides of Nitrogen as (NO)                      | Annual Average*       | 40 µg/m <sup>3</sup>            | 40 µg/m <sup>3</sup>            | Gas Phase Chemiluminescence  |
|   | 24 hours**            | 40 µg/m <sup>3</sup>            | 40 µg/m <sup>3</sup>            |  |
| Oxides of Nitrogen as (NO <sub>2</sub> )        | Annual Average*       | 40 µg/m <sup>3</sup>            | 40 µg/m <sup>3</sup>            | Gas Phase Chemiluminescence  |
|   | 24 hours**            | 80 µg/m <sup>3</sup>            | 80 µg/m <sup>3</sup>            |  |
| Ozone (O <sub>3</sub> )                         | 1 hour                | 180 µg/m <sup>3</sup>           | 130 µg/m <sup>3</sup>           | Non dispersive UV absorption method  |
| Suspended Particulate Matter (SPM)              | Annual Average*       | 400 µg/m <sup>3</sup>           | 360 µg/m <sup>3</sup>           | High Volume Sampling, (Average flow rate not less than 1.1 m <sup>3</sup> /minute) |
|   | 24 hours**            | 550 µg/m <sup>3</sup>           | 500 µg/m <sup>3</sup>           |  |
| Respirable Particulate Matter PM <sub>10</sub>  | Annual Average*       | 200 µg/m <sup>3</sup>           | 120 µg/m <sup>3</sup>           | β Ray absorption method  |
|   | 24 hours**            | 250 µg/m <sup>3</sup>           | 150 µg/m <sup>3</sup>           |  |
| Respirable Particulate Matter PM <sub>2.5</sub> | Annual Average*       | 25 µg/m <sup>3</sup>            | 15 µg/m <sup>3</sup>            | β Ray absorption method  |
|   | 24 hours**            | 40 µg/m <sup>3</sup>            | 35 µg/m <sup>3</sup>            |  |
|   | 1 hour                | 25 µg/m <sup>3</sup>            | 15 µg/m <sup>3</sup>            |  |
| Lead (Pb)                                       | Annual Average*       | 1.5 µg/m <sup>3</sup>           | 1 µg/m <sup>3</sup>             | ASS Method after sampling using EMP 2000 or equivalent Filter paper                |
|   | 24 hours**            | 2 µg/m <sup>3</sup>             | 1.5 µg/m <sup>3</sup>           |  |
| Carbon Monoxide (CO)                            | 8 hours**             | 5 µg/m <sup>3</sup>             | 5 µg/m <sup>3</sup>             | Non Dispersive Infrared (NDIR) method  |
|   | 1 hour**              | 10 µg/m <sup>3</sup>            | 10 µg/m <sup>3</sup>            |  |

\* Annual Arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval

\*\* 24 hourly/ 8 hourly values should be met 98 % of the in a year. 2 % of the time. It may exceed but not on two consecutive days.



**Table 2-5: NEQS for Motor Vehicle Exhaust and Noise**

| Parameter                             | Standard   | Measuring method  |
|---------------------------------------|--|---|
| Smoke                                 | 40% or 2 on the Ringlemann scale during engine acceleration mode | To be compared with Ringlemann Chart at a distance of 6 meters or more          |
| Carbon monoxide                       | New Vehicle 4.5%<br>Used Vehicle 6%                              | Under idling conditions, non-dispersive infrared detection through gas analyser |
| Noise                                 | 85 dB (A)  | Sound-meter at 7.5 meters from the source                                       |
| Source: Qadar (2003)                  |  |   |
| Notes: <sup>a</sup> 10 years or older |  |   |

**Table 2-6: NEQS for Noise**

| S.No.  | Category of Area/Zone | Effective from 1st July, 2010 |            | Effective from 1st July,2012 |            |
|--|-----------------------|-------------------------------|------------|------------------------------|------------|
|  |                       | Limit dB(A) Leq*              |            |                              |            |
|  |                       | Day Time                      | Night Time | Day Time                     | Night Time |
| 1  | Residential Area (A)  | 65                            | 50         | 55                           | 45         |
| 2  | Commercial Area (B)   | 70                            | 60         | 65                           | 55         |
| 3  | Industrial Area (C)   | 80                            | 75         | 75                           | 65         |
| 4  | Silence Zone (D)      | 55                            | 45         | 50                           | 45         |
| *dB(A) Leq: Time Weighted average of the level of sound in decibels on scale A which is relatable to human hearing |                       |                               |            |                              |            |

**Note:**

1. Day time hours: 6.00 a.m to 10.00 p.m
2. Night time hours: 10.00 p.m. to 6 a.m.
3. Silence zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters around hospitals, educational institutions and courts
4. Mixed categories of area may be declared as one of the four above-mentioned categories by the competent authority



Table 2-7: NEQS for Selected Gaseous Pollutants from Industrial Sources

| Parameter           | Source of Emission   | Standard   |
|---------------------|--|--|
| Smoke               | Any  | 40% or 2 Ringlemann scale or equivalent smoke number |
| Particulate Matte b | Boilers and furnaces:  |  |
|                     | Oil Fired  | 300  |
|                     | Coal Fired   | 500  |
|                     | Cement Kilns   | 300  |
|                     | Grinding, crushing, clinker coolers and related processes, metallurgical processes, converter blast furnaces and cupolas | 500  |
| Hydrogen chloride   | Any  | 400  |
| Chlorine            | Any  | 150  |
| Hydrogen flouride   | Any  | 150  |
| Hydrogen sulfide    | Any  | 10   |
| Sulfur oxidesc      | Sulfuric acid/Sulfonic acid plants   | 5,000  |
|                     | Other plants except power plants operating on oil and coal   | 1,700  |
| Carbon monoxide     | Any  | 800  |
| Lead                | Any  | 50   |
| Mercury             | Any  | 10   |
| Cadmium             | Any  | 20   |
| Arsenic             | Any  | 20   |
| Copper              | Any  | 50   |
| Antimony            | Any  | 20   |



|                                 |  |       |
|---------------------------------|--|-------|
| Zinc                            | Any  | 200   |
| Oxides of Nitrogen <sup>d</sup> | Nitric acid manufacturing unit                             | 3,000 |
|                                 | Other plants except power plants operating on oil or coal: |       |
|                                 | Oil Fired  | 400   |
|                                 | Coal Fired   | 600   |
|                                 | Cement Kilns   | 1,200 |

**Notes:**

<sup>a</sup> All values are in mg/Nm<sup>3</sup>, unless otherwise defined

<sup>b</sup> Based on the assumption that the size of the particulates is 10 micron or more

<sup>c</sup> Based on 1% Sulfur content in fuel oil. Higher content of Sulfur will cause standards to be pro-rated

<sup>d</sup> In respect of the emissions of the sulfur dioxide and nitrogen oxides, the power plants operating on oil or coal as fuel shall, in addition to NEQS specified above, comply with the following standards.

#### 2.3.4 SELF-MONITORING & REPORTING RULES (SMART)

Pakistan Environmental Protection Council constituted an Environmental Standards Committee in 1996 to devise realistic modalities for NEQS enforcement and simplified monitoring procedures with the consultation of representatives of industrial interest groups, non-governmental organizations (NGOs) and other stakeholders. Their efforts succeeded in the bringing up of "Self-Monitoring and Reporting System for Industry". As per the rules set by this system, industries have to monitor effluents and emissions in compliance with the NEQS and report it to provincial or federal EPAs. This system classifies industry into three categories A, B and C each corresponding to a specified reporting frequency. Battery Manufacturing Unit falls in category A and it requires monthly monitoring of liquid effluent.

#### 2.3.5 ANTIQUITIES ACT 1975

The protection of cultural resources in Pakistan is ensured by the Antiquities Act of 1975. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments etc. The act is designed to protect antiquities from destruction, theft, negligence, unlawful excavation, trade and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area, which may contain articles of archaeological significance.



No antiquity protected under the law was identified in the vicinity of the proposed project during fieldwork for the EIA. Furthermore, the project site is unlikely to contain any buried antiquity. However, the project staff will be instructed before ground preparation and earthworks to report any archaeological artifact or what may appear to be an archaeological relic to the project management. In case of such a discovery, appropriate action will be taken.

### **2.3.6 LAND ACQUISITION ACT, 1894**

The Land Acquisition act (LAA) of 1894 amended from time to time has been the policy governing land acquisition, resettlement and compensation in the country. The LAA is the most commonly used law for acquisition of land and other properties for development projects. It comprises of 55 sections pertaining to area notifications and surveys, acquisition, compensation and appointment awards and disputes resolution, penalties and exemptions. In the proposed project there is no such kind of land acquisition or resettlement of proposed project affected persons.

### **2.3.7 PAKISTAN PENAL CODE (1860)**

The Pakistan Penal Code (1860) authorizes fines, imprisonment or both for voluntary corruption or fouling of public spring or reservoirs so as to make them less fit for ordinary use.

The Pakistan Penal Code (PPC) 1860 deals specifically with the pollution of water in Chapter XIV on public health and safety. Here, “fouling” or “corrupting” the water of a public spring or reservoir is listed as an offence, punishable with up to three months in prison and/or a fine of 500 rupees (Section 277). This provision is limited in scope, since it applies only to reservoirs and public springs, and the terms “fouling” and “corrupting” are not defined. But provisions of PEPA (Amended 2012) (Sections 6 and 7) and the NEQS may be applied to facilitate enforcement of Section 277. Other sections of this chapter may be interpreted to include the protection of water resources, including Section 268 on public nuisance, Section 269 on negligence likely to spread infectious disease, and Section 284 on negligent conduct with respect to the possession and handling of poisonous substances.

Similarly, Chapter XVII on offences against property contains certain provisions that may be interpreted to include the protection of water resources. Sections 425–440 deal with “mischief”, defined as damage to property resulting in destruction or loss of utility. Section 430 provides specifically for mischief caused to irrigation works, while Section 431 deals with damage to roads, bridges, rivers or channels. Meanwhile, Chapter XXIII, Section 511 on attempted offences could also be interpreted to include offences related to the “fouling” or “corrupting” of water.





Under Section 278 of the PPC, the punishment for “making [the] atmosphere noxious to health” is a maximum fine of 500 rupees. In addition, certain sections of Chapter XIV on public health and safety concerning “public nuisance” may be interpreted to include air and noise pollution from vehicles, as well as emissions (Sections 268, 278, 290 and 291).

## **2.4. NATIONAL ENVIRONMENTAL GUIDELINES**

### **2.4.1 THE PAKISTAN ENVIRONMENTAL ASSESSMENT PROCEDURES, 1997**

The Pakistan Environmental Protection Agency prepared the Pakistan Environmental Assessment Procedures in 1997. They are based on much of the existing work done by international donor agencies and Non Governmental Organisations (NGO's). The package of regulations prepared by PEPA includes:

- Policy and Procedures for Filing, Review and Approval of Environmental Assessments;
- Guidelines for the Preparation and Review of Environmental Reports;
- Guidelines for Public Consultation;
- Guidelines for Sensitive and Critical Areas; and
- Sectoral Guidelines for various types of projects.

### **2.4.2 SECTORAL GUIDELINES FOR ENVIRONMENTAL REPORTS MAJOR CHEMICAL AND MANUFACTURING PLANTS**

This guideline deals with major chemical and manufacturing plants. These plants may involve the production or stage of chemical substances (including reactive, toxic or flammable liquids, vapours, gases and solids) and may include the following operations:

- Facilities with major distillation, filtration and dewatering processes
- Drying, crushing, formulation, blending and packaging facilities
- Storage facilities for raw materials, products and by-products, bulk storage facilities, stockpiles and dumps
- Recycling facilities, and
- Other manufacturing plants

The guideline also include the manufacture of chlorine/alkali, calcium carbide, inorganic acids, salts, phosphor compounds, hydrogen peroxide, inorganic pigments such as titanium dioxide, and metal salts. Inorganic chemicals such as ammonia, nitric acid, urea, phosphoric acid, etc., are discussed in the section on fertilizer manufacturing.



### **2.4.3 GUIDELINES FOR PUBLIC CONSULTATION**

These guidelines are a part of a package of regulations and guidelines. It provides assistance throughout the environmental assessment of project by involving the public which can lead to better and more acceptable decision-making.

## **2.5. INTERNATIONAL GUIDELINES**

### **2.5.1 WORLD BANK GUIDELINES ON ENVIRONMENT**

The principal World Bank publications that contain environmental guidelines are listed below.

- Environmental Assessment-Operational Policy 4.01. Washington, DC, USA. World Bank 1999.
- Environmental Assessment Sourcebook, Volume I: Policies, Procedures, and Cross-Sectoral Issues. World Bank Technical Paper Number 139, Environment Department, the World Bank, 1991,
- Technical Paper No. 154, Environment Department, the World Bank, 1991.
- Environmental Health and Safety (EHS) guidelines, International Finance Corporation (IFC) World Bank Group, 2008.

The first two publications provide general guidelines for conducting EIAs, and address EIA practitioners as well as project designers. While the Sourcebook in particular has been designed with Bank projects in mind, and is especially relevant for the impact assessment of large-scale infrastructure projects, it contains a wealth of useful information, for environmentalists and project proponents.

The Sourcebook identifies a number of areas of concern, which should be addressed during impact assessment. It sets out guidelines for the determination of impacts, provides a checklist of tools to identify possible biodiversity issues and suggests possible mitigation measures. Possible development project impacts on different areas such as wild lands, wetlands and forests are also identified and mitigation measures suggested. The EHS guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP).

These guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, based on environmental assessments and/or environmental audits as appropriate, with an appropriate timetable for achieving them.



## **2.6. INTERNATIONAL CONVENTIONS & TREATIES**

### **2.6.1 INTERNATIONAL CONVENTION ON BIODIVERSITY**

The International Convention on Biodiversity was adopted during the Earth Summit of 1992 at Rio de Janeiro. The Convention requires parties to develop national plans for the conservation and sustainable use of biodiversity, and to integrate these plans into national development programmes and policies. Parties are also required to identify components of biodiversity that are important for conservation, and to develop systems to monitor the use of such components with a view to promote their sustainable use.

### **2.6.2 THE CONVENTION ON CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS, 1979**

The Convention on the Conservation of Migratory Species of Wild Animals (CMS), 1979, requires countries to take action to avoid endangering migratory species. The term "migratory species" refers to the species of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries. The parties are also required to promote or co-operate with other countries in matters of research on migratory species.

The Convention contains two appendices. Appendix I contain the list of migratory species that are endangered according to the best scientific evidence available. For these species, the member states to the Convention are required endeavour to:

- Conserve and restore their habitats;
- Prohibit their hunting, fishing, capturing, harassing and deliberate killing;
- Remove obstacles and minimize activities that seriously hinder their migration;
- Control other factors that might endanger them, including control of introduced exotic species.

Appendix II lists the migratory species, or groups of species, that have an unfavourable conservation status as well as those that would benefit significantly from the international co-operation that could be achieved through intergovernmental agreements.

### **2.6.3 THE CONVENTION ON WETLANDS OF INTERNATIONAL IMPORTANCE, RAMSAR 1971**

Pakistan is a signatory to the said Convention. The principal obligations of contracting parties to the Convention are:

- To designate wetlands for the List of Wetlands of International Importance.



- To formulate and implement planning so as to promote wise use of wetlands, to carry out an EIA before transformations of wetlands, and to make national wetland inventories.
- To establish nature reserves on wetlands and provide adequately for their wardening and through management to increase waterfowl populations on appropriate wetlands.
- To train personnel competent in wetland research, management and wardening.
- To promote conservation of wetlands by combining far-sighted national policies with coordinated international action, to consult with other contracting parties about implementing obligations arising from the Convention, especially about shared wetlands and water system.
- To promote wetland conservation concerns with development aid agencies.
- To encourage research and exchange of data.

So far 19 sites in Pakistan have been declared as wetlands of International Importance or Ramsar Sites.

None of these wetlands is located within or in close vicinity of the project area.

#### **2.6.4 CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES)**

This convention came into effect on 03 March 1973 in Washington. In all 130 countries are signatory to this convention with Pakistan signing the convention in 1976. The convention requires the signatories to impose strict regulation (including penalization, confiscation of the specimen etc.) regarding trade of all species threatened with extinction or that may become so, in order not to endanger further their survival.

The Convention contains three appendices. Appendix I include all species threatened with extinction which are or may be affected by trade. The Convention requires that trade in these species should be subject to strict regulation. Appendix II include species that are not necessarily threatened presently but may become so unless trade in specimens of these species is subject to strict regulation. Appendix III includes species which any contracting party identifies as subject to regulations in trade and requires other parties to cooperate in this matter.

#### **2.6.5 INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES (IUCN) RED LIST**

The red list is published by IUCN and includes those species that are under potential threat of extinction. These species have been categorized as:



- **Endangered:** species that are sent to be facing a very high risk of extinction in the wild in the near future, reduction of 50% or more either in the last 10 years or over the last three generations, survive only in small numbers, or have very small populations.
- **Vulnerable in Decline:** species that are seen to be facing a risk of extinction in the wild, having apparent reductions of 20% or more in the last 10 years or three generations.
- **Vulnerable:** species that are seen to be facing a high risk of extinction in the wild, but not necessarily experiencing recent reductions in population size.
- **Lower Risk:** species that are seen to be facing a risk of extinction that is lesser in extent than for any of the above categories.
- **Data Deficient:** species that may be at risk of extinction in the wild but at the present time there is insufficient information available to make a firm decision about its status.

## **2.7. INTERNATIONAL AND NATIONAL ENVIRONMENT AND CONSERVATION ORGANIZATIONS**

### **2.7.1 INTERNATIONAL AND NATIONAL NGOS**

International environmental and conservation organisations such as IUCN and the World Wide Fund for nature (WWF) have been active in Pakistan for some time. Both these organisations have worked closely with government and act in an advisory role with regard to the formulation of environmental and conservation Policies. Since the convening of the Rio Summit, a number of national environmental NGO's have also been formed, and have been engaged in advocacy, and in some cases, research. Most prominent national environmental NGO's, such as the Sustainable Development Policy Institute (SDPI), Strengthening, Participatory Organization (SPO), Shehri, and Shirkatgah are members of the Pakistan National Committee (PNC) of IUCN.

Much of the government's environmental and conservation policy has been formulated in consultation with leading NGO's, who have also been involved in drafting new legislation on conservation.



### 3 PROJECT DESCRIPTION

This chapter provides the description of the proposed project Lead-Acid battery unit installation, its components and requirements.

#### 3.1 NEED ASSESSMENT OF THE PROJECT

Different Batteries are used for different purposes in Pakistan especially in automobiles and UPS. Though many industries are manufacturing different types of batteries including lead acid batteries but the current production does not meet the demand. Electricity load-shedding has compelled the people to adopt alternatives like generator and UPS (Uninterrupted Power Supply). UPS is the most preferable option because it produces fewer nuisances that have indirectly increased the demand of batteries since last few years. Only source of MFSB is import which is inconsistent and unreliable and also consumes large revenue. No formal plant of Lead-Acid maintenance free sealed batteries (MFSB) exists in the Country. Lead-Acid batteries are Spill-proof, High specific power, low internal resistance, capable of Water retention (oxygen and hydrogen combine to produce water), Vibration resistance due to sandwich construction, Stands up well to cold temperature, require low room ventilation and emit no acid fumes. Treet is bringing state of the art technology comparatively having more efficiency and bringing Lead-Acid maintenance free sealed batteries (MFSB) in Pakistan with multinational brand name (i.e. Daewoo) for Batteries. The proposed project of Lead-Acid maintenance free sealed batteries will help to balance the demand and supply of batteries, generate revenue and replace the conventional batteries.

#### 3.2 PROJECT OBJECTIVE

The objective of the proposed project is to install Lead-Acid battery unit at FIEDMC M3 Industrial City, Faisalabad District. The main purpose of the proposed project is to enhance the production of UPS and automobile batteries in the area.

#### 3.3 PROJECT LOCATION

The proposed project is located in FIEDMC M3 Industrial City, tehsil Chak Jhumra, district Faisalabad, Punjab, Pakistan. The M3 Industrial City lies adjacent to M3 Motorway and Chiniot Road in Chak Jhumra district Faisalabad.

A description of salient features of proposed project site is given in **Table 3.1**.



Table 3-1: Description of Salient Features of Proposed Project Site

| Features  | Description   |
|---|---|
| <b>Location of Project</b>                      |   |
| Village ( Nearest Village)                      | Sahianwala  |
| Tehsil  | Chak Jhumra,  |
| District  | Faisalabad  |
| <b>General Climatic Conditions (Faisalabad)</b> |   |
| Mean Monthly Maximum Temperature                | 41.9 °C   |
| Mean Monthly Minimum Temperature                | 3.5 °C  |
| Annual average Rainfall                         | 441.18 mm   |
| Relative Humidity                               | 42.7%   |
| Elevation Above sea Level                       | 191 meter above mean sea level (MSL)  |
| <b>Accessibility</b>                            |   |
| Road Connectivity                               | Located on Chinot Road and M3   |
| Rail Connectivity and roads                     | Sahianwala Railway Station  |
| Airport   | Faisalabad  |
| River Chenab                                    | Approximately at a distance of 30 km from project site. Small tributaries of Jhang Branch are present close to project site |
| <b>Historical / Important Places</b>            |   |
| Archaeological/ Historically Important Site     | No archeological site was found within 5 m2 area of the project site  |

### 3.4 EXISTING OPERATIONS OF TREET

At 72-B Industrial Area, Kot Lakhpat in District Lahore, Treet Corporation limited is operating as the corporate headquarter with its strategic business units. Its first manufacturing unit was set up in Hyderabad in 1954 and the second unit was set up in





Lahore in 1975. It is the sole manufacturer of razor blades and disposable razors in the country. Other companies working under Treet are:

- Manufacturing of shaving blades/disposable razors;
- Manufacturing of corrugated packaging;
- Manufacturing of soaps;
- Assembling of motorcycles (including Rickshaws);
- Educational Projects – under process;
- Labour-Hire Services;
- Floatation and control of Modarabas etc.
- Associated Companies of Treet Group are:
- Liaquat National Hospital and Medical College;
- Loads limited;
- Packages Limited;
- IGI Insurance;

### **3.5 PROJECT PHASES AND SCHEDULE**

The proposed project activities can be broadly divided into following four phases:

- Design phase
- Construction Phase
- Commissioning Phase
- Operation phase

The proposed Battery Unit is expected to come in commission phase in a time period of 2 years.

### **3.6 PROPOSED PROJECT DESCRIPTION**

The proposed project pertains to install Lead-Acid battery unit at FIEDMC M3 Industrial City, Faisalabad District.

#### **3.6.1 DESIGN AND LAYOUT**

The proposed Battery Unit will acquire an area of approximately 40 Acres as per its activities and operational setup. The layout of the proposed project is provided in the **Figure 3.1** as following;

[illegible]



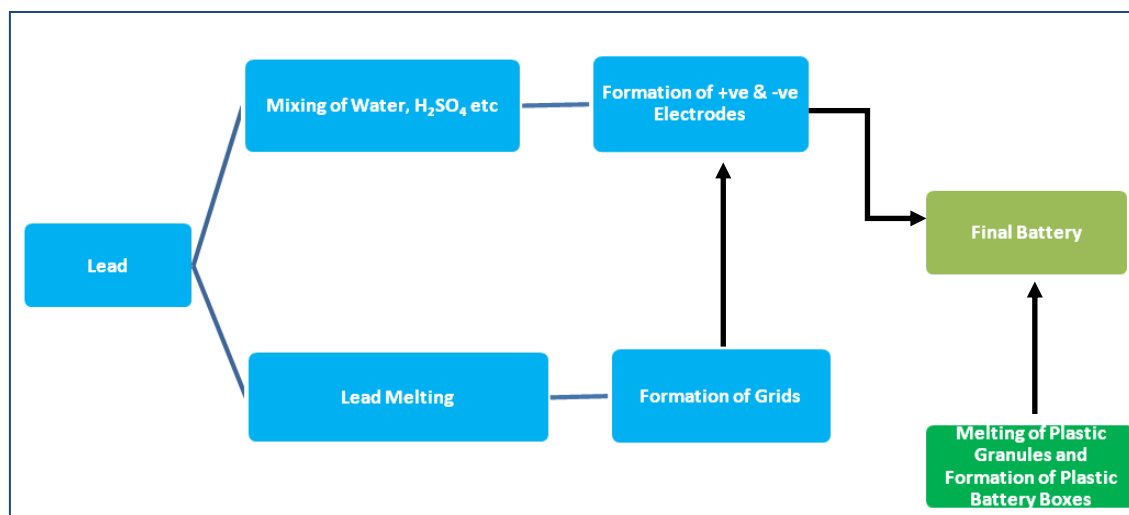
### 3.7 PROCESS DESCRIPTION OF THE PROPOSED PROJECT

The main process of the proposed battery unit will contain following activities

- 1) Plastic Container and Cover Formation
- 2) Grid Casting
- 3) Lead Oxide Formation
- 4) Pasting Process
- 5) Curing Process
- 6) First Assembly Section (P.E Assembly)
- 7) Final Assembly Section
- 8) Battery Storage Area

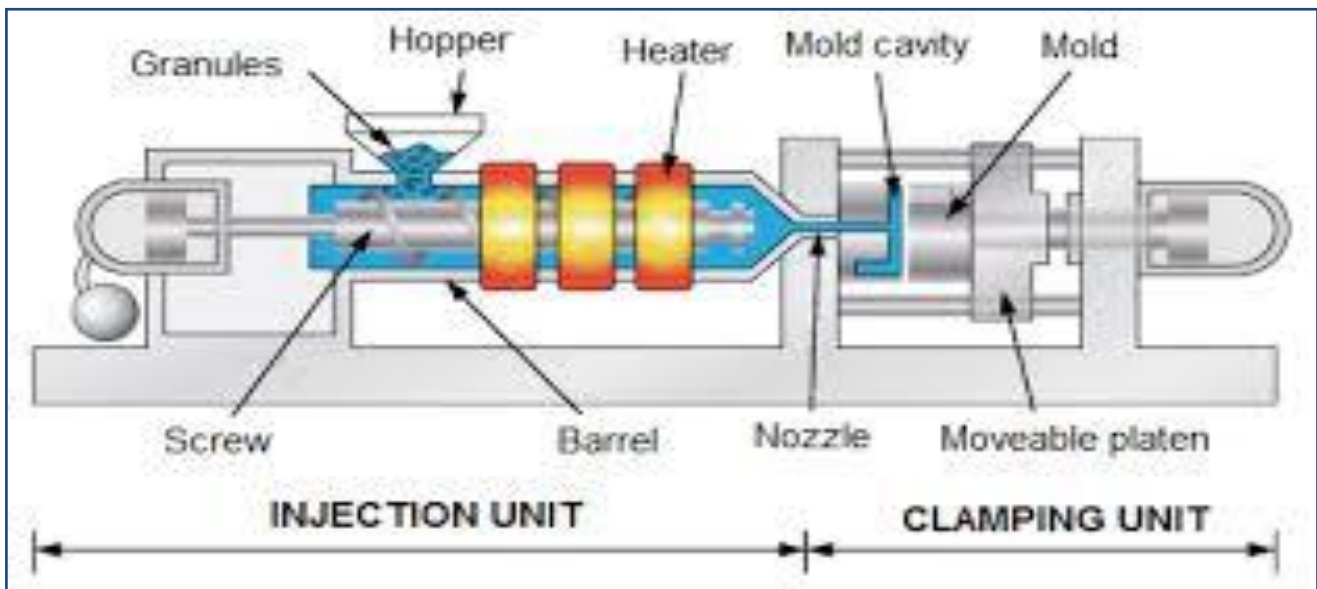
(1) Imported Plastic granules will be processed to manufacture plastic casings and covers of the batteries. (2) Imported Lead from Middle East will be received at lead storage area. From here lead will be sent to grid casting machine to manufacture Lead strips and grids. (3) Lead oxide will be prepared from pure lead. A pasting material will be prepared by the mixing of lead oxide, sulphuric acid and water. Expander material made of powdered sulfates is added to the paste to produce negative plates. (4) This pasting material will be pasted on the grids. (5) Pasted plates will be dried at a specific temperature for a specific time duration to minimize the moisture content. (6) These plates will be placed in a polyethylene packet known as P.E Assembly at first assembly section. (7) P.E Assemblies will be fixed in battery casing along with some liquid solution containing 70% water, 20% Sulphuric Acid and 10% other ingredients in Final Assembly Section. (8) After completion all the batteries will be sent to battery storage area.

Figure 3-1: Process Flow Diagram



### 3.7.1 MANUFACTURING OF PLASTIC COVERS AND CONTAINERS

Imported polypropylenes will be used to prepare the plastic covers and containers. These granules will then be molded separately for covers and boxes because the amount of pigments used to prepare the covers of different colours vary accordingly. The container manufacturing machine and the cover manufacturing machine are not same but the production processes are almost same. Following figure shows a generalized process of molding the plastic granules.



### 3.7.2 GRID CASTING

Different sizes and types of grids are prepared in grid casting machine. Different quantities of Calcium Lead and antimony lead are used to prepare the grid for cars and UPS respectively. Grid machine has different parts where lead is melted first then it is poured in the mold part where grids are formed. Then it is sent to the cutter to cut the scrap part. Then the final grids come out from the machine by conveyer belt. Following figure shows a generalized grid.

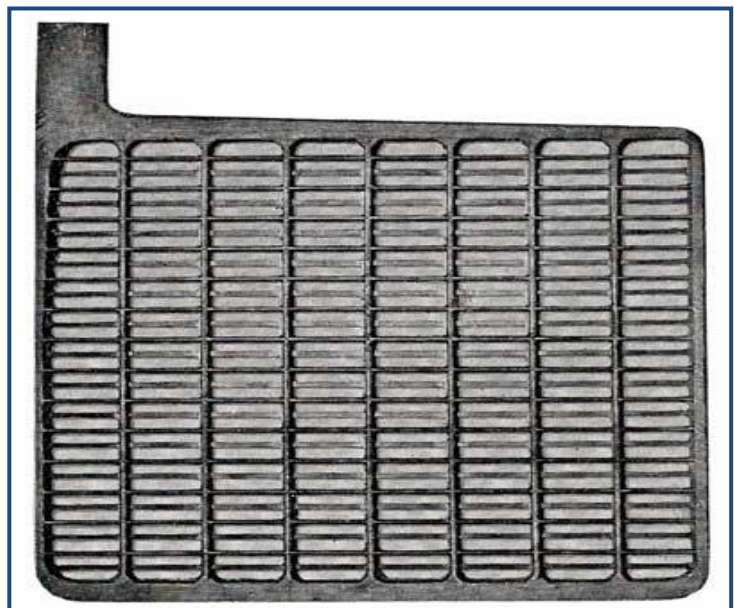


Figure 3-2: Grid

### 3.7.3 PREPARATION OF PASTE

Different chemical compounds will be mixed together to prepare active materials for the battery cell. Active materials are different for different plates. Different quantities of compounds are mixed together to follow the different steps to prepare positive paste and negative paste.

#### Positive Paste

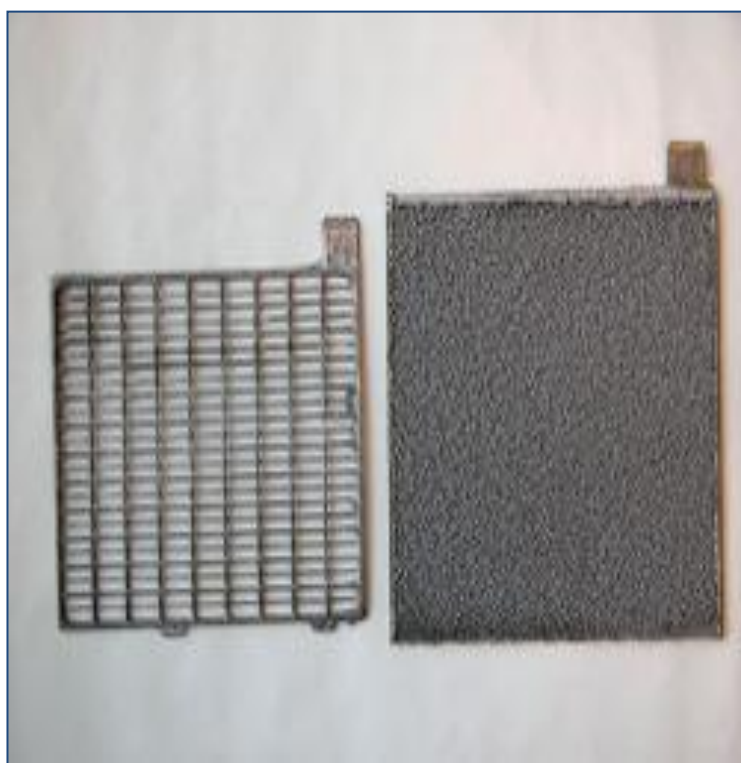
Chemical compounds for the preparation of positive paste are as follows.

- Lead oxide (PbO)
- Sulphuric acid (H<sub>2</sub>SO<sub>4</sub>)
- Demineralised water (DM water)
- Fibre flock

These compounds will be mixed with specific compositions in order to produce positive and negative pastes for the positive and negative terminals of the batteries respectively.

### 3.7.4 PASTING PROCESS

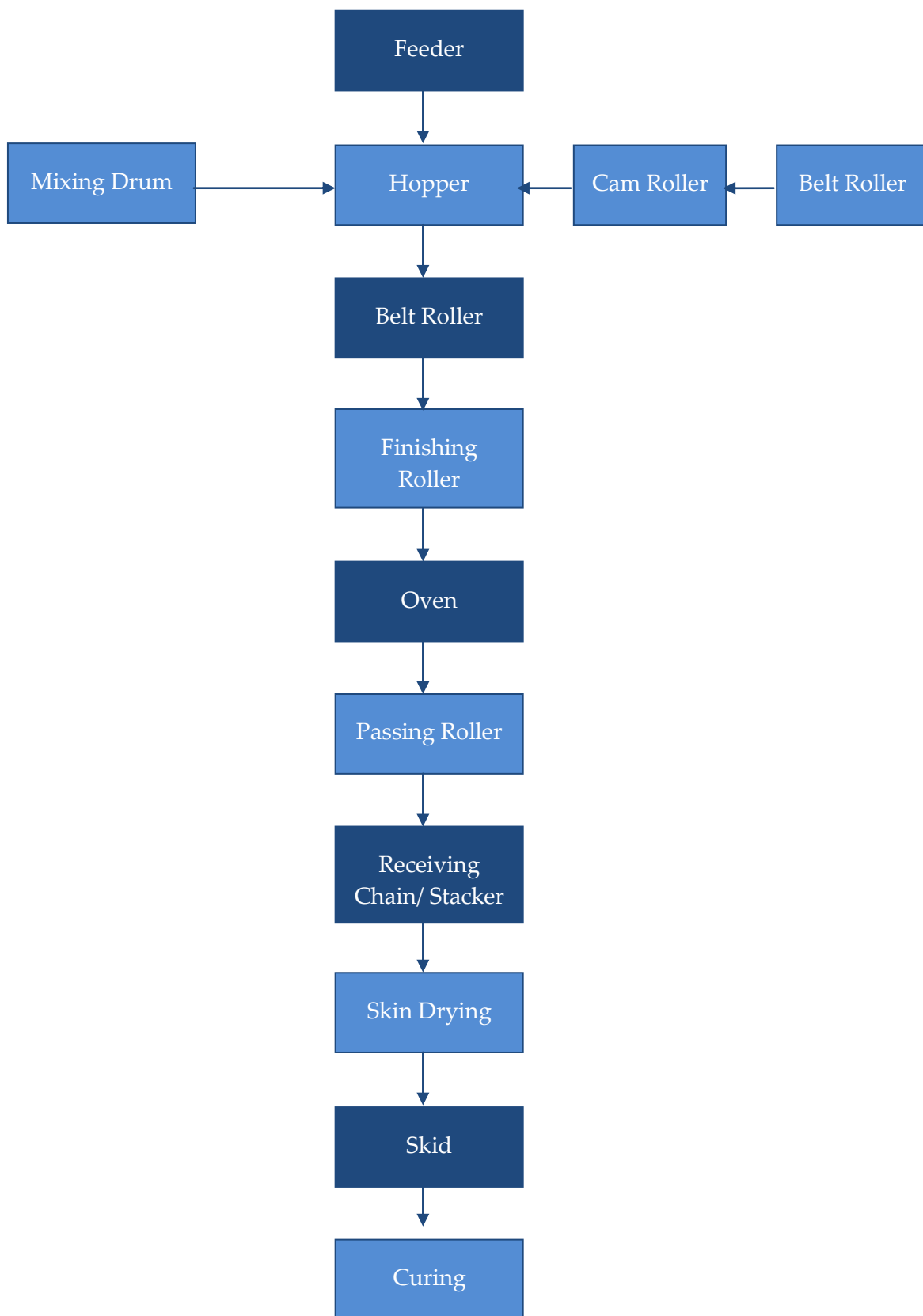
At first pastes will be poured in the hopper from mixture drum. On the other side, grids will be put in the belt roller which sends the grids into the cam roller or auto lifter. Pastes will be pasted on the grids by a roller and pasting will be finished in the finishing roller. Then the pasted plates will be passed into the oven by conveyer chain. Then it will be sent into the receiving chain by passing roller and the pasted plates are put in the skid. The skid has a square shape tray in the bottom which is filled with water. The layers of skid will be covered by the wet jute bag. These wet jute bags and water filled tray will be used to



maintain accurate moisture; otherwise these pasted plates will create reaction with air and will lose the moisture range. Then the skid is sent to the curing oven. The schematic diagram of generalized pasting process is given in following Figure.



Figure 3-3. Schematic Diagram of Pasting Process





### 3.7.5 CURING AND CONDITIONING

Grids will be dried with skin drying process to remove the moisture from the plate to keep it under certain value. Skids of grids will be kept at specific temperatures for specific period of time to reduce the moisture content. This process is called curing. After curing, grids will be kept at ambient temperature for 48 hours. This process is called conditioning.



### 3.7.6 1ST ASSEMBLY SECTION

Polyethylene separators will be cut into envelopes by a machine known as P-Envelope machine. One side of PE separator is rib side and another side is plane side. Positive plates will be enveloped & stacked with negative plates, to get stacked elements known as P.E-Assembly.

### 3.7.7 2ND ASSEMBLY SECTION

After separating, the flags of positive plates and negative plates will be joined by melting lead stick. PE Assemblies will then be automatically placed in the battery cases. A top will be placed on the battery case. The posts on the case top will then be welded to 2 individual points that connect the positive and negative plates to the positive and negative posts, respectively. 70% Sulphuric Acid (Specific Gravity 1.28) and 20% water will be added and then a boost charge is applied to complete the battery. Completed battery will then be sent to battery storage area.

## 3.8 CONSTRUCTION ACTIVITIES

The proposed lead Acid Battery unit will take approximately 2 years for construction installation and commissioning.

Typical activities that are conducted during the civil construction are listed below:

- Construction camp setup and mobilization of contractors
- Excavation for foundations
- Laying of foundations
- Masonry work





- Concrete work
- Asphalt work (pavement etc.)
- Finishing (plastering, painting, etc.)

The proposed project and ancillary equipment, brought to site by road in sections, will be erected on site and commissioned. Typical activities that are conducted during installations are listed below:

- Site fabrication (equipment/pipe supports, equipment assemblies, etc.);
- Placement of the vessels and equipment
- Laying of pipes;
- Welding, joining, etc.
- Electrical installation (cabling, switchgears, transformers, etc.)
- Instrument installation and
- Painting etc.

### **3.8.1 RESOURCES CONSUMPTION AND SUPPLIES**

#### **Staffing**

It is expected that around 200 skilled and unskilled personnel will be required during construction activities of the project. Local people will also be hired for unskilled and semi-skilled work during project activities.

#### **Water & Electricity Sourcing**

Water required during peak construction period will be procured from groundwater resource. The estimated amount of water required for the construction process will be approximately 100 GPD. The Potable water collected for the proposed project will meet NEQS for drinking water and WHO guidelines.

Electricity from FESCO will be the primary source during the construction phase and generators will be used as backup.

#### **Construction Material Sourcing**

The construction material for the proposed battery unit includes 30 lac bricks, sand 250, 00 cft crush 450, 00 cft, cement 4000 tonnes and steel 1500 tonnes.



### **3.8.2 WASTE DISCHARGE**

#### **Gaseous Emissions**

The primary source of gaseous emissions during construction activities will be diesel-engine driven generator exhaust and the transportation vehicles. Other emission sources include construction machinery, vehicle exhaust emissions, and dust emissions from excavation and other field activities.

#### **Waste Disposal**

The liquid waste generated during the construction phase of the project will be sent to waste water treatment system before its final disposal. The solid waste generated during all construction activities will be collected and land filled as per its nature. Waste material will be disposed off following the waste management plan.

### **3.8.3 TESTING AND COMMISSIONING**

After the completion of construction activities, fabrication, and installation of systems, the equipments will be tested and commissioned.

### **3.8.4 DEMOBILIZATION AND SITE RESTORATION**

On completion of the construction and commissioning phase, the construction contractor will demobilise from site and construction camp will be removed. Temporary infrastructure will be decommissioned and sites restored. This will involve:

- Removing the temporary construction camp
- Removing all waste and leftover construction materials from site
- Levelling and restoration of areas if required.

## **3.9 PROPOSED PROJECT OPERATIONS**

A brief description of the operations of lead acid battery unit is mentioned below, while details of process and technology are discussed in **Section 3.6** above:

- 1) The proposed battery unit will be operated electrically
- 2) Imported lead will be used to generate positive and negative plates
- 3) Imported plastic granules will be used to produce plastic battery cases and covers.
- 4) The lead will be imported and stored on site
- 5) Lead storage area will be constructed at project site.
- 6) Sulphuric acid tanks will be designed within the project area.



- 7) The effluents will be sent to treatment plant inside the battery unit before its discharge into the combined treatment system of M3 Industrial City.

### **3.9.1 RESOURCES CONSUMPTION – OPERATIONAL PHASE**

#### **Staffing**

It is expected that around 175~200 personnel skilled and unskilled staff will be appointed during operational phase of the project. Local people will also be hired during project activities.

#### **Water consumption**

Water for the operations would be extracted from ground water aquifer. The total water required for the operational phase will be approximately 175 tons/day

### **3.10 HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT STANDARDS**

The construction and operational phase of the project will have to meet the requirements of health, safety and environmental standards and Health Safety and Environment Policy of Treet FTMM standards highlight commitment on prioritizing health and safety of all its employees, contractors and visitors involved in its activities and confer overriding commitment towards minimizing impact of its activities on the natural environment.

#### **3.10.1 HEALTH, SAFETY AND ENVIRONMENTAL**

Treet Group HSE policy is to;

- Minimize its environmental impact, as is economically and practically possible.
- Save raw material, water and energy and avoid wastage (and reprocess the waste to the maximum possible extent).
- Ensure that all its present and future activities are conducted safely without endangering the health of its employees, its customers and the public.
- Develop plans and procedures and provide resources to successfully implement the policy and for dealing effectively with any emergency.
- Provide environmental, health and safety training to all employees and other relevant persons to enable them to carry out their duties safely without causing harm to themselves, others and to the environment.
- Ensure that all its activities comply with national environmental, health and safety regulations.
- Donations, charities, contributions and other payments of a similar nature; Companies within Treet Group are, subject to Board's approval, encouraged to provide support to local



communities through donations, charities etc. to fulfill its duty toward social cause. But companies in our Treet Group will not, in any case, contribute any amount;

a) To any political party; or

b) For any political purpose to any individual or body.

- Moreover, Companies in Treet Group shall not distribute gifts in any form to its members in its meeting.

During the construction phase contractor will develop a specific “health & safety management plan” as part of “construction management plan” considering all safety aspects of man & machine. The framework will be as under:

**Area assignment & demarcation:**

- Areas for site offices
- Storages for raw material and equipment including loading / unloading areas
- Waste yard
- Location of any potentially hazardous material such as oil, chemical

**Health:**

- Owner will develop first aid facility center for its own manpower
- Whereas, contractor will be responsible to arrange first aid facilities for its manpower

**Safety:**

- Appropriate PPE's will be provided / ensured to all manpower including training
- Training for handling of chemical including display 'material safety data sheets'
- Proper scaffolding will be provided / ensured for working above 1 m floor level
- Ear protection above 85 dB(A) noise level
- Identification, working environment, ventilation and safety procedure for confined space working
- Parking
- Lifting equipment (such as cranes) will be tested as per governing standards
- Proper illumination will be provided

**Fire Protection:**

- Fire protection plan, equipment and training will be ensured

**Disposal of waste:**



- Demarcation and assignment of waste yard
- Liquid and solid effluents from site office / camp

Moreover following procedures will also be followed during all phases of project activities.

- FTMM Safety Rules
- Plant Safety Committees
- Work Permit Procedure
- Personal Protective Equipment
- Safe Driving Procedure
- Incident Investigation Procedure
- Emergency Response Procedure
- Hazards Identification &
- Risk Control Procedure

### **3.11 BATTERY UNIT SAFETY MEASURES**

Measures will be taken to reduce the hazards ensuring the safe and reliable working

- Work area will be well ventilated.
- Acid will be stored in accordance with the available prescription in MSDS.
- Emergency wash stations should be located near lead-acid battery storage and charging areas.
- Distance will be maintained while boosting, testing or charging of battery.
- Lead-acid battery storage and charging areas should be posted with “Flammable and No Smoking” signs.
- Following PPE’s will be provided accordingly:
  - Non-vented safety goggles
  - Face shield (considered secondary safety protection)
  - Acid resistant gloves (neoprene is sufficient)
  - Apron (If there is a potential to spill acid)
  - Steel-toe boots or foot guards if the battery is lifted
- Regular housekeeping reports and checks.



## 4 PROJECT ALTERNATIVES

This section covers the project alternatives which were examined for the proposed battery unit installation at Tehsil Chak Jhumra, Faisalabad District, Punjab Province. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options will be adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of appropriate option that was required to ensure optimal results within defined set of economic, environmental, health and safety constraints. In particular it outlines the following project options:

- 1) The “No Development Option”.
- 2) Alternative Site Option.
- 3) Technology Alternatives

### 4.1. NO DEVELOPMENT OPTION

Different Batteries are used for different purposes in Pakistan especially in automobiles and UPS. Though many industries are manufacturing different types of batteries including lead acid batteries but the current production does not meet the demand. Electricity load-shedding in Pakistan has compelled the people to adopt alternatives like generator and UPS (Uninterrupted Power Supply).

MFSB (Maintenance Free Sealed Batteries) is replacing Conventional Batteries. No formal plant of MFSB exists in the Country at the moment. Only source of MFSB is import which is inconsistent, unreliable and costly.

The current battery unit of MFSB will help the people in Pakistan to access the technology easily and may help to cater the demand for high quality MFSB batteries.

### 4.2. ALTERNATIVE SITE SELECTION

Different sites were evaluated for the installation of proposed project in order to control and mitigate the environmental and socioeconomic impacts at an early stage. The evaluation of sites was based on following criterion:

- Sufficient land should be available for development.
- It should be easily accessible not putting an additional transportation cost to the proposed project.
- Proximity of environmentally sensitive receptors should be avoided.

Recognizing that the proposed development may have adverse impacts on surrounding environment, site selection exercise was carried out. It was decided to install the proposed



battery unit inside the M3 Industrial City Faisalabad facility in order to achieve a balance between the area to be used for the installation and resources required to maintain the operations. The merits of the selected site are given below:

- Sufficient area is available for the proposed development
- The proposed project is in the vicinity of M-3 Motorway which will ensure easy access for the transfer of materials and products to nearby areas
- Environmental management and controls are easier as industrial city has its own environmental management controls along with the environmental policies of FTMM
- The M3 Industrial city Faisalabad has its own combined Waste Water Treatment System which is definitely cost/management effective for FTMM.

### **4.3. TECHNOLOGY ALTERNATIVE**

Sealed lead acid dry batteries usually have following advantages against the conventional batteries being used in Pakistan.

- Inexpensive and simple to manufacture - in terms of cost per watt hours, the SLA (Sealed Lead Acid) is the least expensive.
- Mature, reliable and well-understood technology - when used correctly, the SLA is durable and provides dependable service.
- Low self-discharge - the self-discharge rate is among the lowest in rechargeable battery systems.
- Low maintenance requirements - no memory; no electrolyte to fill.
- Capable of high discharge rates.





## **5 ENVIRONMENTAL AND SOCIAL BASELINE**

This chapter defines the prevailing environmental and socio-economic settings within the proposed project area, and details the importance of these resources. The project area in this document is defined as the area where the project related activities to be carried out which include the proposed project site and surroundings, and the area that can interact with the project's positive and negative externalities in the long run. The environmental impact of any activity or process will be assessed on the basis of a deviation from the baseline or normal situation. Followings are the main components of the baseline:

- Physical Environment
- Biological Environment
- Socioeconomic Environment

The description provided in this section is based on followings:

- Desktop study and literature review
- Baseline data gathered from field activities
- Baseline data from relevant departments
- Government released publications such as Provincial and Federal census reports.
- Meetings and data collection from the proponent.

The main components of environment as mentioned above is broadly covers following environmental features;

- Surface water resources
- Ground water quality
- Ambient Air quality
- Soil Characteristic
- Noise
- Flora and Fauna
- Local communities and their concerns

### **5.1. PHYSICAL ENVIRONMENT**

Physical environment essentially illustrates baseline conditions of topography, geology/ soils, climate, surface water and groundwater of the project area, where necessary, of proposed project regardless of an EIA or IEE studies.



### **5.1.1 PHYSICAL FEATURES & TOPOGRAPHY**

The proposed project lies in M3 Industrial City, FIEDMC, Faisalabad where proponent “First Treet Manufacturing Modaraba (FTMM)-Battery Division” aims to install Lead-Acid Battery Unit. There are different industrial units within the M3 industrial city in operational, constructional and planning phase. These units include Maham Engineering, Zahid Textile, Multan Chemicals, Ayan Engineering, Brighto Chemicals, ZKBI (PVC Piping), Ghani Feed, Match Industry, Al-Hafiz Crystoplast, Chemtech, Noor Fatima, Power Plant and different warehouses etc. The following major industrial and commercial units are located in the vicinity of proposed project location.

The project lies in district Faisalabad and it has detail background history. Faisalabad previously known as Lyallpur was established as a Mandi Town in 1895 as a part of the program of colonization of West Punjab. It was formerly a part of Tehsil Jhang of Multan Division. Because of the fact that most of the area was un-cultivated and there were no regular crops, it served the purpose of only a meadow for the cattle of the indigence. The opening of Lower Chenab Canal in 1892 and its extension to the area in the form of Rakh Branch, Jhang Branch and Gogerah Branch coupled with the introduction of a Canal Irrigation system, brought the whole area under regular cultivation. The city was named in honor of Sir James Lyall, the then lieutenant Governor of the Punjab. The design of the Town was prepared by Mr. Young and it was further improved by Sir Gunga Ram, a renowned Town Planner of the time. It was laid down on a parcel of land measuring 110 acres in a square form with eight bazaars radiating from the central Clock Tower.

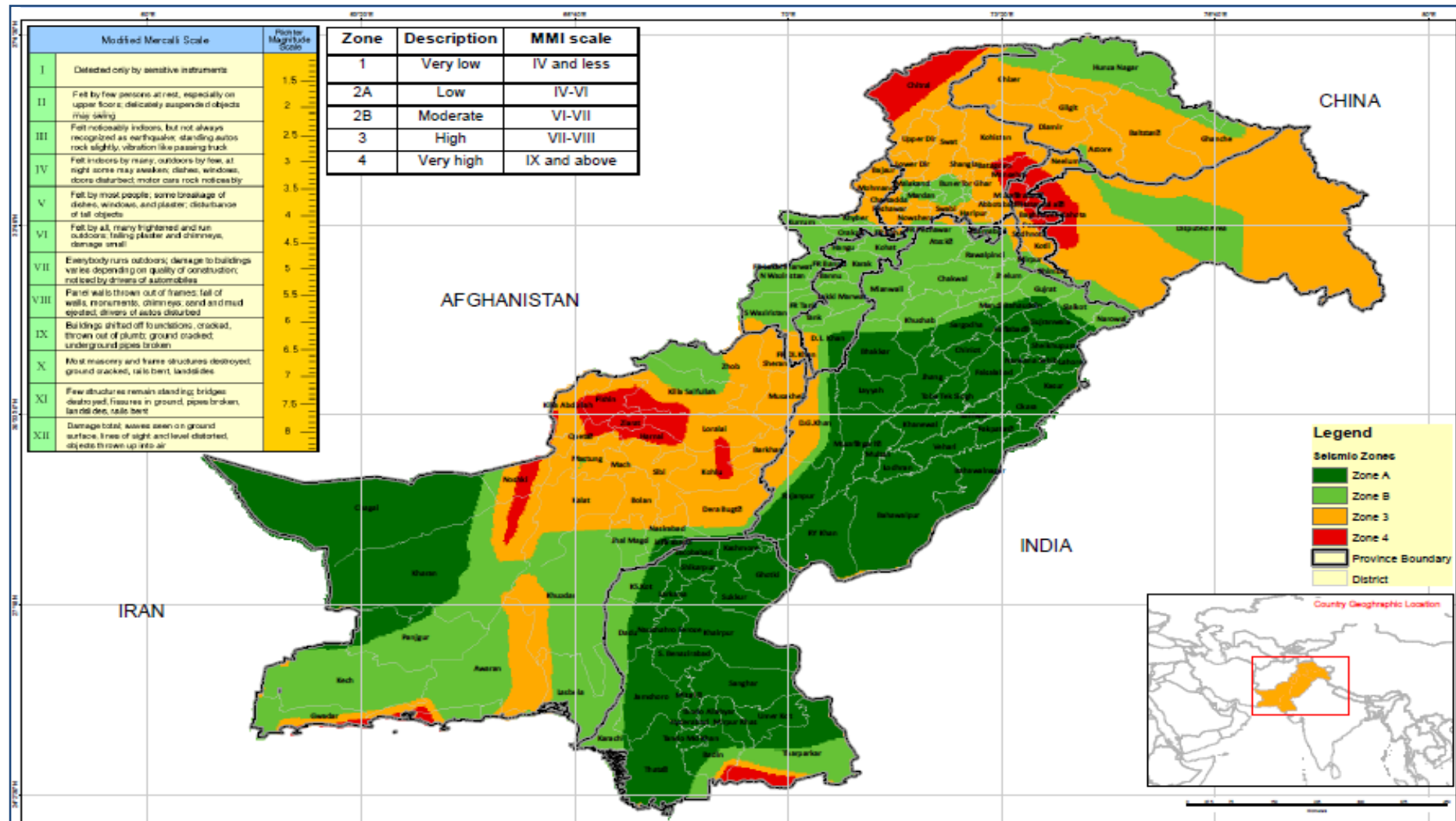
The district of Faisalabad is situated in the center of the lower Rachana Doab, the area between Chenab and Ravi rivers, which has a mild slope from North-East to South-West with an average of about 0.2 to 0.3 meter drop per kilometer or about 1 to 1.5 feet per mile. The city is situated at an elevation of about 183.35 meters above the Sea level. The topography is however marked by valleys, local depression and relatively high ground.

### **5.1.2 SEISMICITY**

Pakistan lies on an active seismic belt of earth. Seismic observations indicate that hundred of shocks originate every year. Mostly, these seismic waves are of low intensity and do not have significant effect. According to seismic zones of UN-Habitat the project area falls under Zone 2A. The seismic zoning map is shown in **Figure 4-1**.



Figure 5-1: Seismic Zoning Map





### 5.1.3 GEOLOGY AND SOIL

The city is located on the “Bar Upland” which is relatively older alluvium deposit as found in the central part of the Doad. Because of its elevation above the bordering flood plains, the upland is generally beyond the reach of flood spills, which is the significant physiographic feature of the alluvial plan. Like other Punjab plains, the alluvium is quaternary and has been deposited on semi-consolidated tertiary rocks or on a basement of metamorphic and igneous rocks of Precambrian age. It emanates from the mountain ranges of the north and has been deposited by the present and ancestral streams. The deposition is predominantly fluvial sediments.

### 5.1.4 CLIMATE

#### Climatic Zone

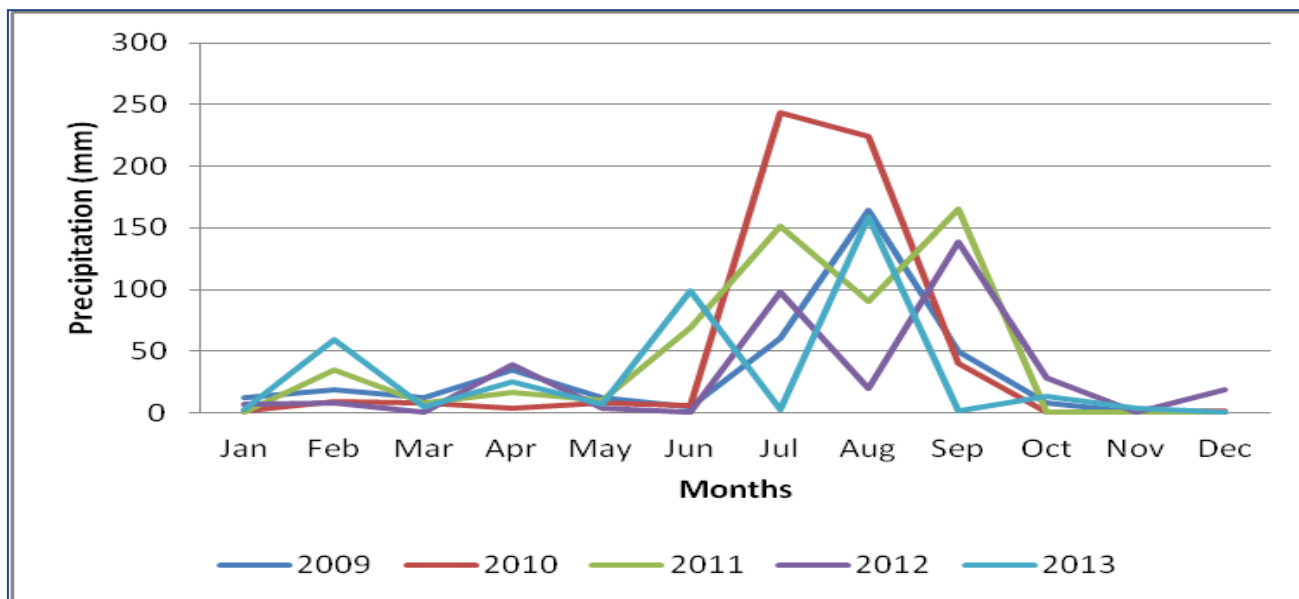
The meteorological data from Faisalabad has been used to identify the baseline climatic condition of the project area and surroundings. The proposed project lies in arid climate region.

The last five years data was obtained from Pakistan Meteorology Department, meteorological station at Faisalabad to have an overview of the area’s climatic regime. The data from the Department of Metrology is included as **Annex-C** of the report while a brief description is given below:

#### Seasons and Rainfall

The proposed project is situated in district Faisalabad which has hot summers and moderately cold in winter. It is located in the region that encounters four seasons, the hot summer starts from May and continues till July, monsoon starts from July and continues to September while winter season end in February starting from November and spring season lasts for two months from March and April. The last five years annual rain fall data from 2009 to 2013 shows variation between -1 – 243.1 mm. The rain fall data has been used from nearest weather station residing in Faisalabad district is summarized in **Figure 5-2**.

**Figure 5-2: Mean Monthly Precipitation (mm)**



### Temperature

The ambient temperature of proposed project region varies from summer to winter. The change in temperature has a direct influence on the environment of the project area. Hot and dry conditions during summer season changes the air quality by increase in particulate matters due to drying of road pavements and open soil. According to last five years data, mean monthly minimum temperature in the area varies from 3.5 to 28.6 C° and mean monthly minimum temperature were found 16.6 – 41.9 C°. The mean monthly minimum and maximum temperature from Faisalabad weather station at Lahore and its surrounding areas for last five years are given in **Figure 5.3** and **Figure 5.4** respectively.

**Figure 5-3: Mean Monthly Minimum Temperature (°C)**

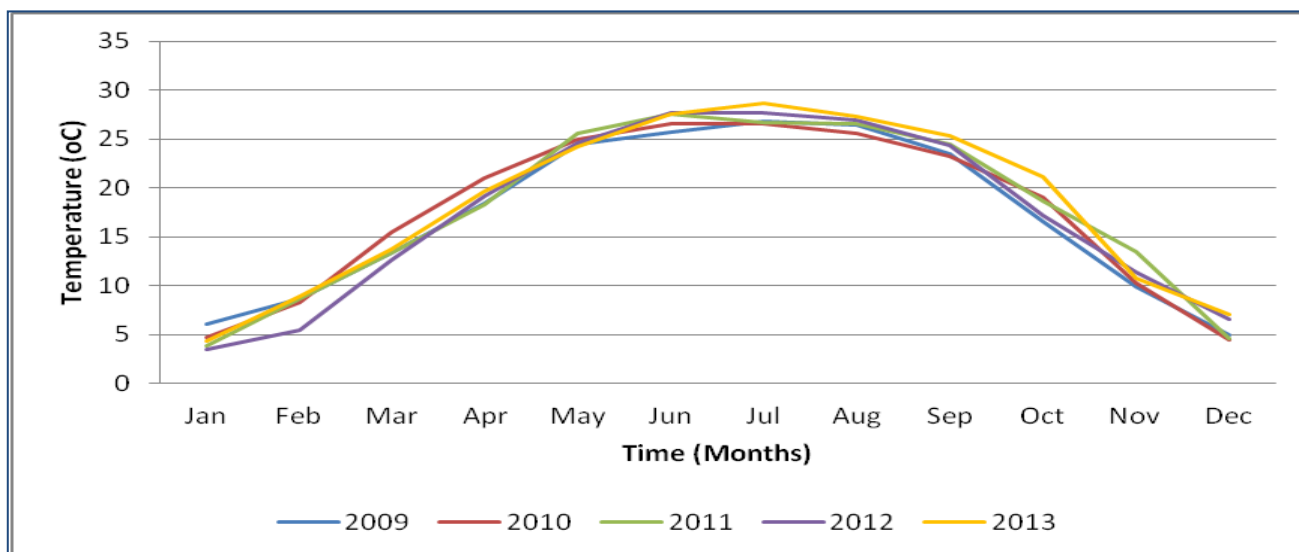
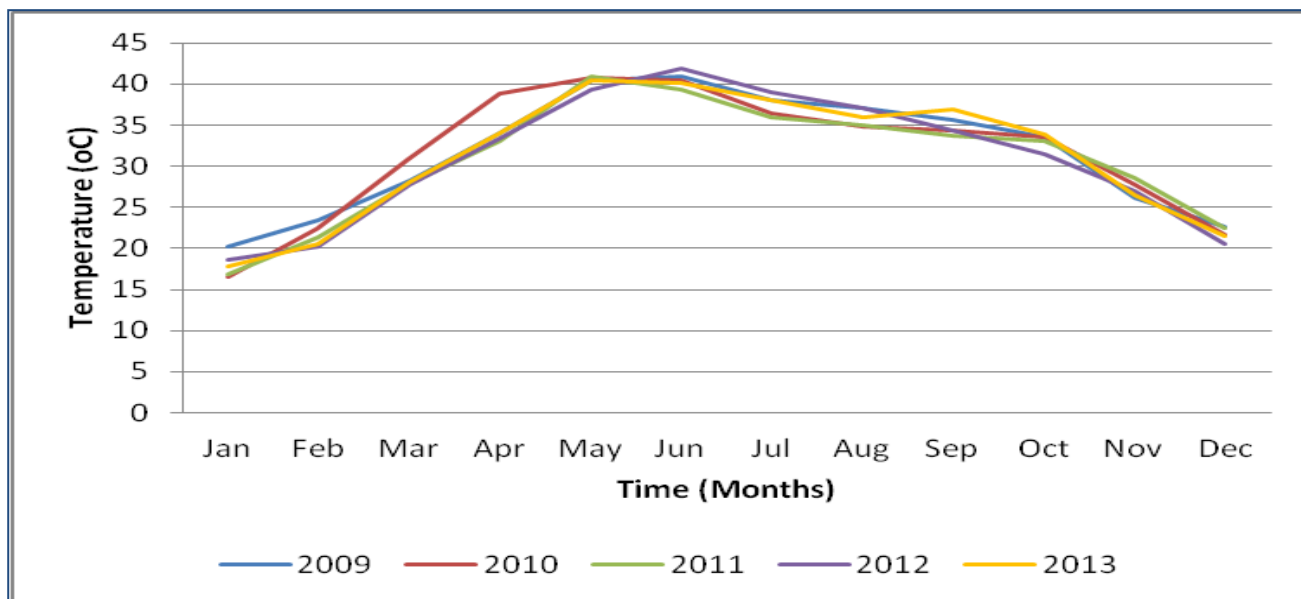




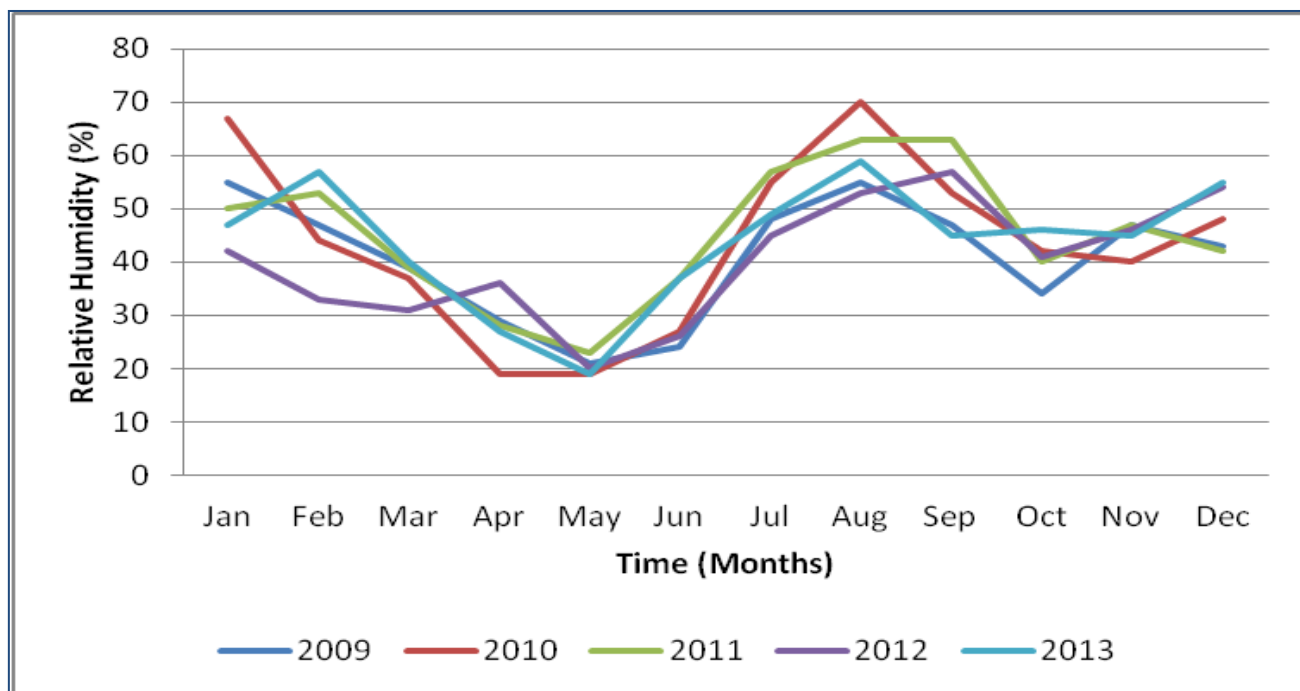
Figure 5-4: Mean Monthly Maximum Temperature (°C)



#### Relative Humidity

The relative humidity in project region varies from 19 to 70 %. The highest humidity in the area was recorded 70 %, which was in the month of August 2010. The humidity data from 2009 to 2013 is summarized in the following **Figure 5.5**.

Figure 5-5: Mean Monthly Relative Humidity at 1200 UTC (%)



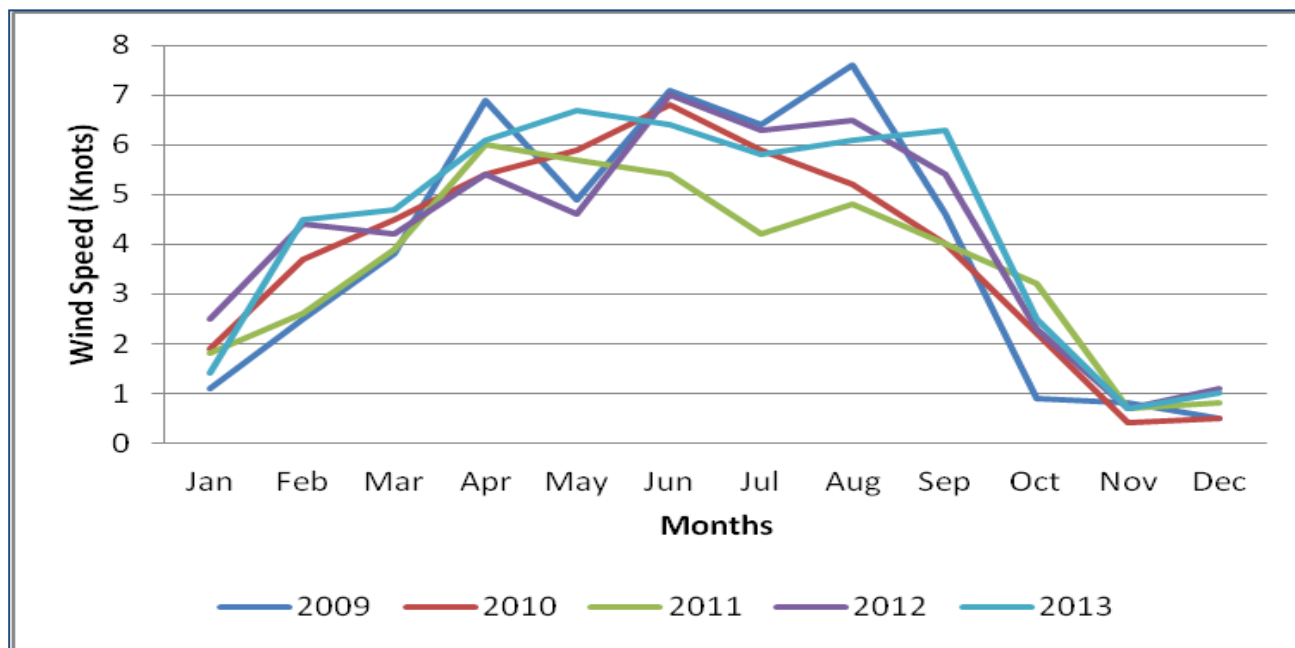




## Wind Speed

The dust storms and hot winds blow continuously during the months of March to August. Wind speeds and seasonal patterns vary considerably in the project area. The monthly average of wind speed is ranging from 0.4 to 7.6 Knots. The data for the wind speed from 2009 to 2013 is summarized as **Figure 5.6**.

**Figure 5-6. Mean Monthly Wind Speed at 1200 UTC (%)**



### 5.1.5 WATER RESOURCES

Water resources of the area are discussed under two broad headings, surface water resources and groundwater resources.

#### Surface Water

Surface waters resources are usually exposed to the surface of earth in the form of mobile and immobile situation which includes snow-clad mountains, rivers, non-river streams, rain, sleet, wetlands and oceans. Surface resourced waters are highly susceptible to natural and anthropogenic derived contamination in terms of Chemical and Biological contamination and thus are not used for sensitive applications such as drinking directly, unless it is pre-treated.

Among surface waters, district & near the project extremities there is a distributor canal of Jhang Branch which is used for the irrigation purpose and etc.

#### Ground Water

Ground water resources are found hidden and camouflaged into the surface of earth in the form of mobile and immobile state and exist as shallow and deep wells, confined and un-





confined aquifers, springs and watersheds. Ground resourced waters are not easily susceptible to natural and anthropogenic derived contamination caused by Chemical/Biological pollution and thus is directly used for sensitive applications such as drinking even it is un-treated. Main visible pollutants such as turbidity, color and odor usually remain absent in ground extracted waters. Invisible biological contaminants such as Bacteria, Protozoa and Viruses are also not expected in sub-surface water regimes unless it is contaminated by un-expected upheaval.

Water constitutes an important section of Physical Environment of an IEE/EIA Study to define its magnitude, quality and occurrence throughout the entire project corridor. On geo-sphereic earth water is amounting to 3% as fresh water resource of the total water reserve. Of this groundwater comprises 95%, surface water 3.5% and soil moisture 1.5%. Out of all the fresh water on the earth, only 0.36% is readily available for diversity uses and applications.

The project area lies in the district of Faisalabad; the groundwater table normally exists 25 to 30 meter below the ground level and contains high level of salinity.

## **5.2. ENVIRONMENTAL BASELINE MONITORING**

In order to assess the baseline conditions of the project area, following environmental components were monitored;

- 1) Ambient air quality monitoring,
- 2) Noise monitoring,
- 3) Soil sampling and analysis
- 4) Water sampling and analysis

Environmental baseline monitoring was conducted at different locations. The details of the sampling/ monitoring locations along with discussions on result are given subsequent sections. Pictorial over-view of environmental monitoring carried out in the project area is presented in **Figure 5-8**.

### **5.2.1 AMBIENT AIR QUALITY**

Troposphere air is highly susceptible to hostile anthropogenic activities taking place at ground level or in vicinity of ground; which are mainly caused by fossil fuel combustion in industrial units and also caused by high density transportation through mobile & immobile vehicles. Degradation of fossil fuel under the impact of high temperature give rise to varying gaseous products composed mainly of CO<sub>2</sub> in association with small amounts of Particulates, CO, NO<sub>x</sub> and SO<sub>x</sub> etc. These pollutant gases changes the ambient



concentration of air environment and could cause sufficient damage to ground level air ecology.

The proposed project is located in fairly open and clean air and is mostly surrounded by diverse agriculture lands and villages. The only sources of air pollutants are from few operational industries in M3 Industrial City and main roads in the vicinity.

As such no viable air contaminants are expected in the air-shed of proposed project. However, most common airborne contaminants that are likely to be emanated from aforementioned sources giving rise to very low magnitude of these contaminants include Smoke, CO, NO, NO<sub>2</sub>, SO<sub>2</sub> and particulate matter.

In the absence of continuous and permanent air quality monitoring stations in the country, it is difficult to provide a concrete baseline on ambient air quality concentrations for criteria pollutant, such as, Carbon monoxide, Nitrogen dioxide, sulphur dioxide, and suspended particulate matter.

In order to collect the current baseline data for ambient air quality including SO<sub>2</sub>, NO<sub>x</sub>, CO & PM, were monitored at project area to determine the magnitude of these pollutant gases. The Air monitoring point is depicted in **Figure 5.7**.

Ambient air quality is measured with monitoring devices that have the capability to capture & analyze criteria air borne pollutants including CO, NO<sub>2</sub> and SO<sub>2</sub> at micro levels. The monitoring techniques of each of these pollutant gases based on USEPA defined standard methods depicted in **Table 5-1**.

**Table 5-1: Ambient Air Monitoring Methodology**

| Air Pollutant                          | Monitoring Technique                 | Reference Method                       | Measurement Range                                     | Lowest Detection Limit |
|--|--------------------------------------|--|---|------------------------|
| Carbon Monoxide (CO)                   | Gas Filter Correlation CO Analyzer   | US EPA Designated Method RFCA-0981-054 | 0 – 100 mg/m <sup>3</sup>                             | 0.01 mg/m <sup>3</sup> |
| Sulfur Dioxide (SO <sub>2</sub> )      | Pulsed Fluorescent Analyzer          | US EPA Designated Method EQSA-0486-060 | 0 – 50 µg/m <sup>3</sup><br>0 – 100 mg/m <sup>3</sup> | 0.01 µg/m <sup>3</sup> |
| Nitrogen Dioxide (NO <sub>2</sub> )    | Chemiluminescent Analyzer            | US EPA Designated Method RFNA-1289-074 | 0 – 50 µg/m <sup>3</sup><br>0 – 100 mg/m <sup>3</sup> | 0.01 µg/m <sup>3</sup> |
| Particulate Matter (PM <sub>10</sub> ) | High Volume PM <sub>10</sub> Sampler | 40 CFR 50, Appendix J (US EPA)         | 2 – 750 µg/m <sup>3</sup>                             | 2 µg/m <sup>3</sup>    |



NEQS for air quality standards have been introduced in Pakistan since 2010; therefore, the monitoring values of Carbon monoxide (CO), Sulphur dioxide (SO<sub>2</sub>), Nitrogen dioxide (NO<sub>2</sub>), and Particulate Matter (PM<sub>10</sub>) were compared with standards set by NEQS.

08 hours Air monitoring CO was found 0.9 mg/m<sup>3</sup> inside the proposed project boundary and it was well complying NEQS guideline limit of 5.00 mg/m<sup>3</sup> regulated at 8 hours monitoring.

24 hours Air monitoring pattern on NO<sub>2</sub> indicates that it was below the detection limit as per below mentioned table (**Table 5-2**) and comply with NEQS, 2010.

24 hours Air monitoring of SO<sub>2</sub> indicates that it was below the detection limit as per below mentioned table (**Table 5-2**) and comply with NEQS, 2010.

Overall Air monitoring indicates that average 24 hours concentrations of CO, NO<sub>2</sub> and SO<sub>2</sub> were found below the permissible limits regulated by NEQS, 2010 for ambient air whereas Particulate Matter (PM<sub>10</sub>) was recorded 92.86 µg/m<sup>3</sup> inside the SCIL and the results were found well complying NEQS defined limit of 150 µg/m<sup>3</sup> during 24 hour of measurement. Summary of ambient air quality monitoring is presented in **Table 5-2**.

**Table 5-2. Ambient Air Monitored Data**

| Parameter                              | Unit              | Duration | Inside Proposed Project Boundary | NEQS Limits |
|--|-------------------|----------|----------------------------------|-------------|
| Carbon Monoxide (CO)                   | mg/m <sup>3</sup> | 8 Hours  | 0.9                              | 5.0         |
| Nitrogen Dioxide (NO <sub>2</sub> )    | mg/m <sup>3</sup> | 24 Hours | <0.1                             | 120         |
| Sulfur Dioxide (SO <sub>2</sub> )      | mg/m <sup>3</sup> | 24 Hours | <0.1                             | 120         |
| Particulate Matter (PM <sub>10</sub> ) | mg/m <sup>3</sup> | 24 Hours | 95.5                             | 150         |

The meteorological conditions were also monitored with the help of meteorological station installed for 24 hrs to assess the trend of air movements. The average monitored data is presented in the following table. The detailed data has been attached as **Annex-D** of the report.



Table 5-3: Meteorological Monitored Data

| Monitoring Locations | Monitoring Parameters (Avg 24 Hrs)    |               |              |                      |
|----------------------|---------------------------------------|---------------|--------------|----------------------|
|                      | Ambient Temperature (C <sup>o</sup> ) | Wind velocity | Humidity (%) | Atmospheric Pressure |
| Inside the SCIL      | 29.16                                 | 1.47          | 48.5         | 758.9                |

### 5.2.2 NOISE MONITORING

Noise is an important environmental stressor and is essential part of baseline for IEE/EIA studies. Noise has become a very important "stress factor" in the environment of human. The term "noise pollution" has been recently used to signify the hazard of sounds which are consequence of modern day development, leading to health hazards of different type.

In the absence of reliable noise data, noise monitoring was conducted during field survey at 6 locations by utilizing Mastech Noise Meter and the LAeq was measured. The noise level was found in range of 45.6 –58.0 dBA at day time which comply the permissible limit of 75 dBA for Industrial area. **Table 5-4** shows the summarized results of noise levels while noise measuring locations are also presented in **Figure 5.7**.

Table 5-4: Results of Noise Monitoring

| Sr # | Location               | Noise Levels (dB) |
|------|------------------------|-------------------|
| 1.   | Chak 161               | 48.5              |
| 2.   | Project Site           | 45.6              |
| 3.   | Within Industrial City | 50.1              |
| 4.   | Bharoki Pind           | 57.8              |
| 5.   | Shyan Wala Interchange | 57.8              |
| 6.   | West Boundary of Site  | 53.4              |
| 7.   | East Boundary of Site  | 58.0              |
| 8.   | South Boundary of Site | 48.6              |
| 9.   | North Boundary of Site | 51.1              |



### 5.2.3 SOIL QUALITY OF PROJECT AREA

In order to assess the quality of soil, two soil samples were collected from within the project area and near village and analysed according to the standard methods.

**Table 5-5: Results of Soil Analysis**

| Sr. # | Parameters                   | Method            | Unit    | LDL   | Test Results |                      |
|-------|------------------------------|-------------------|---------|-------|--------------|----------------------|
|       |                              |                   |         |       | Project Site | Bharoki Sahi da Pind |
| 01    | pH @ 28.9 oC (1:1)           | SW-846 Guidelines | -       | 0.1   | 8.34         | 8.37                 |
| 02    | Conductivity @ 28.9 oC (1:1) | SW-846 Guidelines | µS/cm   | 1.0   | 1056         | 154.0                |
| 03    | Grease & Oil                 | SW-846 Guidelines | % by wt | -     | BDL-         | BDL-                 |
| 04    | Chloride                     | SW-846 Guidelines | mg/kg   | 0.50  | 15.86        | 10.                  |
| 05    | Chromium (Cr)                | SW-846 Guidelines | mg/kg   | 0.50  | 8.70         | 11.49                |
| 06    | Lead ( Pb )                  | SW-846 Guidelines | mg/kg   | 0.50  | <0.50        | <0.50                |
| 07    | Cadmium (Cd)                 | SW-846 Guidelines | mg/kg   | 0.50  | <0.50        | <0.50                |
| 08    | Zinc (Zn)                    | SW-846 Guidelines | mg/kg   | 0.50  | 33.80        | 47.77                |
| 09    | Silver (Ag)                  | SW-846 Guidelines | µg/L    | 00.50 | 1.90         | 2.489                |
| 10    | Arsenic (As)                 | USEPA 3050B       | mg/kg   | 00.50 | 02.85        | 03.19                |
| 11    | Selenium (Se)                | USEPA 3050B       | mg/kg   | 00.50 | <00.50       | <00.50               |
| 12    | Barium (Ba)                  | USEPA 3050B       | mg/kg   | 00.50 | 1861.23      | 1466.53              |
| 13    | Mercury (Hg)                 | USEPA 7471B       | mg/kg   | 0.050 | <0.050       | <0.050               |
|       |                              |                   |         |       |              |                      |



#### 5.2.4 WATER QUALITY MONITORING OF PROJECT AREA

In order to assess the quality of ground water, the physical and chemical parameters were analyzed for the determination of quality of ground water and concentration of components. The analysis results of collected samples are tabulated below in **Table 5.6** and **Table 5.7**.

**Table 5-6: Chemical Results of Ground Water**

| Sr. # | Parameters                   | Method          | Unit  | LDL   | Test Results |                      | National Standards |
|-------|------------------------------|-----------------|-------|-------|--------------|----------------------|--------------------|
|       |                              |                 |       |       | Project Site | Bharoki Sahi Da Pind |                    |
| 01    | pH 25 oC                     | APHA4500H+ B    | -     | 0.1   | 8.19         | 8.06                 | 6.5-8.5            |
| 02    | Color                        | APHA 2120 C     | Pt-Co | 5.0   | <5.0         | <5.0                 | -                  |
| 03    | Turbidity                    | APHA 2130 B     | mg/L  | 0.20  | 3.8          | 1.6                  | <5                 |
| 04    | Total Dissolved Solids (TDS) | APHA 2540 C     | mg/L  | 5.0   | 519          | 295                  | <1000              |
| 05    | Chloride (Cl)                | APHA 4500Cl-B   | mg/L  | 0.5   | 10.89        | 6.80                 | 250                |
| 06    | Total Hardness               | APHA 2340 B & C | mg/L  |       | 273.6        | 83.6                 | -                  |
| 07    | Fluoride                     | APHA 4500F-C    | mg/L  | 0.050 | 0.312        | 0.170                | ≤ 1.5              |
| 08    | Nitrate                      | APHA 4500NO3 B  | mg/L  | 0.003 | 3.47         | 9.53                 | ≤50                |
| 09    | Nitrite                      | APHA 4500NO2 B  | mg/L  | 0.003 | <0.003       | <0.003               | ≤3                 |
| 10    | Cyanide (CN)                 | 4500CN F        | mg/L  | 0.05  | <0.05        | <0.05                | ≤0.05              |
| 11    | Phenols                      | APHA 5530D      | mg/L  | 0.01  | <0.01        | <0.01                | ≤0.002             |
| 12    | Cadmium (Cd)                 | APHA-3111 B     | mg/L  | 0.003 | <0.003       | <0.003               | 0.01               |
| 13    | Total Chromium (Cr)          | APHA-3111 B     | mg/L  | 0.005 | <0.005       | <0.005               | ≤ 0.05             |
| 14    | Copper (Cu)                  | APHA-3111 B     | mg/L  | 0.005 | 0.0062       | 0.0078               | 2                  |



|    |                |                    |      |       |        |        |             |
|----|----------------|--------------------|------|-------|--------|--------|-------------|
| 15 | Lead ( Pb )    | APHA-3111 B        | mg/L | 0.005 | <0.005 | <0.005 | ≤ 0.05      |
| 16 | Nickel ( Ni )  | APHA 3120 B        | mg/L | 0.005 | <0.005 | <0.005 | ≤ 0.02      |
| 17 | Zinc (Zn)      | APHA-3111 B        | mg/L | 0.005 | 0.0572 | 0.0238 | 5.0         |
| 18 | Manganese (Mn) | APHA-3111 B        | mg/L | 0.005 | <0.005 | <0.005 | ≤ 0.5       |
| 19 | Aluminum (Al)  | APHA-3111 B        | mg/L | 0.005 | <0.005 | <0.005 | ≤ 0.2       |
| 20 | Antimony (Sb)  | APHA-3111 B        | mg/L | 0.005 | <0.005 | <0.005 | ≤ 0.005 (P) |
| 21 | Arsenic (As)   | APHA 3120 B        | mg/L | 0.005 | <0.005 | <0.005 | ≤ 0.05 (P)  |
| 22 | Boron (B)      | APHA 3120 B        | mg/L | 0.005 | 0.099  | <0.005 | 0.3         |
| 23 | Mercury (Hg)   | APHA 3112 B        | mg/L | 0.001 | <0.001 | <0.001 | ≤ 0.001     |
| 24 | Selenium (Se)  | APHA 3120 B        | mg/L | 0.005 | <0.005 | <0.005 | 0.01        |
| 25 | Barium (Ba)    | APHA 3120 B        | mg/L | 0.005 | 0.366  | 0.051  | 0.7         |
| 26 | Chlorine       | APHA-4500Cl<br>B/C | mg/L | 1.00  | <1.00  | <1.00  | 0.5-1.5     |

**Table 5-7: Microbiological Results of Ground Water**

| Sr.<br># | Parameters                             | Procedure       | National<br>Standards | Results               |                         |
|----------|--|-----------------|-----------------------|-----------------------|-------------------------|
|          |  |                 |                       | Project<br>Site       | Bharoki Sahi Da<br>Pind |
| 01       | Total Colony Count                     | APHA: 9215<br>B | -                     | 8.0 X 10 <sup>3</sup> | 1.0X 10 <sup>4</sup>    |
| 02       | Total Coli Forms                       | APHA: 9222<br>B | 0 cfu /<br>100ml      | Absent                | Absent                  |
| 03       | Faecal<br>Coli Forms (E.Coli)          | APHA: 9222<br>D | 0 cfu /<br>100ml      | Absent                | Absent                  |
| 04       | Faecal<br>Streptococci/<br>Enterococci | APHA: 9230<br>C | 0 cfu /<br>100ml      | Absent                | Absent                  |





Table 5-8: Chemical Results of Surface Water

| Sr.<br># | Parameters                   | Method          | Unit      | LDL   | Test Results                   |
|----------|------------------------------|-----------------|-----------|-------|--------------------------------|
|          |                              |                 |           |       | Tributary from<br>Jhang Branch |
| 01       | pH 25 oC                     | APHA4500H+ B    | -         | 0.1   | 8.26                           |
| 02       | Color                        | APHA 2120 C     | Pt-<br>Co | 5.0   | <5.0                           |
| 03       | Turbidity                    | APHA 2130 B     | mg/L      | 0.20  | 120                            |
| 04       | Total Dissolved Solids (TDS) | APHA 2540 C     | mg/L      | 5.0   | 140                            |
| 05       | Chloride (Cl)                | APHA 4500Cl- B  | mg/L      | 0.5   | 67.0                           |
| 06       | Total Hardness               | APHA 2340 B & C | mg/L      |       | 117.8                          |
| 07       | Fluoride                     | APHA 4500F- C   | mg/L      | 0.050 | 0.127                          |
| 08       | Nitrate                      | APHA 4500NO3 B  | mg/L      | 0.003 | 4.56                           |
| 09       | Nitrite                      | APHA 4500NO2 B  | mg/L      | 0.003 | <0.003                         |
| 10       | Cyanide (CN)                 | 4500CN F        | mg/L      | 0.05  | <0.05                          |
| 11       | Phenols                      | APHA 5530D      | mg/L      | 0.01  | <0.01                          |
| 12       | Cadmium (Cd)                 | APHA-3111 B     | mg/L      | 0.003 | <0.003                         |
| 13       | Total Chromium (Cr)          | APHA-3111 B     | mg/L      | 0.005 | <0.005                         |
| 14       | Copper (Cu)                  | APHA-3111 B     | mg/L      | 0.005 | 0.0084                         |
| 15       | Lead ( Pb )                  | APHA-3111 B     | mg/L      | 0.005 | <0.005                         |
| 16       | Nickel ( Ni )                | APHA 3120 B     | mg/L      | 0.005 | <0.005                         |
| 17       | Zinc (Zn)                    | APHA-3111 B     | mg/L      | 0.005 | <0.0442                        |
| 18       | Manganese (Mn)               | APHA-3111 B     | mg/L      | 0.005 | 0.1104                         |
| 19       | Aluminum (Al)                | APHA-3111 B     | mg/L      | 0.005 | <0.005                         |
| 20       | Antimony (Sb)                | APHA-3111 B     | mg/L      | 0.005 | <0.005                         |
| 21       | Arsenic (As)                 | APHA 3120 B     | mg/L      | 0.005 | <0.005                         |
| 22       | Boron (B)                    | APHA 3120 B     | mg/L      | 0.005 | <0.005                         |
| 23       | Mercury (Hg)                 | APHA 3112 B     | mg/L      | 0.001 | <0.001                         |
| 24       | Selenium (Se)                | APHA 3120 B     | mg/L      | 0.005 | <0.005                         |
| 25       | Barium (Ba)                  | APHA 3120 B     | mg/L      | 0.005 | 0.174                          |
| 26       | Chlorine                     | APHA-4500Cl B/C | mg/L      | 1.00  | <1.00                          |



Figure 5-7. Monitoring Location

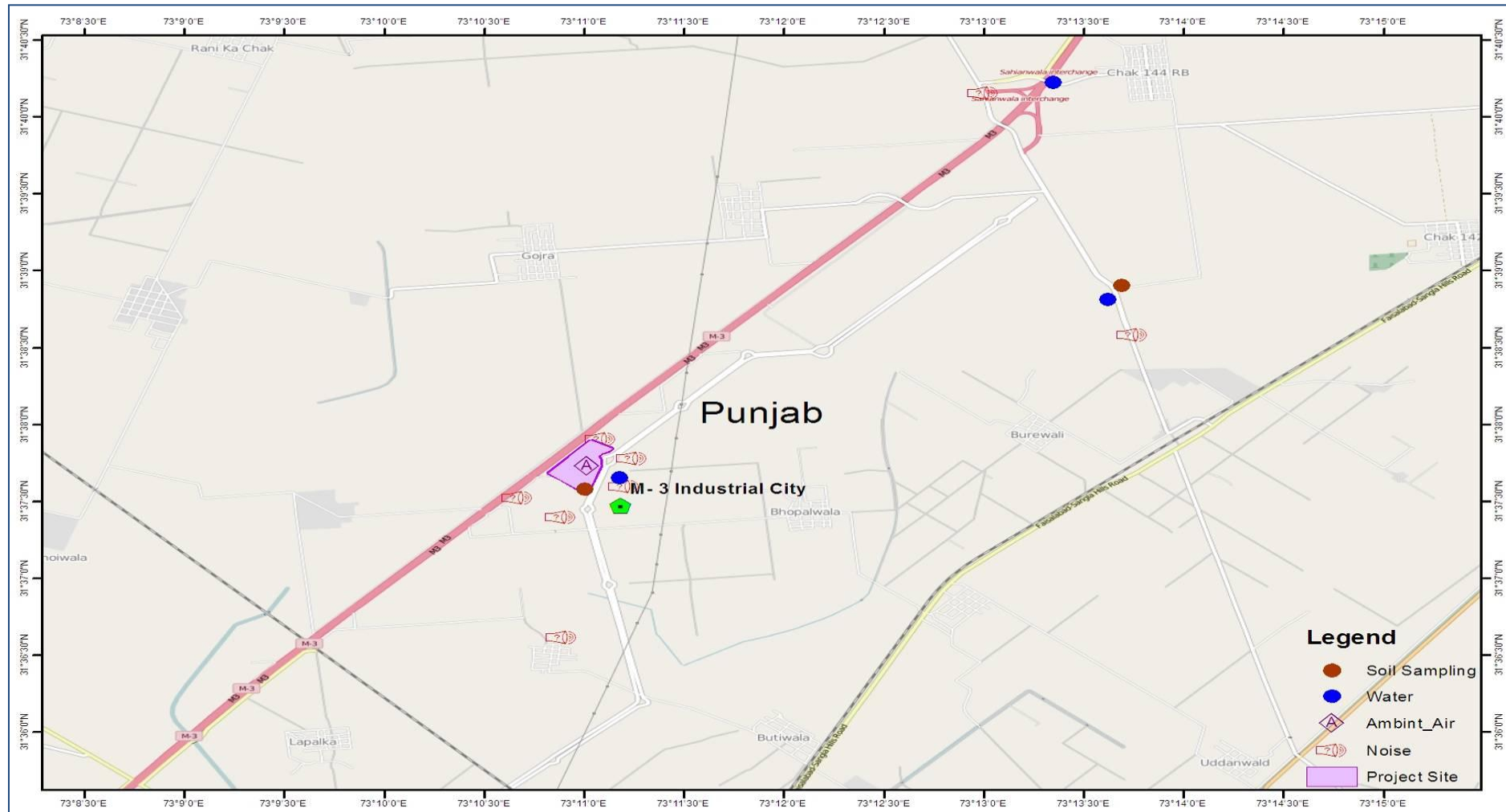


Figure 5-8: Photographs of Environmental Monitoring



Surface Water Sampling



Soil Sampling



Ambient Air Monitoring



Noise Measurement



### 5.3. BIOLOGICAL ENVIRONMENT

In this section, the baseline environmental conditions pertaining to biological environment are described. These conditions have subsequently been used to identify the potential impacts on the biological environment that are likely to arise from the project activities.

#### 5.3.1 FLORA

Based upon observations during the field visit many species of plants were directly observed in the project area. List of the floral species in the project area are given in the following **Table 5-8**.

**Table 5-8: List of Floral Species**

| Sr. No | Plant Species  | Family         | Local Name | Life-Form | Life-Span |
|--------|--|----------------|------------|-----------|-----------|
| 1.     | <i>Acacia nilotica</i>                               | Mimosaceae     | Kikar      | Tree      | Perennial |
| 2.     | <i>Alhaji maurorum</i>                               | Fabaceae       | Kandero    | Sub-shrub | Perennial |
| 3.     | <i>Dalbergia sissoo Roxb.</i>                        | Fabaceae       | Talhi      | Tree      | Perennial |
| 4.     | <i>Albizzia lebbek</i>                               | Fabaceae       | Sharin     | Tree      | Perennial |
| 5.     | <i>Calotropis procera</i>                            | Asclepiadaceae | Ak         | Shrub     | Perennial |
| 6.     | <i>Azadirachta indica</i> (L.)<br><i>Adelb.</i>      | Meliaceae      | Neem       | Tree      | Perennial |
| 7.     | <i>Aeluropus lagopoides</i><br>(Linn.) Trin. ex. Thw | Poaceae        | Gaah       | Grass     | Perennial |
| 8.     | <i>Phragmites karka</i> (Retz.)<br>Trin. ex Steud.   | Poaceae        | Nar        | Grass     | Perennial |
| 9.     | <i>Sorghum bicolor</i>                               | Poaceae        | Jawar      | Grass     | Annual    |
| 10     | <i>Triticum aestivum</i>                             | Poaceae        | Gandum     | Grass     | Annual    |
| 11     | <i>Veazea nays</i>                                   | Poaceae        | Makae      | Grass     | Annual    |
| 12     | <i>Tamarix indica</i>                                | Tamaricaceae   | Kahi       | Shrub     | Perennial |
| 13     | <i>Tamarix aphylla</i>                               | Tamaricaceae   | Lawo       | Tree      | Perennial |





|    |  |                |               |            |                |
|----|--|----------------|---------------|------------|----------------|
| 14 | <i>Zizyphus nummularia</i>             | Rhamnaceae     | Jhangoori Ber | Shrub      | Perennial      |
| 15 | <i>Zizyphus jayaba</i>                 | Rhamnaceae     | Beri          | Tree       | Perennial      |
| 16 | <i>Cyperus difformis</i> L.            | Cyperaceae     | Moniah Gaah   | Sedge      | Perennial      |
| 17 | <i>Cyperus rotundus</i> Linn           | Cyperaceae     | Gaah          | Sedge      | Perennial      |
| 18 | <i>Phoenix sylvestris</i> Roxb.        | Araceae        | Kahjoor       | Tree       | Perennial      |
| 19 | <i>Conyza canadensis</i>               | Asteraceae     | Boti          | Herb       | Annual         |
| 20 | <i>Eclipta alba</i>                    | Asteraceae     | Daryi Boti    | Herb       | Annual         |
| 21 | <i>Helianthus annuus</i>               | Asteraceae     | Soorag mukhi  | Shrub      | Perennial      |
| 22 | <i>Cordia myxa</i>                     | Boraginaceae   | Lesuro        | Small tree | Perennial      |
| 23 | <i>Allium cepa</i>                     | Liliaceae      | Peyaz         | Herb       | Annual         |
| 24 | <i>Salsola imbricata</i> Forssk..      | Chenopodiaceae | Lani          | Sub-shrub  | Semi-perennial |
| 25 | <i>Lycopersicon esculentum</i>         | Solanaceae     | Tamator       | Shrub      | Annual         |
| 26 | <i>Suaeda fruticosa</i> (Linn.) Forsk. | Chenopodiaceae | Lani          | Sub-shrub  | Semi-perennial |
| 27 | <i>Cressa cretica</i> Linn.            | Convolvulaceae |               | Herb       | Perennial      |
| 28 | <i>Ipomoea aquatica</i> Forssk.        | Convolvulaceae | Naar          | Shrub      | Perennial      |
| 29 | <i>Euphorbia thymifolia</i> Linn.      | Euphorbiaceae  | Kheera Wal    | Herb       | Annual         |

### 5.3.2 FAUNA

The main fauna of the project comprises of mammals, birds and reptiles.

#### Mammals

Although most of the study area comprises agricultural lands, but due to presence of shrubs of grass, shrubs and several agricultural crops like wheat in the surroundings 10 mammalian species have been recorded. Dense vegetation provide living shelter to the mammals like Asiatic Jackal, Five Stripped Palm Squirrel, Indian Crested Porcupine, Indian Desert Jird, Indian Gerbil, Cape Hare, Small Indian Mongoose, House Mouse, House Rat,



and Jungli Cat. All the 10 species are commonly found in the project areas as well as in country and no any significant threat can be expected from any activity.

### Reptiles

During the study several types of burros and droppings were found which indicate the presence of respected reptiles.

None of the reptiles and mammalian species found here are listed under any category of the IUCN Red List. Ten species of reptiles were also recorded including snakes, lizards and agamas. Only one species i.e. Indian cobra is listed as Data Deficient in the IUCN Red List.

**Table 5-9: List of Mammals/Reptiles**

| Sr.<br>No. | English Name                | Scientific Name                  | Occurrence |             |      | Listing    |      |       |
|------------|-----------------------------|----------------------------------|------------|-------------|------|------------|------|-------|
|            |                             |                                  | Common     | Less Common | Rare | Prov. Laws | IUCN | CITES |
| Mammals    |                             |                                  |            |             |      |            |      |       |
| 1          | Asiatic Jackal              | Canis aurius                     | x          |             |      |            |      |       |
| 2          | Five Stripped Palm Squirrel | Funambulus pennanti              | x          |             |      |            |      |       |
| 3          | Indian Crested Porcupine    | Hystrix indica                   | x          |             |      |            |      |       |
| 4          | Indian Desert Jird          | Meriones hurrionae               | x          |             |      |            |      |       |
| 5          | Indian Gerbil               | Tatera indica                    | x          |             |      |            |      |       |
| 6          | Cape Hare                   | Lepus capensis                   | x          |             |      |            |      |       |
| 7          | Small Indian Mongoose       | Herpestes javanicus              | x          |             |      |            |      |       |
| 8          | House Mouse                 | Mus musculus                     | x          |             |      |            |      |       |
| 9          | House Rat                   | Rattus rattus                    | x          |             |      |            |      |       |
| 10         | Jungli Cat                  | Felis silvestris ornate          |            | x           |      |            |      |       |
| Reptiles   |                             |                                  |            |             |      |            |      |       |
| 1          | Brilliant Agama             | Trapelus (Agama) agilis isolepis | x          |             |      |            |      |       |
| 2          | Indian Cobra                | Naja naja naja                   |            |             | x    |            | x    |       |
| 3          | Indian Monitor              | Varanus bengalensis              |            | x           |      |            |      |       |
| 4          | Indian Sand Swimmer         | Ophiomorus tridactylus           |            | x           |      |            |      |       |
| 5          | Pakistan Ribbon Snake       | Psammophis leithii               | x          |             |      |            |      |       |
| 6          | Garden Lizard               | Calotes versicolor               | x          |             |      |            |      |       |



|    |                  |                               |   |   |  |  |  |  |
|----|------------------|-------------------------------|---|---|--|--|--|--|
| 7  | Saw scaled Viper | <i>Echis carinatus</i>        | x |   |  |  |  |  |
| 8  | Fat tailed Gecko | <i>Eublepharis macularius</i> | x |   |  |  |  |  |
| 9  | Sand Gecko       | <i>Crossobamon orientalis</i> | x |   |  |  |  |  |
| 10 | Indian Krait     | <i>Bungarus caeruleus</i>     |   | x |  |  |  |  |

## Birds

Based upon observations during the field visit many species of birds were directly observed in the project area. The most favourite habitat of the Avian Fauna were found in the surroundings of the study area especially trees in agricultural fields and Tamarix shrubs. These areas are composed of larger as well as smaller patches vegetation.

Most common species includes House sparrow, House crow, Red vented Bulbul, Myna and Chiffchaff. All these species are also commonly found in other ecological zones of the country.

Table 5-10: List of Birds

| Sr. No. | English Name            | Scientific Name          | Status    |          | Occurrence |          |             |      | Listing         |      |     |
|---------|-------------------------|--------------------------|-----------|----------|------------|----------|-------------|------|-----------------|------|-----|
|         |                         |                          | Migratory | Resident | Common     | Abundant | Less Common | Rare | Provincial Laws | IUCN | CMS |
| 1       | Bank Myna               | Acridotheres ginginianus |           | x        |            | x        |             |      |                 |      |     |
| 2       | Bay-backed Shrike       | Lanius vittatus          |           | x        | x          |          |             |      |                 |      |     |
| 3       | King Crow               | Dicrurus macrocercus     |           | x        | x          |          |             |      |                 |      |     |
| 4       | Black-winged stilt      | Himantopus himantopus    |           | x        | x          |          |             |      |                 |      | II  |
| 5       | Blue Rock Pigeon        | Columba livia            |           | x        | x          |          |             |      |                 |      | III |
| 6       | Chiffchaff              | Phylloscopus collybita   |           | x        |            | x        |             |      |                 |      |     |
| 7       | Common Babbler          | Turdoides caudatus       |           | x        | x          |          |             |      |                 |      |     |
| 8       | Common Myna/Indian Myna | Acridotheres tristis     |           | x        | x          |          |             |      |                 |      |     |





|    |                              |                         |   |   |   |  |   |   |  |  |  |
|----|------------------------------|-------------------------|---|---|---|--|---|---|--|--|--|
| 9  | Common Redstart              | Phoenicurus phoenicurus | x |   |   |  | x |   |  |  |  |
| 10 | Common Rosefinch             | Carpodacus erythrinus   | x |   |   |  | x |   |  |  |  |
| 11 | Crested Lark                 | Galerida cristata       |   | x | x |  |   |   |  |  |  |
| 12 | Golden backed Woodpecker     | Dinopium benghalense    |   | x | x |  |   |   |  |  |  |
| 13 | Hoopoe                       | Upupa epops             |   | x | x |  |   |   |  |  |  |
| 14 | House Crow                   | Corvus splendens        |   | x | x |  |   |   |  |  |  |
| 15 | House Sparrow                | Passer domesticus       |   | x | x |  |   |   |  |  |  |
| 16 | House Swift                  | Apus affinis            |   | x | x |  |   |   |  |  |  |
| 17 | Hume's Wheatear              | Oenanthe alboniger      |   | x |   |  | x |   |  |  |  |
| 18 | Indian Roller                | Coracias benghalensis   |   | x |   |  |   | x |  |  |  |
| 19 | Little Egret                 | Egretta garzetta        |   | x | x |  |   |   |  |  |  |
| 20 | Little Green Bee-eater       | Merops orientalis       |   | x | x |  |   |   |  |  |  |
| 21 | Long-eared Owl               | Asio otus               | x |   | x |  |   |   |  |  |  |
| 22 | Paddy Bird/Indian Pond Heron | Ardeola grayii          |   | x | x |  |   |   |  |  |  |
| 23 | Pied Bushchat                | Ceryle rudis            |   | x | x |  |   |   |  |  |  |
| 24 | Purple Sunbird               | Nectarinia asiatica     |   | x |   |  |   | x |  |  |  |
| 25 | Red-vented Bulbul            | Pycnonotus cafer        |   | x | x |  |   |   |  |  |  |
| 26 | Rufous-tailed Scrub Robin    | Prinia buchanani        |   |   |   |  |   |   |  |  |  |
| 27 | Tawny Pipit                  | Anthus campestris       |   |   |   |  |   |   |  |  |  |
| 28 | Pied                         | Ceryle rudis            |   | x | x |  |   |   |  |  |  |



|    |                             |                       |   |   |  |  |   |  |  |  |  |
|----|-----------------------------|-----------------------|---|---|--|--|---|--|--|--|--|
|    | Kingfisher                  |                       |   |   |  |  |   |  |  |  |  |
| 29 | White Broad<br>Pied Wagtail | Motacilla alba        |   | x |  |  | x |  |  |  |  |
| 30 | Rufous Tailed<br>Shrike     | Lanius<br>isabellinus | x |   |  |  | x |  |  |  |  |

Figure 5-9: Photographs of Fauna of the Project Area



Indian Roller



Bay-backed Shrike



Dove



Domestic Animals



## **5.4. SOCIO-ECONOMIC ENVIRONMENT**

### **5.4.1 METHODOLOGY**

This section describes the key socio-economic features of the study area, including the administrative setup, population, education, health, infrastructure, occupations, and other cultural resources. Primary and secondary data sources were used to develop the socioeconomic baseline of the area.

The basic aim of the study is to update local communities about project activities and obtain their views and concerns. Moreover an in-depth socio-economic analysis of project area is also one of prime objective of this study.

### **5.4.2 GEOGRAPHICAL LOCATION AND SURROUNDING SETTLEMENT**

The proposed project lies in tehsil Chak Jhumra, district Faisalabad. The proposed Battery Unit of FTMM has Chak 157 RB in the North, Chak 106 JB in the South, Chak 103 JB in the west while Chak 148 RB lies in the eastern side of the proposed project. .

The proposed project site is approximately 25 Km away from the Faisalabad city. The city of Faisalabad with latitude 31°-24' N and longitude 73°-05'E, lies on the Western side of Lahore, the Provincial Capital of Punjab. It is situated in the middle of the lower part of the Doab with the Chenab river flowing at a distance of about 32.18 kilometers (20 miles) to its west and the Ravi river at a distance of about 138.4 kilometers (86 miles) to its East. The Faisalabad Urban area covers nearly 90.65 square kilometers or 35 square miles. The city is linked with major urban centers by Roads, Rail and Airway.

### **5.4.3 DEMOGRAPHY**

The Demographic Studies are the major source of any city's Socio-Economic profile. Demographic Studies relate to population. Population studies are extremely important from Town Planning point of view. Until and unless we know about population in detail we cannot do successful planning. All aspects of population, such as sex-age composition, trend of migration, social, cultural, political, economical and administrative have to be related to planning considerations and decisions. Individuals are the raw material of society, therefore, society is directly affected by size, growth, composition and distribution of it population. The term population refers to the number of individuals living within a geographical area at a given time. The estimated population in the nearest Chaks of the project area is expected to be more than 50 thousands individuals.

### **5.4.4 CULTURE CUSTOMS AND TRADITIONS**

There is no specific tradition on specific occasion and are same as other cities of Punjab. There are no clashes found in the area, people live peacefully however there is a



combination of different cast and creeds and religions because district Faisalabad is industrial city and people from different cities live for the jobs and different business. Major casts dwelling there, are Sheikh, Araeen and Rajput.

#### **5.4.5 ECONOMY**

##### **Occupation**

District Faisalabad is an industrial and commercial city having multi-occupations. The main occupation of the people is business and jobs in different industries. The remaining small portion of the population is having different occupation including government and private services as well as agriculture. The women also assist their men in the economic activity in different fields of business, service, education and other institutions. Women mostly serve in schools, colleges and hospitals.

Faisalabad is generating large number of employment opportunities for its locals and outsiders. Industrial areas are using manpower, while nearby towns are providing business opportunities to the residents. In this semi urban area, people are involved in daily wages jobs, while some are involved in small business. They normally travel to adjacent areas for work. Some work in the industrial area and in the surrounding universities and colleges. People are also involved in agriculture. Area having access to irrigation water is another source of income. Similarly, live stock is a secondary source of income. It is safe to assume that livestock farming is practiced uniformly in both types of areas.

##### **Livestock**

Livestock owner ship is also developed in the project area; especially among poor families who sell animals during emergency days as mostly unemployed people depend on livestock and sometimes agriculture. The people have livestock which include cows, goats, sheep and donkeys. All the animals are of native breed and thus they can survive the local harsh environment and drought. Milk and butter from the livestock are consumed by the household and are not sold in the market.

Good breeds of buffaloes and cows are found in the project area. Sheep, goats, camels, horses, asses and mules are also part of the livestock in the district.

##### **Agriculture**

The source of irrigation in the areas is the Canal (Rakh Branch) which is near to the project area. Agriculture is one of the most important economic activities in the project area.

#### **5.4.6 SOCIAL AND PHYSICAL INFRASTRUCTURE**

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



### **Education and Literacy**

In the 1998 census Literacy was defined as the “ability of a person to read a news paper or write a simple letter in any language”. The Literacy is also measured in terms of literacy ratio and computed as percentage of literate persons among the population aged 10 years and above.

The literacy ratio of the district Faisalabad is 60%, with a split of 60% for males and 56% for females. There are sharp differences in the literacy ratios by sex and areas.

There are different government and private sector school near the vicinity of project area. People go to Faisalabad and other cities of Pakistan for university education.

### **Health Facility**

Hospitals exist in the project area. There is a government hospital or Basic Health Unit (BHU) available in Chak Jhumra. People also access to private hospitals in city and sometimes to nearby private dispensaries. Fever, malaria and chest congestion, Hepatitis-C were reported as the common diseases of the project area. In the project area, health conditions are much developed.

### **Transportation**

The project area is rich in the means of transportation. The nearest main road is Lahore-Sheikhupura-Faisalabad road which connects the locals with other major urban areas like, Shahkot, Kharrianwala and Faisalabad. Chinch (four seated vehicle supported by bike), Rickshaw, bikes and some buses are the means of transport for the residents of the area.

### **Communication**

PTCL telephone facility is available in all parts of the project area. Similarly mobile service is also available and is being used efficiently as mode of communication in the project area. Internet, post office service and Police Stations also exist in the project area.

### **Energy**

Power supply line goes all along the project area, and approximately 90% of the community is able to acquire electricity. Gas supply has been provided to the area but few of the houses cannot afford to avail the service, so these houses depend upon fuel wood. But majority of the people belong to business communities, government sectors and having small jobs in district Faisalabad.

#### **5.4.7 ARCHEOLOGICAL AND CULTURAL SITES**

There were no archaeological sites in the vicinity of the project area although nearest chaks do have mosques and graveyards.





## **6 STAKEHOLDERS CONSULTATION**

The participation of project stakeholders in project planning, design and implementation is now universally recognized as an integral part of environmental impact assessment. The Punjab Environmental Protection (Amendment) Act 2012, Section 12(3) highlights that “every review of an environmental impact assessment (EIA) shall be carried out with public participation.”

Stakeholder consultation is a mean of involving all primary and secondary stakeholders in the project’s decision-making process in order to address their concerns and improve project design. Stakeholder consultation, if conducted in a participatory and objective manner, is a mean of enhancing project sustainability.

Stakeholder consultation was therefore conducted in the project area not only to satisfy the legal requirements of the EIA process in Pakistan but also to improve and enhance the social and environmental design of the project.

This section of the report outlines the stakeholder consultation approach adopted for this EIA study, identifies the concerned groups of stakeholders, and describes the consultation process carried out as part of this study. Figure 5.1 and 5.2 shows pictorial presentation of stakeholders meetings.

### **6.1. OBJECTIVES OF STAKEHOLDERS CONSULTATION**

The process of public participation and consultation was endorsed in the United Nations Conference on the Environment and Development (UNCED) in 1992 through one of the key documents of the conference-Agenda 21. Agenda 21 is a comprehensive strategy for global action on sustainable development and deals with issues regarding human interaction with the environment. It emphasizes the role of public participation in environmental decision-making for the achievement of sustainable development.

Through the public consultation process, FTMM hopes to:

- Promote better understanding of the project, its objective, and its likely impact.
- Identify and address concerns of all interested and affected parties of project area
- Provide means to identify and resolve issues before plans are finalized and development instigate, thus avoiding public anger and antipathy and costly delays.
- Encourage transparency and establish trust among various stakeholders to promote cooperation and partnership with the communities and local leadership



## 6.2. IDENTIFICATION OF STAKEHOLDERS

The identification of stakeholders is important for the sustainability of a development project and helps to evaluate and envisage the role of stakeholders. The influence or impact of stakeholders on the project can be elaborated in the form of a matrix and the mitigation measures are proposed accordingly. The stakeholders that are likely to be influenced by the project activities or would like to participate in the project include:

- Residents of the surrounding areas;
- Government Organizations.

## 6.3. CLASSIFICATION OF STAKEHOLDERS

Stakeholders can be classified as primary and secondary stakeholders depending on the influence of the project activities on them. The stakeholders for the proposed project are classified as follows:

**Primary Stakeholders:** People, groups or institutions directly affected by the project and can influence the project outcome.

**Secondary Stakeholders:** People, groups, or institutions that are indirectly affected by the project and can influence project delivery process.

## 6.4. METHODOLOGY FOR CONSULTATION

Stakeholder consultation is a two-way flow of information and dialogue between the project proponent and stakeholders, specifically aimed at developing ideas that can help shape project design, resolve conflicts at an early stage assist in implementing solutions and monitor ongoing activities. Various techniques are used worldwide to carry out the stakeholder consultation that includes discussions, meetings and field visits.

### Primary Stakeholders

Concerns of the primary stakeholders of the proposed project were solicited and collected in the following manner:

- A field visit was arranged to contact the communities within 5km of the project area.
- The team was completely aware of the processes and environmental issues related to the proposed project.
- A brief description of the proposed project was provided verbally to the local community and they were asked to express their concerns regarding the proposed project.
- Concerns, complaints and suggestions were recorded in the written form.





## **Secondary Stakeholders**

Concerns of the secondary stakeholders of the proposed project were solicited and collected in the following manner:

- Meetings were arranged with Government Department, in order to obtain their concerns.
- A brief description of the proposed project was provided verbally and they were asked to express their concerns regarding the proposed project.
- Concerns, complaints and suggestions were recorded in the written form.

## **6.5. STAKEHOLDERS CONSULTED**

In the consultation process for EIA, following key stakeholders were consulted:

- Primary Stakeholders: Local communities
- Secondary Stakeholders: Following were the secondary stakeholders
  - District Faisalabad Agriculture Department
  - District Faisalabad Health Department
  - District Faisalabad Irrigation Department
  - District Faisalabad Livestock Department
  - FIDMEC

Meetings with stakeholders consisted of community consultation meetings, focus group discussions, and in-depth interviews with government officials. The location of the meetings, the process followed, and the outcomes are discussed in the subsequent sections.

## **6.6. CONSULTATION FINDINGS**

The consultation findings were recorded in written form given below:

### **6.6.1 PRIMARY STAKEHOLDERS**

Primary stakeholders were consulted during informal and formal meetings held in the project area. Consultation session was conducted at the settlements near the project site with men and women to obtain their concerns. The consultation process was carried out in the local 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 proposed 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, and focus group discussions.

The findings of the Community consultations have been addressed in various sections of the EIA, and the mitigation plans have been incorporated into the EMP. The summary of the various primary stakeholder consultations is given below;

### **Local Community Concerns**

The general public from the communities was satisfied from the industrial city and didn't express any major concern regarding the proposed project. The main concerns which were identified during consultation are as follows:

- Priority for employment should be given to residing communities;
- Waste management should be proper to avoid any mishandling and open dumping/burning of solid waste in project area;
- Waste Water should be properly treated before discharging.

Communities in the project area emphasized that local villagers should be given priority when employing people for various project-related works and activities according to their skills.

### **6.6.2 SECONDARY STAKEHOLDERS**

Secondary stakeholder consultations were more formal as government officials were 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 any conflict with local administrators. The issues recorded in the consultation process were examined, validated, and addressed in the EIA report.

#### **Agriculture Department District Faisalabad**

A meeting was held with Dr. Javed Iqbal, Deputy Director Agriculture, Faisalabad. The concerns and suggestion expressed and response provided is as follows. All these issues (listed below) have been incorporated in Impact mitigation plan and EMP of the EIA report.

- Dr. Javed Iqbal appreciated the efforts made by the FTMM in terms of creation of a number of direct and indirect employments leading to economic growth in the area and he also appreciated the FTMM efforts towards the social wellbeing of the area



- Improper raw material and Waste Handling and disposal can disturb ecosystem especially lead. Proper management plan should be designed for sustainable environment of the project area
- FTMM should ensure that all project activities of proposed plant will be environmental friendly. It will not only secure flora and fauna but also physical environment of project area as well.

#### **Irrigation Department District Faisalabad**

A meeting with Mr. Ishfaq Arshad, Divisional Head, appreciated the presence of FTMM in the district in term of large scale employment and support to locals. The concerns and suggestion expressed and response provided is as follows. All these issues (listed below) have been incorporated in impacts mitigation and EMP plan of the EIA report.

- FTMM should prepare Waste Management Policy for the proposed project
- Waste Water should be properly treated before disposal.

#### **Livestock and Dairy Development Department District Faisalabad**

A meeting was conducted with Mr. M. Riaz Director at Livestock and Dairy Farms District Faisalabad.

In the meeting it was highlighted that there has been no particular issues for the livestock due the activities of FTMM in the area. Mr. M. Riaz appreciated the efforts of FTMM in the economic growth of the country.

#### **DHQ Hospital Faisalabad**

Consultation meeting conducted with round of introduction and a brief description of the proposed project was provided to Dr. Bilal Ahmad, District Health Officer at District Head Quarter Hospital Faisalabad. The concerns and suggestion expressed and response provided is as follows. All these issues (listed below) have been incorporated in Impact mitigation plan and EMP of the EIA report.

- Dr. Bilal Ahmad appreciated the FTMM efforts towards the environment and social wellbeing of the area.

There must be proper pollution controls for the proposed project especially linked with air and water as the proposed project is coal fired. The air pollution if not controlled may impose harmful impacts on the health of living organisms in the vicinity of the project area

Figure 6-1. Pictorial Presentation of Primary Consultation







Figure 6-2: Pictorial Presentation of Secondary Consultation



Irrigation Department Faisalabad



Livestock Department Faisalabad



Agriculture Department Faisalabad



Health Department Faisalabad



## **7 IMPACT PREDICTION, EVALUATION AND MITIGATION MEASURES**

This chapter discusses the potential environmental and social impacts of the proposed project activities, predicts the magnitude of the impact, assesses the significance and proposes the mitigation measures to minimize adverse impacts.

The discussion of the environmental and socioeconomic impacts are then organized in the following manner:

### **Impacts Associated with Proposed Project Activities**

- Environmental Impact—Construction and Operation Activity
- Socioeconomic Impact— Construction and Operation Activity

### **7.1 IDENTIFICATION OF POTENTIAL IMPACTS**

In the first step, potential impacts of the project are identified by desktop screening exercise, using checklist during field visits for collection of baseline data, professional judgment, published literature on environmental impact of similar projects and standard environmental guidelines. A critical step in identifying potential impacts is discussion with project proponent, consultation with stakeholders and community to identify their concerns. Public consultation was carried out to identify the concerns of primary and secondary stakeholders.

The main aspect associated with potential impacts are as follow;

- Geomorphology, Soil
- Water Resources (Aquifer and Surface Water Quality)
- Ambient Air Quality
- Waste Discharges
- Noise Pollution
- Greenhouse Gases Emissions
- Ozone Depleting Substance
- Protected Areas
- Ecology of the Area, including Flora and Fauna
- Vehicle Movement
- Socio-economic conditions; and
- Archaeology



## 7.2 IMPACT CLASSIFICATION

The potential impacts are classified according to the type of potential receptors. The following receptor categories were used:

- Community (people, their social and cultural values, aspirations and archaeological sensitivity,)
- Land and soil (land resources, soil resources)
- Air Quality (ambient air quality, GHG emissions, Ozone depletion)
- Water Resources (aquifer and surface water resources)
- Ecosystem (Vegetation, Wildlife, and Biodiversity).

## 7.3 IMPACT SCOPING CRITERIA

Identified potential impacts are evaluated on the basis of following criteria;

- the present baseline conditions, the change in environmental parameters likely to be effected by proposed project related activities,
- Is there an impact that environmental standards or environmental guidelines applicable to the project will be breached? This includes the national standards such as the National Environmental Quality Standards (NEQS) and guidelines such as the World Bank, International Finance Corporation (IFC) and WHO environmental guidelines.
- Is there a high risk of a permanent, irreversible, and significant change to environmental conditions due to the particular project activity? Some impacts are transitory; they last until the activity that is the cause of the impact is there. Others may last much longer than the activity. After a long period the environmental parameter may or may not revert back to its natural state.
- Did the community express any concern about this aspect?

An impact scoping matrix is described in below **Table 7.1**.





**Table 7-1: Impact Scoping Matrix**

| Project Phase                | Environmental Impact  | Social Impact  |
|------------------------------|---|--|
| <b>Construction Activity</b> | Water resources depletion, contamination.<br>Dust Emission During Construction<br>Vegetation Loss<br>Vehicle and Equipment Exhaust<br>Soil Contamination<br>Drainage and Storm Water Run-off<br>Camp Effluent<br>Hazardous and Non-Hazardous Waste Management<br>Wildlife | Traffic disturbance, unrest, road accident<br>Employment conflicts<br>Archaeological resources damage<br>Unskilled labour jobs |
| <b>Operation Activities</b>  | Air Pollution<br>Noise Pollution<br>Wastewater<br>Green House Gas emissions<br>Water Resources Depletion<br>Hazardous and non-hazardous substances<br>Waste Management  | Occupational Health and Safety   |

## 7.4 IMPACT ASSESSMENT METHODOLOGY

The impacts have been assessed following standard international guidelines and best available practices. The method defines three levels of consequence (or severity) and likelihood (or probability of occurrence) - High, Medium or Low - of an impact. A standard risk based approach has been used in which;

- the significance of an impact is determined on the basis of the level of consequence and likelihood of the impact e.g. an impact of medium severity is assigned a low significance if the likelihood of occurrence of the impact is low and high significance if the likelihood of occurrence is high or almost certain. The definition of consequence and likelihood is illustrated in **Table 7.2** and impact significant matrix is provided in **Table 7.3**.
- The prediction of impacts also include the duration of impacts (in terms of long-medium and short-term), nature of impact, geographical location of the impact and reversibility of the impact. Impact assessment criteria for the above mention parameters are illustrated in **Table 7.4**.



Table 7-2: Definitions for Consequence and Likelihood of Impacts

| Level  | Consequence (Severity of Impact)   | Likelihood  |
|--------|--|---|
| High   | Serious/catastrophic damage to local and regional environment<br>Direct legislative requirements of EPA and World Bank<br>Corporate requirement<br>Serious threat to corporate reputation/profitability/ability to do business | High likelihood of occurrence during lifetime of operation<br>Regular/continuous part of operations       |
| Medium | Measurable damage to the environment<br>Subject to potential future legislation<br>Potential to affect reputation/cost<br>Implication/reduced efficiency   | Moderate possibility of occurrence during lifetime of operation<br>Periodic/occasional part of operations |
| Low    | Negligible damage to the environment<br>No risk to business  | Unlikely to occur during lifetime of operation  |

Table 7-3: Impact Significant Matrix

| Likelihood  |        |        |        |
|-------------|--------|--------|--------|
| Consequence | High   | Medium | Low    |
| High        | High   | High   | Medium |
| Medium      | High   | Medium | Low    |
| Low         | Medium | Low    | Low    |

Table 7-4: Impact Assessment Criteria

| Impact Characteristics | Categories   |
|------------------------|--|
| Nature of the Impact   | <b>Direct:</b> The environmental parameter is directly changed by the project.<br><b>Indirect:</b> The environmental parameter changes as a result of change in another parameter. |



|                                     |   |
|-------------------------------------|---|
| Duration of the impact              | <p><b>Short term:</b> Lasting only till the duration of the project such as noise from the construction activities.</p> <p><b>Medium term:</b> Lasting for a period of few months to a year after the project before naturally reverting to the original condition such as contamination of soil or water by fuels or oil.</p> <p><b>Long term:</b> Lasting for a period much greater than medium term impacts before naturally reverting to the original condition such as loss of soil due to soil erosion.</p> |
| Geographical Location of the impact | <p><b>Local:</b> Within the area of project i.e. operation site and access road.</p> <p><b>Regional:</b> Within the boundaries of the project area.</p> <p><b>National:</b> Within the boundaries of the country.</p>   |
| Reversibility of the impact         | <p>Defined as</p> <p><b>Reversible:</b> When a receptor resumes its pre-project condition.</p> <p><b>Irreversible:</b> When a receptor cannot resume its pre-project condition.</p>   |

- **Identification of the mitigation measures:** If it is determined that the predicted impact is significant, suitable mitigation measures are identified. There is a range of mitigation measures that can be applied to reduce impacts. This is discussed in following **Sections 7.6**.
- **Evaluation of the Residual Impact:** Incorporation of the suggested mitigation measures reduces the adverse impact of the project and brings it within the acceptable limit. This step refers to the identification of the anticipated remaining impacts after mitigation measures have been applied – the residual impacts. This is discussed in following **Sections 7.6**.
- **Identification of the Monitoring Requirements:** The last step in the assessment process is the identification of the monitoring requirements. The scope and frequency of the monitoring depends on the residual impacts. The purpose of monitoring is to confirm that the impact is within the predicted limits and to provide timely information if unacceptable impact is taking place. An environmental management plan (EMP) will be developed with identification of monitoring requirements. This is discussed in next chapter.

## 7.5 IMPACTS ASSOCIATED WITH CONSTRUCTION ACTIVITIES

In this section the environmental and socioeconomic impacts associated with the proposed project construction activities are discussed. Construction activities here mean construction of infrastructure for the plant. The identified impact's assessment are detailed in the below **Table 7.5**.



**Table 7-5: Impact Assessment of Construction Activities**

| <i>Environmental Aspects</i> | <i>Potential Impact</i>  | <i>Project Phase</i> | <i>Description</i>  | <i>Consequence Severity Rating</i> | <i>Likelihood /Frequency</i> | <i>Nature of Impact</i> | <i>Geographical Location of Impact</i> | <i>Duration of Impact</i> | <i>Reversibility of Impact</i>                                       | <i>Significance of Impact</i> |
|------------------------------|--|----------------------|---|------------------------------------|------------------------------|-------------------------|--|---------------------------|--|-------------------------------|
| Protected Areas              | Habitat loss, temporary relocation   | C                    | No protected areas, wetlands or wildlife sanctuary were found inside or in the close proximity of the area.   | Low                                | Low                          | No impact               | Not applicable                         | Not applicable            | Not applicable   | Low                           |
| Geology and Soils            | Soil erosion, soil contamination by the spillage of fuel, oil and chemicals                | C                    | The construction activity will involve a little bit clearing of land for the purpose of installation of proposed plant facility units. The land is already within M3 Industrial City Faisalabad. During construction activity, there is the potential for spills of fuel, lubricating oils and chemicals that could lead to soil contamination. | Medium                             | Medium                       | Direct                  | Local /Regional                        | Short Term                | Reversible   | Low                           |
| Water Resources              | Depletion of aquifer from overuse, and contamination of water resources by the spillage of | C                    | There could be potential of local water resources depletion if the project's water needs are fulfilled by procuring water from the existing water wells of at proposed site during Construction Phase. The local water table is available at 25-30 m depth, so proposed project activities will not impact on local                             | Medium                             | Low                          | Direct                  | Local /Regional                        | Short Term                | Reversible (depending on the rainfall pattern and aquifer recharge). | Low                           |



| Environmental Aspects | Potential Impact  | Project Phase | Description  | Consequence Severity Rating | Likelihood / Frequency | Nature of Impact | Geographical Location of Impact | Duration of Impact | Reversibility of Impact | Significance of Impact |
|-----------------------|---|---------------|--|-----------------------------|------------------------|------------------|---------------------------------|--------------------|-------------------------|------------------------|
|                       | fuel, oil and chemicals                                   |               | water resources.<br>Surface and aquifer quality may deteriorate if pollutants are mixed with surface runoff during rain and carried to water resources in the vicinity, or if pollutants leach into the ground.                  |                             |                        |                  |                                 |                    |                         |                        |
| Air Quality           | Vehicular emission, Dust emission                         | C             | Construction activities can generate locally exhaust emission and dust during activities such as 'earthmoving' operations by using cranes, bulldozers etc and other pollutants emission from diesel generators and vehicles.     | Medium                      | Low                    | Direct           | Local/ Regional                 | Short Term         | Irreversible            | Low                    |
|                       | GHG Emissions   | C             | The main source for GHG emissions will be generators and vehicles.   | Low                         | Low                    | Indirect         | National                        | Long term          | Irreversible            | Low                    |
|                       | Ozone Depletion   | C             | HCFC and CFC's if any of them used during project activities, can deplete ozone layer.   | Low                         | Low                    | Indirect         | National                        | Long term          | Irreversible            | Low                    |
| Noise                 | Impacts at nearest community, Disturbance to the wildlife | C             | There is a very little potential of disturbance to nearby community due to noise because the project is located in M3 industrial city.<br>The potential of wildlife temporary relocation because of noise is also insignificant. | Medium                      | Low                    | Indirect         | Local                           | Short term         | Reversibility           | Low                    |



| Environmental Aspects | Potential Impact  | Project Phase | Description  | Consequence Severity Rating | Likelihood / Frequency | Nature of Impact | Geographical Location of Impact | Duration of Impact | Reversibility of Impact | Significance of Impact |
|-----------------------|---|---------------|--|-----------------------------|------------------------|------------------|---------------------------------|--------------------|-------------------------|------------------------|
| Waste                 | <b>Liquid Waste:</b><br>risk of liquid waste contaminating aquifer, contaminating surface water | C             | The proposed project activity would generate the liquid waste from campsite.   | Medium                      | Low                    | Direct           | local                           | Short term         | Reversible              | Low                    |
|                       | <b>Solid Waste (Non-hazardous):</b><br>Aesthetic issues   | C             | The proposed project works will result in the generation of a range of non-hazardous solid wastes.   | Low                         | Low                    | Direct           | Regional                        | Short term         | Reversible              | Low                    |
|                       | <b>Hazardous waste:</b> soil, surface and aquifer contamination                                 | C             | Hazardous waste such as waste oil and batteries, chemicals generated during construction and fabrication activities.   | Medium                      | Medium                 | Direct           | Local                           | Short term         | Reversible              | Low                    |
| Traffic               | Disturbance to local community  | C             | During the project activities, the traffic movement on the main highway and project site will increase. The project site is located on Chiniot road in the vicinity of M3 Motorway, Faisalabad with a less to moderate traffic movement, | Medium                      | Low                    | Direct           | Local                           | Short term         | Reversible              | Low                    |



| Environmental Aspects        | Potential Impact   | Project Phase | Description   | Consequence Severity Rating | Likelihood / Frequency | Nature of Impact | Geographical Location of Impact | Duration of Impact | Reversibility of Impact | Significance of Impact |
|------------------------------|--|---------------|---|-----------------------------|------------------------|------------------|---------------------------------|--------------------|-------------------------|------------------------|
|                              |  |               | so no major issue will be raised due to movement of vehicles.   |                             |                        |                  |                                 |                    |                         |                        |
| Wildlife and Habitat         | Direct habitat loss and migration of wildlife, Temporary Disturbance to Fauna, Hunting, Accidental killing of wildlife | C             | The construction of project under consideration can result in short term displacement of wildlife species along work areas corridors. There is not much potential of habitat loss because of clearing of vegetation during construction activities. | Medium                      | Low                    | Direct           | Local /Regional                 | Short to long term | Irreversible            | Low                    |
| Socio – Economic Environment | Local Procurement of Goods and Service   | C             | Local procurement of goods and services will be procured from local nearest market such as Chak Jhumra, Sianwala, and Faisalabad etc. So overall it is beneficial for locals.   | Positive impact             | -                      | -                | -                               | -                  | -                       | Positive impact        |
|                              | Local Employment   | C             | Due to proposed project activities, there will be employment opportunities for locals for unskilled work. Approximately 200 skilled and unskilled personnel will be required during construction activities which will                              | Positive impact             | -                      | -                | -                               | -                  | -                       | Positive impact        |





| Environmental Aspects | Potential Impact   | Project Phase | Description  | Consequence Severity Rating | Likelihood / Frequency | Nature of Impact | Geographical Location of Impact | Duration of Impact | Reversibility of Impact | Significance of Impact |
|-----------------------|--|---------------|--|-----------------------------|------------------------|------------------|---------------------------------|--------------------|-------------------------|------------------------|
|                       |  |               | generate work opportunities for locals.  |                             |                        |                  |                                 |                    |                         |                        |
|                       | Disturbance to community from material and equipment transport | C             | The project site is located on Chiniot road in the vicinity of M3 Motorway, Faisalabad where a less to moderate traffic movement, was observed during field survey. There will be no major issue of disturbance for local due to traffic movement. | Low                         | Low                    | No impact        | No impact                       | No impact          | No impact               | Low                    |
|                       | Employment Conflicts   | C             | The potential employment related issue includes infuriation among local communities over the number of jobs offered to them, disagreement on definition of 'local' and also on distribution of jobs within the local community                     | Low                         | Low                    | No impact        | No impact                       | No impact          | No impact               | Low                    |
|                       | Project and Community Interface                                | C             | Inter-cultural differences between the project staff from other areas and the local community can result in frictions.   | Low                         | Low                    | No impact        | No impact                       | No impact          | No impact               | Low                    |

C = Construction Phase





## **7.6 DISCUSSION ON KEY ENVIRONMENTAL ASPECTS, MITIGATION MEASURES AND RESIDUAL IMPACTS DURING CONSTRUCTION ACTIVITIES**

The potential impacts of the proposed project have been discussed in the following sections. Where appropriate, mitigation measures have also been included to reduce the unacceptable impacts. This section includes a priority list of the most important measures that the project proponent should adopt to ensure a practical, cost-effective and sufficient approach to impact mitigation. Broadly, these measures can be classified into five categories:

- Avoiding the impact altogether by not taking certain proposed activity or parts of an activity, for example, using Halon, HCFC and CFC-free equipment to avoid impact on ozone layer.
- Minimizing impacts by limiting the degree or magnitude of the activity, for example, minimizing dust emission by reducing by using water sprinkler.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Compensating for the impact by replacing or providing substitute resources or environments.

The project proponent plays a vital role in developing the mitigation plan by identifying possible mitigation measures and assessing the feasibility of proposed measures.

This section provides a summary of the residual effects that are likely to be present following implementation of the mitigation measures.

### **7.6.1 PROTECTED AREAS**

There is no protected area, wetlands or wildlife sanctuary was found inside or in the close proximity of the area.

### **7.6.2 GEOMORPHOLOGY AND SOILS**

#### **Potential Impacts**

Impacts on geomorphology and soils may arise from the following project activities:

- Clearing and levelling for facility construction site preparation.
- Contamination of soil due to spillage of fuels, oils, chemicals or acid.

Likely impacts of these activities can include:

- Physical scarring of the landscape,
- Accelerated soil erosion,
- Alteration of soil quality by loss of topsoil,
- Soil contamination.



## **Assessment of Potential Impacts**

The physical scarring caused by clearing and levelling during proposed site construction activities could lead to alteration of soil quality by removal of topsoil, and limited soil erosion induced by disturbance to native soil. The land is almost cleared and levelled and no major earthwork such as digging is required for proposed battery unit and its associated ancillaries.

The total area for proposed battery unit is approximately 40 acres it is expected that the project crew will use existing roads for transportation of goods. Construction should follow good industry practices to avoid unnecessary clearing outside of the work corridors and likelihood of soil erosion along or across natural drainage paths.

Loss of topsoil may only take place at a few locations during construction activities. However, in view of the limited area covered by proposed project, this impact is expected to be of low significant. The spillage and leakage of fuels, oils, and other chemicals may lead to soil contamination. Possible contaminant sources include fuel, lubricant oil, storage areas and all project vehicles. A spill prevention plan will be developed and implemented.

Considering the limited land area requirement for the development of a proposed project, no significant impacts due to this activity will occur provided the mitigation measures listed in following section of the report are adhered with.

## **Mitigation Measures**

The proposed mitigation measures to reduce the impacts on geology, topography, and soil during the proposed construction activities are:

- Vegetation clearing will be kept minimum;
- Unnecessary clearing of vegetation will be strictly prohibited;
- Vehicle speeds will be regulated and monitored to avoid excessive dust emissions;
- Off-road travel should be avoided and observance of this should be monitored during the operation;
- Use of existing roads for transportation of goods.
- Vehicles and equipment would not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination.
- Waste oils should be collected in drums and sold to the recycling contractors.
- Regular inspections would be carried out to detect leakages in construction vehicles and equipment.
- Fuels, lubricants, and chemicals will be stored in covered banded areas, underlain with impervious lining.



- Appropriate arrangements, including shovels, plastic bags and absorbent materials, will be available near fuel oil and acid storage areas.

### **Residual Impact**

The land use will change as a result of construction of the proposed battery unit. The nature of impact is direct and its duration is short term and reversible but takes time to rehabilitate the natural environment of the area, so the overall significance of impact is medium resulting from medium likelihood. If the mitigation measures are effectively implemented, the residual impact of the proposed activities on the area's geophysical environment is expected to be low in significance.

### **7.6.3 WATER RESOURCES**

#### **Potential Impacts**

Proposed activities could affect the area's water resources in two ways:

- Reduction from overuse, and
- Contamination

The water in the area is abundant due to the project area's proximity to the Jhang branch canal and Chenab River. Groundwater is available in the majority of the area at, or at less than a depth of 25-30 meter below the surface level.

#### **Assessment of Potential Impacts**

Water will be required during construction activities. Water will be procured from ground water resources. Chenab River and Jhang branch canal lies in vicinity which is the continuous source of groundwater regeneration in the project area. Water conservation practices will be utilized to reduce the overall water consumption during proposed project activities.

Surface water quality may deteriorate if pollutants are mixed with surface runoff during rain and carried to water resources in the vicinity. Potential sources of pollution in such cases may include:

- Domestic waste (sanitary and kitchen discharge);
- Oil and grease from vehicles and machinery;
- Stored fuel, oil, acid and other chemicals;

Sewage from the camp will go into an impermeable septic tank. The impermeable septic tank will prevent untreated sewage from polluting surface water.



## **Mitigation Measures**

The mitigation measures described below will ensure that the project area's surface and aquifer resources are not significantly affected by project activities.

- The water extraction will be kept at minimum;
- A water management plan will be developed. The plan will also include strategies to minimize water use (and therefore volume of discharge) and maintain reserves;
- Follow good housekeeping practices with all machinery that may potentially discharge wastewater;
- No untreated effluents will be released to the environment
- Effluents from the camp offices and the residential camps will be disposed off in the nearby drain channel after treatment.

## **Residual Impact**

The significance level given is low, because the water in the area is abundant due to the project area's proximity to the Chenab River and Jhang branch canal. Groundwater is available in the majority of the area at, or at less than a depth of 17 meters below the surface level. Proper implementation of the required mitigation and monitoring techniques will prevent any adverse water quality impacts. Residual impacts are anticipated to be negligible / low in this case.

### **7.6.4 AMBIENT AIR QUALITY**

#### **Potential Impacts**

Air emissions from proposed project-related activities are likely to include:

- Dust emissions produced during construction activities;
- Combustion products (nitrogen oxides, sulfur dioxide, particulate matter, carbon monoxide, and volatile organic compounds) from diesel generators;
- Combustion products from vehicles used for project-related activities;

#### **Assessment of Potential Impacts**

The sources of emissions during proposed project construction will not be significantly enough to alter the ambient air quality. The emissions will disperse quickly with the prevalent wind currents. All generators, vehicles, equipment and machinery will be properly maintained during the operation to minimize emissions.

Other factors that support the insignificant nature of the impact are:



### ***Dust Emissions:***

Dust emissions during construction can be an issue. Potential sources of dust emission during construction activities include earthworks (dirt or debris pushing and grading), exposed surfaces, exposed storage piles, truck dumping, hauling, vehicle movement, and concrete mixing and batching.

Dust emitted during construction activities can result in deterioration of ambient air quality in the vicinity of the source, and be a nuisance to the communities and plant workers. Dust clouds also reduce road visibility, creating a traffic hazard.

### ***Vehicle and Equipment Exhaust Emissions:***

Combustion processes in generators and other construction equipment result in exhaust gases that can effects the ambient air quality locally.

Emissions produced by vehicles and equipment will be in terms of the resulting pollutants (SO<sub>2</sub>, NO<sub>x</sub>, PM, etc.). However, the environmental issue can be avoided by using properly maintained equipment.

### **Mitigation Measures**

The mitigation measures given below will further reduce their impact, and ensure that they remain within acceptable limits.

- Water will be sprinkled daily or when there is an obvious dust problem on all exposed surfaces to suppress emission of dust. Frequency of sprinkling will be kept such that the dust remains under control, particularly when wind is blowing towards the receptors.
- All equipment, generators, and vehicles used during the project will be properly tuned and maintained in good working condition in order to minimize exhaust emissions;
- Construction materials that are susceptible to dust formation will be transported only in securely covered trucks to prevent dust emission during transportation.
- All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke;

### **Residual Impact**

Implementation of the proposed mitigation measures is likely to leave no long-term residual impact on the ambient air.

#### **7.6.5 GHG EMISSIONS**

The main source for GHG emissions will be generator and vehicle emissions during the project activity. The overall rating given to impact is low because the GHG emissions generated will be less and to minimize the impact all vehicles, generators and other





equipment used during the construction will be properly tuned and maintained in good working condition.

By implementing the mitigation measures listed above in 7.6.4. Ambient Air Quality, the residual impact of the proposed activities is expected to be insignificant.

#### **7.6.6 OZONE DEPLETION**

The proposed project will not use any source of ozone depleting compounds such as Halon, Chlorofluorocarbons (CFC), Hydro-chlorofluorocarbons (HCFC) or any other source which deplete the ozone layer, so the overall assessment of the impact is significantly low.

#### **7.6.7 NOISE POLLUTION**

##### **Potential Impacts**

Potential sources of noise pollution will include operation of generators, machinery, construction equipment, and vehicles during the project activities.

The potential noise related issues during construction is the disturbance to workers and of proposed battery unit due to construction machinery operation on the proposed site. The nearest local community is approximately 2km away from the project area so the impacts regarding noise will be negligible

##### **Assessment of Potential Impacts**

The potential sources of significant noise during the construction period include the construction machinery, generators at camps and construction related traffic.

There is no continuous major source of noise. Intermittent sources of noise include farm tractors, adjacent mill and road traffic on the Chiniot road and M3 motorway. The main exposure of noise pollution will be on crew members. To minimize exposure to noise personal protective equipment (PPE) will be provided to the workers.

There is a potential of temporary wildlife relocation because of noise, so to reduce this impact night work will be minimized thus reducing the disturbance to wildlife. The overall impact level is low in significance as the likelihood of occurrence is low.

##### **Mitigation Measures**

- All on-site personnel will use required personal protective equipment (PPE) in high noise areas that will be clearly marked.
- Proper engineering control will be applied to noise producing sources like generator.



- It will be ensured that generators, vehicles and other potentially noisy equipments used are in good condition. Noise from generators, vehicles and other equipment and machinery will be kept to the minimum through regular maintenance.
- Before the start of the operations conduct a noise survey of the equipment and prepare a noise control plan
- Use noise-abating devices wherever needed and practicable.
- Blowing of horn will be prohibited on the access road to the proposed site and inside the site

### Residual Impact

By implementing the above mitigation measures the overall impact will be significantly low. Residual noise impact is expected to be low from the construction activities of the proposed Battery Unit.

### 7.6.8 WASTE DISCHARGES

#### Potential Impacts

The expected waste generated during construction activities and their proposed methods of disposal are discussed below **Table 7.6**.

Likely impacts from Hazardous and non- hazardous waste generated by construction activities (if disposed-off improperly) can include;

- Surface and groundwater pollution
- Soil contamination
- Air pollution, odour
- Health hazards
- Aesthetic issues

**Table 7-6: Construction Activities Waste**

| Category    | Waste Generated and point source   | How Managed  |
|-------------|--|--|
| Solid Waste |  |  |
| Hazardous   | Batteries, rubber tire, used oil filters, chemical containers, contaminated soil, grease trap sludge | Used oil and ferrous/non-ferrous materials will be provided to approved contractor for recycling. Batteries will be hauled away by contractor for recycling. |



|                          |   |   |
|--------------------------|---|---|
| Non-hazardous            | Packaging waste Paper, textiles cardboard, rubber, wood, glass, tin cans, Food waste                        | Combustible materials such as paper, card board, textiles will be burnt on-site. Non-combustible materials such as glass, plastics, tin and aluminium cans will be hauled away by contractor for recycling. Food waste will be burnt in burn pit. |
| Non-hazardous Recyclable | Cable drums, wood, packaging, scrap metal, recyclable plastic sheeting, debris, plastic, aluminum cans etc. | Will be hauled away by contractor for recycling.  |
| Non-recyclable           | Demolition Waste: Concrete, plaster, plumbing, heating and electrical parts                                 | Concrete and plaster will be utilized for filling of depressions / pits. Plumbing, heating and electrical parts will be hauled away by the contractor for recycling.  |
| Liquid Waste             |   |   |
| Hazardous                | Sewerage water  | Wastewater from kitchen and washing areas will be collected for reused for plantation. Sewerage will be treated by using septic tank and treated water will be reused for water sprinkling.   |

### Assessment of Potential Impacts

All the waste generated during construction activities will be disposed of through implementation of an effective waste management plan. By proper implementation of a waste management plan, the overall potential risk/impact will be significantly low.

#### *Domestic Wastes:*

Domestic wastes generated during construction activities will include sewage or black water, grey water (from kitchen, laundry, and showers), kitchen wastes and recyclable wastes. Sewage or black water will be treated and disposed of by means of a septic tank and will be reused for plantation.

Recyclable materials such as paper, card board, textiles, plastics, tin and aluminium cans will be hauled away by contractor for recycling.

#### *Oil Stains and Spills:*

Fuel or oil stains, leakage or spill during construction operations can result in contamination of soil and water. Consequently spill containment will be used for all fuel



and lubricant storage. All spills to ground will be remediated as soon as rationally practical. The waste management plan will be developed to include this.

### **Mitigation Measures**

A waste management plan will be developed before the start of the project activities. Key elements of the waste management system will be the following:

#### ***On-site handling***

- The recyclable waste will be sent to approved waste contractors
- Waste bins will be placed inside the boundary. All waste removed from the site will be under license and handled by an approved contractors. All hazardous waste will be separated from other waste.

#### ***Audits***

- On-site audits of the waste management will be undertaken on a regular basis during the project activity.
- Audits of the waste disposal contractors and waste disposal facilities will be undertaken on a regular basis to ensure the implementation of waste handling and disposal procedures.

#### ***Records***

- Records of all waste generated during the project activity period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a waste tracking register.

#### ***Disposal***

- All non-hazardous waste material that cannot be recycled or reused will be disposed of as per waste management plan;
- Depending on the nature and quantity of the hazardous waste, it will be disposed of by licensed hazardous waste contractors as per the waste management plan;

#### ***Other Management Measures***

- Training will be provided to personnel for identification, segregation, and management of waste;
- An emergency response plan will be developed for the hazardous waste (and substances)
- All containers of hazardous waste will be appropriate labeled;
- Equipment and material containing asbestos, poly-chlorinated biphenyls (PCBs), and ozone depleting substances (ODSs) will not be used.



## **Residual Impact**

Even after implementation of the above measures, it is possible that some littering may take place. Monitoring will be undertaken to minimize the residual impact.

### **7.6.9 TRAFFIC**

#### **Potential Impacts**

Following will be the potential impacts from the traffic;

- Disturbance to local community,

#### **Assessment of Potential Impacts**

The nearest community settlement is located approximately 2 km from the proposed project boundary. The M3 motorway and Chiniot road will be used by all the proposed project related traffic and project site is located adjacent to the road, thus ensuring that the community will not be influenced by the construction vehicle movement.

Both M3 motorway and Chiniot road is with low to medium traffic congestion, so the overall traffic impact on local community will be low.

#### **Mitigation Measures**

- Journey management plan will be developed;
- To the extent possible, peak traffic times will be avoided for project traffic;
- Vehicles will remain confined to defined access;

#### **Residual Impacts**

By implementing the above mitigation measures the overall impact will be significantly low, so the residual impact is low.

### **7.6.10 WILDLIFE AND HABITAT**

#### **Potential Issues**

Impacts on wildlife may arise from the following project activities:

- Noise generated from project activities;
- Movement of personnel and vehicles;
- Lights used at the project facilities;
- Clearing of vegetation;
- Improper disposal of wastes;

Likely impacts of these activities can include:



- Temporary migration of mammals and bird from the area;

### **Assessment of Potential Impacts**

During the construction activities there will be less possible impacts to wildlife due to disturbance and loss of habitat, clearing and levelling of construction site because proposed project is located within M3 industrial city. Wildlife may be disturbed due to sensory disturbance from earthwork, construction; movement of vehicles and crew personnel. This can possibly result in changes in distribution and abundance.

### **Mitigation Measures**

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

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

### **Residual Impact**

Once the mitigation measures given above are implemented, it is expected that the project will have lesser significant impacts on the area's wildlife.

#### **7.6.11 SOCIO-ECONOMIC IMPACT**

### **Potential Impacts**

Potential sources of positive and negative impacts on local communities can include:





- Safety and security
- Mobility and transportation
- Project and Community Interface
- Cultural and religious sites
- Archaeological Sites
- Local Economy
- Local Employment

### **Assessment of Potential Impacts**

#### ***Safety and Security:***

There is very less possibility that construction activities may affect the safety and security of the inhabitants of the areas by arising conflicts between residents because the proposed project is within the industrial city which is approximately 2km away from the local community. Community sensitive project planning and implementation as prescribed through the recommended mitigation measures will minimize the occurrence of any serious impacts. Further project vehicles will use the existing road and there will be no road safety issues.

#### ***Mobility and Transportation:***

As the proposed project is already within the industrial city so mobility of local women will not be affected due to project activities. Project personnel will be given gender sensitization briefings and will be instructed to respect local norms, the local culture, particularly in relation to the womenfolk of the area.

#### ***Project and Community Interface:***

Inter-cultural differences between the project staff from other areas and the local community could result in frictions.

To mitigate these issues locals will preferred for unskilled jobs. Also with proper management of the workforce, it is possible to avoid any complaints.

#### ***Cultural and Religious Opportunities:***

Cultural sites in the form of mosques, tombs and graveyards do not exist in the proximity of project site. So, the proposed project have no negative impact regarding culture and religion.



### ***Archaeological Sites:***

There are no documented sites of archaeological, historical, or cultural significance near project area.

### ***Local Economy:***

There will be positive impact on local economy due to project activities:

- Increased turnover of local businesses and shops due to an increased demand from project contractors and their employees. During the proposed project activities such as construction, material such as the gravel, aggregate, steel, cement, sand for construction will be procured from local market. General supplies which include camp supplies (food, etc), fuels and oils etc will also be procured from local nearest urban settlements.
- An increase in the income of locals may occur due to employment in the project.

### ***Local Employment:***

- Distribution of employment opportunities during construction activities. The project will employ local people for unskilled jobs. Local people will be hired for unskilled jobs. When hiring local people, preference will be given to people living within the close proximity of project site, as they will be the most directly influenced by the project.

### **Mitigation Measures**

The following mitigation measures will be implemented:

- Limit the social interaction between the workforce and the local communities;
- All vehicle drivers will be trained in community safety aspects. Drivers will be trained in responsible and safe driving practices; safe speed limits for vehicles will be followed;
- The construction crew's interaction with the local population will be minimized.
- The project proponent and the contractor will maintain liaison with the local community. The communities will be informed of the construction activities well in advance.
- There will be no interaction with the local women folk.
- The company will maintain a social complaint register at the site to document all complaints received from local communities. The register will also record the measures taken to mitigate these concerns.
- Awareness and cultural inductions to educate the contractor workforce on the requirement of minimizing social interaction with local communities;
- Project staff will respect cultural norms.
- The non-local project staff will be sensitized to local culture and norms.



- Unnecessary interaction of local population with the non-local project staff will be avoided.
- Residents of the area will be informed at least two weeks before project activities commence.
- Maximum number of unskilled and semi-skilled jobs will be reserved for the local communities.

## **7.7 IMPACTS ASSOCIATED WITH OPERATION ACTIVITIES**

In this section the environmental and socioeconomic impacts associated with the proposed project operation activities are discussed. The impacts that are discussed are as follows:

- Environmental Impacts
  - Air Emissions
  - Water Resources
  - Green House Gas Emissions
  - Hazardous Material
  - Wastewater
  - Waste Management
- Occupational Health and Safety

### **7.7.1 AIR EMISSIONS**

#### **Potential Impacts**

Impacts on local air quality may arise from the following project activities:

- Particulate matter emissions may results from operation process.
- Air emissions from vehicles, generators etc.

#### **Assessment of Potential Impacts**

Proposed battery unit air emissions can have a minor impact on the local and regional air quality. The pollutants can impair human health and ecological environment and other materials. There will be proper mitigations and controls to stop any emission of air pollutants

A significant impact will be interpreted if the concentration of pollutants in the ambient air exceeds the NEQS or recognised international guidelines for ambient air quality such as World Bank and World Health Organization (WHO) ambient air quality guidelines.



## **Mitigation Measures**

The proposed mitigation measures to reduce the impacts on air quality during the proposed operation activities are:

- Use of cleaner fuels
- Keep the instruments and equipments well maintained
- Monitoring of Ambient air parameters (PM10, SO<sub>2</sub>, and NO<sub>x</sub>) emissions should be carried out on quarterly basis to ensure compliance with the NEQS and World Bank emission guidelines.

If the mitigation measures are effectively implemented, the residual impact of the proposed activities on the area's air quality is expected to be low in significance.

### **7.7.2 WATER RESOURCES**

#### **Potential Impacts**

Proposed activities could affect the area's water resources in two ways:

- Reduction from overuse, and
- Contamination

The water in the area is abundant due to the project area's proximity to the Chenab River and Jhang branch Canal. Groundwater is available in the majority of the area at, or at less than a depth of 25-30 meter below the surface level.

#### **Assessment of Potential Impacts**

Water will be required during construction activities. Proposed battery unit management will procure 100GPD water from FIEDMC. Water conservation practices will be utilized to reduce the water consumption.

Surface water quality may be deteriorated if pollutants are mixed with surface runoff during rain and carried to water resources in the vicinity. Potential sources of pollution in such cases may include:

- Oil and grease from vehicles and machinery;
- Stored fuel, oil, acid and other chemicals;

#### **Mitigation Measures**

The mitigation measures described below will ensure that the surface and aquifer resources of project area are not significantly affected by project activities.

- A water management plan will be developed. The plan will also include strategies to minimize water use (and therefore volume of discharge) and maintain reserves;



- Follow good housekeeping practices with all machinery that may potentially discharge wastewater;
- No untreated effluents will be released to the environment

### **Residual Impact**

The nature of impact is direct and its reversibility depends on the rainfall pattern, catchment size and associated aquifer recharge to the project area. The significance level given is low, because the water in the area is abundant due to the project area's proximity to the Chenab River and distributor canals. Groundwater is available in the majority of the area at, or at less than a depth of 17 meters below the surface level. Proper implementation of the required mitigation and monitoring techniques will prevent any adverse water quality impacts.

### **7.7.3 HAZARDOUS MATERIALS**

#### **Potential Issues**

The operations of proposed battery unit will require use of chemicals during battery manufacturing process and water treatment, as lubricants and corrosion control etc. Some of these chemicals may be of hazardous nature. These chemicals have a potential to harm human health and contaminate soil, surface and groundwater if not handled correctly.

#### **Assessment of Potential Impacts**

A significant impact will be interpreted if the hazardous materials are not handled properly. The chemicals for the plant operations will include various salts, expenders, coagulants, flocculants, Sulfuric acid and caustic soda for water treatment and regeneration systems, lubricants etc for use in maintenance. These chemicals and hazardous materials will be handled following the mitigation measures described below

#### **Mitigation Measures**

A chemical and hazardous material management plan will be prepared that must contain:

- Storage and handling of hazardous materials will be in accordance with international standards and appropriate to their hazard characteristics.
- Storage areas for fuels and liquid chemicals will be designed with secondary containment to prevent spills and contamination of soil and groundwater.
- Labeling will be placed on all storage vessels/containers as appropriate to national and international standards. The labeling will clearly identify the stored materials.
- A Hazardous Materials Register will be in place to cover hazardous material name, HAZCHEM/United Nations Code, Material Safety Data Sheet (MSDS), summary of maximum



inventory, storage requirements and precautions, location, physical properties of the materials and approved disposal methods.

- Supporting information such as Material Safety Data Sheets (MSDS) will be available for all hazardous materials.
- A Hazardous Materials Register will be in place that covers:
  - Hazardous Material name
  - MSDS
  - Summary of maximum inventory
  - Storage requirements and precautions
  - Location, physical properties of the materials where they are used
  - Approved disposal methods
- Disposal of any hazardous material will be according to the MSDS requirements.

### **Residual Impacts**

Implementation of the proposed mitigation measures is not likely to leave any significant impact.

#### **7.7.4 OZONE DEPLETION**

The proposed project will not use any source of ozone depleting compounds such as Halon, Chlorofluorocarbons (CFC), Hydro-chlorofluorocarbons (HCFC) or any other source which deplete the ozone layer, so the overall assessment of the impact is significantly low.

#### **7.7.5 NOISE**

### **Potential Issues**

The proposed battery unit may result in increase in noise. The increased noise may be the source of disturbance for plant workers but will not pose any significant impact on the nearby community because nearby community is approximately 2km away from the proposed project.

### **Assessment of Potential Impacts**

Noise sources in the community mostly intermittent in nature including road traffic. It can therefore be concluded that area surrounding the proposed battery unit has low noise pollution.



The World Bank guidelines for noise require that the sound level in residential areas should not exceed 55 dB(A) during the day and 45 dB(A) during the night. An alternate criterion is the World Health Organization (WHO) guidelines.

The existing daytime noise levels at location show that noise levels are well below guideline value of 55 dB(A). Noise levels at the proposed battery unit location will not be much higher even then only concerned staff will be working in the area with required PPE, and the exposure will be limited to short durations. The control on occupational hazards including noise is discussed later in this section. The residential area is located approximately 2 Km away from the proposed project site and there will be no significant impact on community.

### **Mitigation Measures**

The following mitigation measure will be undertaken in order to further reduce the noise levels.

- The noise producing equipments will be placed inside the acoustic enclosures to reduce noise at source.
- All equipments with potential of noise generation will be well maintained.

### **Residual Impacts**

Implementation of the mitigation measures proposed above will result in negligible or no residual impact due to plant noise on surrounding environment.

#### **7.7.6 WASTEWATER**

### **Potential Issues**

The proposed battery unit operations will require approximately 175 tones water per day which will be used in different process.

The proposed battery unit will generate approximately 85 tones wastewater per day as a result of operational activities. The wastewater can be a potential source of pollution to surface and groundwater resources of the area if not treated properly.

### **Assessment of Potential Impacts**

A significant impact will be interpreted if discharged to the environment exceed the NEQS limits for effluent discharge or World Bank guidelines for effluent discharge from proposed battery unit. Similarly a significant impact will be interpreted if wastewater contaminates the groundwater. The proposed project will acquire the water from existing sources. However, this very limited increase will leave a negligible impact on the ground water table. The wastewater generated from the proposed project will be treated in WWTP before





discharging. Following mitigation measures will be adopted for effective management of wastewater from the plant.

### **Mitigation Measures**

- The wastewater from the proposed battery unit will be treated in wastewater treatment system. Treated water will meet NEQS and will be disposed off properly.
- Sanitary wastewater will be treated in septic tank before discharge into the evaporation pond.
- Water conservation practices provided will be followed to minimize the water usage.
- Water use will be monitored periodically to ensure that water is not being wasted;
- Performance of the wastewater treatment plant will be monitored periodically;

### **Residual Impacts**

Implementation of the proposed mitigation measures and regular monitoring is not likely to leave any significant impact of the wastewater from the proposed Battery Unit

#### **7.7.7 SOLID WASTE MANAGEMENT**

### **Potential Issues**

The solid waste generated during the operational phase of proposed project can pose a health hazard, pollute soil, surface and ground water if not managed properly.

### **Assessment of Potential Impacts**

A significant impact will be interpreted if the waste management is not carried out properly; which may effect to health of workers, pollution of soil, surface or groundwater:

- Any person is exposed to potentially hazardous waste generated by the project.
- Excessive wastes are generated, recyclable waste are not recycled, waste are scattered, handling of wastes results in contamination, and wastes are improperly disposed off causing pollution

The operation of the proposed battery unit will generate approximately 2 tones of solid waste per day which is relatively a minor volume of solid wastes. So the impact will be of low level

All wastes generated from the project will be properly managed by proposed controls discussed in the following section. Implementation of the proposed mitigations will minimize the environmental impacts.

### **Mitigation Measures**

Key elements of the waste management system will be the following:



- Separate waste bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton.
- Recyclable material will be separated at source. The recyclable waste will be sold to waste contractors for recycling.
- Non-hazardous non-recyclable wastes will be disposed off on designated site.
- No waste will be dumped at any location outside the plant boundary.
- All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with restricted access and proper marking. Hazardous wastes will be disposed off through approved waste contractors.
- Surplus materials including partially filled chemical and paint containers will be returned to suppliers.
- Records of all waste generated will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register.
- Training will be provided to personnel for identification, segregation, and management of waste.

### **Residual Impacts**

Proper implementation of the mitigation measures will ensure that the residual impact from waste will be negligible. Monitoring and inspection will be undertaken to ensure

#### **7.7.8 OCCUPATIONAL HEALTH AND SAFETY**

This section discusses the occupational and safety impacts of operations of proposed Battery Unit.

#### ***Safety***

The major safety topics discussed below include:

- Electrical hazards
- Confined space entry
- Machine guarding
- Eye, head and foot protection
- Fire and explosion hazards
- Housekeeping Issues



### *Electrical Hazards*

Electrical hazards constitute a major threat to employees. Care will be taken to properly ground and insulate all equipment, maintenance activities around electrical equipment will utilise written procedures to de-energise circuits that will be impacted by the repair activity. Tools shall also be of the type that will not conduct electricity if circuits cannot be de-energised. Employees will be required to periodically inspect and maintain their equipment. Procedures shall be developed and implemented to protect workers from exposure to toxic explosive gases as well as other hazards associated with such inspections and maintenance.

### *Confined Space Entry*

Standard procedures for confined space entries will be in written form and will include electrical lockout, air testing before and during entry, proper respiratory protection if required, standby help (buddy system), and piping system disconnection. Hazardous air conditions that may be encountered are oxygen deficiency and toxic gases such as aromatic hydrocarbons.

### *Machine Guarding*

Proper machine guarding, which is critical for the prevention of injuries to workers by isolating them from moving machinery, will be provided. Examples of critical guarding points are fan belts and moving gears. Guard railing necessary to minimise hazard of falls from elevated walkways on equipment such as fuel storage tanks will be provided.

### *Eye, Head and Foot Protection*

Head protection will be worn in appropriate areas, i.e., Production areas. Open-toed shoes will be prohibited. Eye protection will be required during all maintenance activities involving dust exposure or the production of particulates from sanding or grinding activities.

### *Fire and Explosion Hazards*

Explosion and fire are risk from flame out, electrical fault, or equipment overheating. Firefighting equipment will be available in the form of ABC fire extinguishers as a minimum, 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 facility in well marked piping. Portable fire extinguishers will be located in appropriate areas for use by employees.

### *House Keeping*

Housekeeping will be frequent and thorough to prevent slips, trips, and falls. Problem areas include aisles and roadways that are often oily from machinery leakage. Visibility



will be clear at pathway intersections to prevent employee injury and equipment damage. A lockout / tag out program will be implemented

### *Occupational health*

The occupational topics discussed below include:

- Noise levels
- Medical Monitoring
- Ambient temperature

### *Noise Levels*

Measurements of noise exposure will be made for all job categories as soon as the new equipment is fully operational. Employee exposure above 90 dB (A) requires engineering or administrative controls to reduce exposure wherever feasible. If noise reduction is not feasible, personal protective equipment must be worn for those job categories with exposures over 90 dB (A).

### *Medical Monitoring*

Medical monitoring is important for all project workers. Pre-employment medical examinations will be utilised to develop a baseline set of data for each worker which can be compared to future data developed during periodic examinations

### *Ambient Temperature*

Ambient temperatures are often in the 40°C (104°F) range in this portion of Pakistan. This fact coupled with the heat generated from the equipment indicates that heat-related stress must be monitored at the facility. Heat-related illnesses include: heat stroke (life threatening collapse of the body's cooling mechanisms), heat exhaustion (profuse sweating, headache, nausea, dizziness), and heat rash (dermatitis from clogged pores). These illnesses can be prevented through the use of the proper work/rest cycle and increased intake of fluids.

## **7.8 ENVIRONMENTAL AND SOCIAL BENEFITS**

### **7.8.1 EMPLOYMENT**

The project will generate directly approximately 200 jobs during the construction phase of the project. The project operational phase will also generate new jobs approximately 175-200 employees will be employed. The locals will be preferred for the jobs as per their capabilities.



Most of the locals belonging to the project area do not have the required education or skills for the skilled or semi skilled jobs however, locals will be given preference for unskilled jobs.

Similarly the construction and operation of the project will create far greater number of indirect income resources for example income resource for transporters for the transportation of the facility materials, procurement of goods from local market etc.

Overall the proposed battery unit will have a very positive impact on the employment opportunities in Pakistan.



## **8 ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

The potential environmental and social impacts are identified from the planning stage of proposed 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 construction and operations phase. To minimize the effects of adverse impacts the EIA has recommended mitigation measures. These mitigation measures include the use of alternative technologies, management and physical controls, or compensation in monetary terms. 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 residual impacts (impacts remaining after applying the recommended mitigation measures) and for impacts in which there can be a level of uncertainty in prediction at the EIA stage, monitoring measures have been recommended to ascertain these impacts during the course of the project.

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

### **8.1 PURPOSE AND OBJECTIVES OF THE EMP**

The primary objectives of the EMP are to:

- Achieve FTMM corporate health, safety and environmental (HSE) goals.
- Facilitate the implementation of the mitigation measures identified in the EIA.
- Define legislative requirements, guidelines and best industrial 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.

## **8.2 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 programme

## **8.3 LEGISLATION AND GUIDELINES**

The EIA has discussed national and international legislation and guidelines that are relevant to the project. FTMM will ensure that the project is conducted in conformance to FTMM environmental policy, national legislation and relevant international conventions and that guidance is sought from national and international guidelines. FTMM 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. The details on national and international legislation and guidelines are given in **Chapter 2** of the report.

## **8.4 ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES**

This section provides an organizational structure for environmental management during the proposed project operation and defines the roles and responsibilities of the various players for the duration of the project. The proposed project includes the following four organizations:

- FTMM as the project proponent and owners of the EMP;
- Design and project management consultant (International & Local)
- Project construction contractor(s) as executors of the EMP during construction phase of the project.





- Proposed Battery unit operation & maintenance (O&M) team as executor of the EMP during the operational phase of the project.

These organisations will have the following roles and responsibilities during the project.

## 8.5 ROLES AND RESPONSIBILITIES

### 8.5.1 GENERAL

#### *Roles and Responsibilities of FTMM*

As project proponents, FTMM will be responsible for ensuring the implementation of the EMP. Proposed battery unit manager of FTMM will be responsible for the overall environmental performance of the project. FTMM will monitor the environmental performance of the project to ensure that the project is carried out in accordance with governing legislation, FTMM corporate policies and recommendations of this EIA.

#### *Roles and responsibilities of Contractors*

FTMM will appoint construction contractor(s) for the construction and commissioning of the proposed project including the auxiliary facilities. Similarly proposed battery unit operations and maintenance (O&M) team will be appointed for operations of the proposed facility. O&M team will manage all the day to day operations of proposed battery unit. This team will be responsible for implementation of, or adherence to, all provisions of the EMP and with any environmental and other codes of conduct required by FTMM. Overall responsibility for environmental performance of the operation will rest with the senior management. Site managers of the contractors will be responsible for the effective implementation of the EMP.

### 8.5.2 PLANNING AND DESIGN OF THE OPERATION

#### *Design of the Operation*

Design and operations of the proposed project have been described in **Chapter 3** of the EIA report. Following approval of the EIA, if any aspect of the operations or requirements of the EIA need to be changed, FTMM will categorise that change in accordance with the Change Management Plan provided in **Section 8.10** of this EMP and take appropriate measures thereon.

#### *Contractual Provisions*

Adherence to the requirements of the EIA and EMP in terms of environmental mitigation will be required from all project contractors and suppliers and thus EMP will form part of their contracts with FTMM.



### 8.5.3 IMPLEMENTATION OF THE OPERATION

#### *Co-ordination with Stakeholders*

FTMM will ensure that co-ordination required with the project stakeholders on environmental and social matters as required by the EMP throughout the operations.

#### *Environmental Management Systems*

FTMM and the contractors will ensure that the mitigation measures mentioned in the EIA are adhered to and organisational HSE Management Systems are implemented during the proposed project. The contractors will abide by the relevant contractual provisions relating to the environment.

#### *Monitoring*

FTMM and its contractors will ensure that the monitoring of the project activities is carried out according to the monitoring programme given in the EMP.

#### *Emergency Procedures*

FTMM and its contractor will prepare and maintain contingency plans to deal with any emergency situation that may arise during the operation e.g. fire, explosion, evacuation and communicate these to the regulatory agencies if required by these agencies. Emergency plans will be in accordance to FTMM internal procedures.

#### *Approvals*

The project contractors will be responsible for obtaining all relevant approvals from FTMM such as approvals for waste contractors and others as specified in the environmental management and monitoring plan.

#### *Training*

FTMM and its contractors and suppliers will be responsible for the selection and training of their staff that are capable of completing the project activities in an environmentally safe manner. FTMM and its contractors and suppliers will be responsible for providing introduction to their staff members on the EIA, the EMP and their implementation provided in the EMP. The contractors will be responsible for providing awareness training on potential environmental issues of the project to all personnel at site. In addition, trainings on emergency preparedness and implementation of EMP will also be covered during the training programme.

#### *Communication and Documentation*

For effective monitoring, management and documentation of the environmental performance during the operation, environmental matters will be discussed during



meetings held on-site. Environmental concerns raised during the meetings will be mitigated after discussions between FTMM and the contractors. Any issues that require attention of FTMM higher management will be communicated to them for action. FTMM and its contractors will ensure that the communication and documentation requirements specified in the EMP are fulfilled during the project.

### *Audits*

FTMM and its contractor and sub-contractors will carry out periodic audits/inspections of all project activities regarding their effects on the surrounding environment. The contractors will take account of any recommendations relating to the operation arising during the monitoring, with the prior consent of the proponent.

## **8.6 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN**

The Environmental Management and Monitoring Plan (EMMP) will be used as a management and monitoring tool for implementation of the mitigation measures identified by the EIA. The purpose of monitoring is to ensure that the impact is within the predicted limits and to provide timely information if unacceptable impact is taking place. The scope and frequency of the monitoring depends on the residual impacts identified in **Chapter 7** of the report. To address the mitigation measures and monitoring requirements identified in EIA, a management plan is developed. It ensures that the project is designed, constructed, maintained and implemented in the manner described in the EIA.

A detailed monitoring plan is discussed in following tables. This table lists all the project component's impacts and their associated mitigation measures identified in the EIA. For each component, the following information is presented in the plan:

- The required mitigation measures recommended in EIA.
- The person/organization directly responsible for adhering to or executing the required mitigation measures.
- The person/organization responsible for ensuring and monitoring adherence to mitigation measures.
- The parameters which will be monitored to ensure compliance with the mitigation measures.
- The timing at which the mitigation or monitoring has to be carried out.

FTMM will hold primary and overall responsibility for ensuring full implementation of the EMP. The Environmental Management and Monitoring Plan has been provided separate for construction and operations phase of the proposed project activities in **Table 8.1** and **Table 8.2** respectively.



Table 8-1: Management and Monitoring Plan – Construction Phase

| Sr.No. | Impact                       |     | Mitigation Measures  | Responsibility |            | Action/Monitoring<br>Parameter/Monitoring<br>Method                                    | Timing                       |
|--------|------------------------------|-----|--|----------------|------------|--|------------------------------|
|        |                              |     |  | Execution      | Monitoring |  |                              |
| 1.     | Soil Erosion & Contamination | 1.1 | Unnecessary clearing outside work areas will be avoided  | CC             | CC/FTMM    | Monitor land clearing activities   | During construction phase    |
|        |                              | 1.2 | Unnecessary clearing of vegetation will be strictly prohibited.  | CC             | FTMM       | Check the sites and routes selected for camp site and monitor land clearing activities | Before land clearing         |
|        |                              | 1.3 | Vehicle speeds will be regulated and monitored to avoid excessive dust emissions.  | CC             | CC/FTMM    | Set speed limits and check compliance  | During construction phase    |
|        |                              | 1.4 | Periodic trainings will be provided to drivers on mitigation measures related to off-road travel and speed limits.         | CC             | FTMM       | Check training records   | During construction phase    |
|        |                              | 1.5 | Fuel tanks will be daily checked for leaks and all such leaks will be plugged immediately.                                 | CC             | CC/FTMM    | Daily checking of fuel tanks for leakages  | During construction phase    |
|        |                              | 1.6 | All fuel and oil storage areas will have a secondary containment to prevent soil contamination in case of leaks or spills. | CC             | CC/FTMM    | Ensure provision of Secondary containment  | During construction activity |
|        |                              | 1.7 | A Waste Management plan will be prepared to dispose off all kinds of wastes.   | CC             | FTMM       | Development of Waste Management plan and its implementation                            | During construction phase    |
| 2.     | Water Resources              | 2.1 | Follow good housekeeping practices with all machinery that may potentially   | CC             | CC/FTMM    | Check housekeeping practices   | During construction phase    |



| Sr.No. | Impact                       |     | Mitigation Measures  | Responsibility |            | Action/Monitoring<br>Parameter/Monitoring<br>Method | Timing                                   |
|--------|------------------------------|-----|--|----------------|------------|---|--|
|        |                              |     |  | Execution      | Monitoring |   |  |
|        |                              |     | discharge into or come in contact with the surface water.  |                |            |   |  |
|        |                              | 2.2 | Fuels and lubricants will be stored in areas with Impervious floors that can contain spills.   | CC             | FTMM       | Check compliance                                    | During construction                      |
|        |                              | 2.3 | All areas containing potentially hazardous materials will be isolated and contained.   | CC             | FTMM       | Check compliance                                    | During construction phase                |
|        |                              | 2.4 | Pipeline routes (for water supply) shall be selected to minimize adverse impacts by preferential selection of a route that:<br>- uses previously disturbed areas,<br>- avoids sensitive areas (including steep slopes, watercourses) | CC             | CC/FTMM    | Check compliance                                    | During the Construction phase of project |
| 3      | Air Pollution, GHG Emissions | 3.1 | All equipment, generators, and vehicles used during the project will be properly tuned and maintained in good working condition in order to minimize exhaust emissions.  | CC             | CC/FTMM    | Check compliance                                    | During all project activities            |
|        |                              | 3.2 | Imposing speed limits and encouraging more efficient journey management will reduce the dust emissions produced by vehicular traffic.  | CC             | CC/FTMM    | Visually check dust emissions                       | During Construction phase                |
|        |                              | 3.3 | All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not   | CC             | CC/FTMM    | Visually check smoke and emissions                  | During all project activities            |



| Sr.No. | Impact             |     | Mitigation Measures  | Responsibility |            | Action/Monitoring<br>Parameter/Monitoring<br>Method     | Timing  |
|--------|--------------------|-----|--|----------------|------------|---|---|
|        |                    |     |  | Execution      | Monitoring |   |   |
|        |                    |     | emitting smoke.  |                |            |   |   |
| 4.     | Construction Noise | 4.1 | All on-site personnel will use required personal protective equipment (PPE) in high noise areas.                         | CC             | CC/FTMM    | Check compliance  | During construction and fabrication of plant activities |
|        |                    | 4.2 | Equipment noise will be reduced at source by proper maintenance and repair of construction machinery and equipment.      | CC             | CC/FTMM    | Monitor compliance and periodic noise monitoring        | Prior to start and during construction phase            |
|        |                    | 4.3 | Movement of all project vehicles and personnel will be restricted within work areas.                                     | CC             | CC/FTMM    | Check compliance  | During all project activities                           |
| 5.     | Waste Management   | 5.1 | Separate bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and food.                | CC             | CC/FTMM    | Monitor compliance                                      | During construction phase                               |
|        |                    | 5.2 | Recyclable material will be separated at source. The recyclable waste will be disposed off as per waste management plan. | CC             | CC/FTMM    | Monitor compliance                                      | During construction phase                               |
|        |                    | 5.3 | On-site audits of the waste management will be undertaken on a regular basis during the period of project activity.      | CC             | CC/FTMM    | Onsite waste management audit                           | During construction phase                               |
|        |                    | 5.4 | Training will be provided to personnel for identification, segregation, and management of waste.                         | CC             | CC/FTMM    | Conduct periodic training and maintain training record. | During construction phase                               |



| Sr.No. | Impact                  |     | Mitigation Measures   | Responsibility |            | Action/Monitoring<br>Parameter/Monitoring<br>Method | Timing                    |
|--------|-------------------------|-----|---|----------------|------------|---|---------------------------|
|        |                         |     |   | Execution      | Monitoring |   |                           |
|        |                         | 5.5 | An emergency response plan as per FTMM safety policy will be followed for all hazardous activities  | CC             | CC/FTMM    | Develop and implement emergency response plan.      | During construction phase |
|        |                         | 5.6 | All containers of hazardous waste will be appropriately labeled.  | CC             | CC/FTMM    | Check compliance                                    | During construction phase |
| 6.     | Vehicle Movement        | 6.1 | Journey management plan will be developed in accordance with FTMM procedures.   | CC             | CC/FTMM    | Check compliance                                    | During construction phase |
|        |                         | 6.2 | Existing tracks will be used wherever possible.   | CC             | CC         | Check compliance                                    | During construction phase |
|        |                         | 6.3 | Project vehicles will follow the speed limits prescribed by FTMM. Drivers will receive specific training on this requirement.                                     | CC             | CC/FTMM    | Check compliance                                    | During construction phase |
|        |                         | 6.4 | Night time driving of project vehicles will be limited where possible.  | CC             | CC/FTMM    | Check compliance                                    | During construction phase |
|        |                         | 6.5 | Vehicles will remain confined to defined access.<br>A Specified Speed limit will be maintained on the section of the access road that is adjacent to the village. | CC             | CC/FTMM    | Check compliance                                    | During construction phase |
| 7.     | Disturbance to Wildlife | 7.1 | Vegetation loss will be kept to an absolute minimum.  | CC             | CC/FTMM    | Check compliance                                    | During construction phase |
|        |                         | 7.2 | Wildlife policy will be strictly observed, unless threatening to human life.  | CC             | CC/FTMM    | Check compliance                                    | During construction phase |





| Sr.No. | Impact                          |     | Mitigation Measures  | Responsibility |            | Action/Monitoring<br>Parameter/Monitoring<br>Method                      | Timing                    |
|--------|---------------------------------|-----|--|----------------|------------|--|---------------------------|
|        |                                 |     |  | Execution      | Monitoring |  |                           |
|        |                                 | 7.3 | Food wastes will not be disposed off in the open.  | CC             | CC/FTMM    | Check compliance   | During construction phase |
|        |                                 | 7.4 | Movement of all project personnel will be restricted to work areas;  | CC             | CC/FTMM    | Monitor compliance   | During construction phase |
| 8.     | Clearing of Natural Vegetation  | 8.1 | Vegetation clearing will be kept to a minimum.   | CC             | CC/FTMM    | Check compliance   | During construction phase |
|        |                                 | 8.2 | Whenever to develop new tracks, routes that minimize vegetation loss will be chosen and unnecessary damage to vegetation will be avoided;  | CC             | CC/FTMM    | Check compliance   | During construction phase |
| 9.     | Socioeconomic / Local Community | 9.1 | All community grievances will be recorded and maintained in a Community Complaint's Register. In addition to this close liaison will be maintained between the community and the site representatives of Civil Contractor and FTMM throughout the project activities | CC             | CC/FTMM    | Check the provision of complaint register and its access for communities | During construction phase |
|        |                                 | 9.2 | Suitable number of unskilled and semi-skilled jobs will be reserved for the local communities.   | CC             | CC/FTMM    | Check compliance   | During construction phase |
|        |                                 | 9.3 | Awareness and cultural introductions to educate the contractor workforce on the requirement of minimizing social interaction with local communities;   | CC             | CC/FTMM    | Check compliance   | During construction phase |
|        |                                 | 9.4 | Unnecessary interaction of local   | CC             | CC/FTMM    | Check compliance   | During                    |



| Sr.No. | Impact                    |      | Mitigation Measures  | Responsibility                                    |            | Action/Monitoring<br>Parameter/Monitoring<br>Method | Timing                           |
|--------|---------------------------|------|--|---|------------|---|----------------------------------|
|        |                           |      |  | Execution   | Monitoring |   |                                  |
|        |                           |      | population with the non-local project staff will be avoided.   |   |            |   | construction phase               |
|        |                           | 9.5  | Discharging firearms will be explicitly prohibited.  | CC  | CC/FTMM    | Check compliance                                    | During construction phase        |
| 10     | Contractor Management     | 10.1 | The Company will inform contractors of their HSE responsibilities, including requirements within this EMP. Applicable Health, Safety and Environmental requirements shall be specified within contractual agreements.  | FTMM Management                                   |            | Check compliance                                    | During all phases of the project |
| 11     | Workers Health and Safety | 11.1 | The Company will manage contractors to ensure a safe and healthy working environment, promoting best occupational health and safety practice. Provision of adequate Personal Protective Equipment (PPE) and enforcement of its use.<br>Adoption of safe working practice, in accordance with FTMM requirements, for working:<br>in confined spaces<br>at heights<br>with moving machinery<br>dusty environments<br>electrical equipment<br>as a vehicle driver<br>Workers shall only perform those tasks | FTMM Management & relevant Contractors Management |            | Check compliance                                    | During all phases of the project |



| Sr.No.  | Impact |  | Mitigation Measures  | Responsibility |            | Action/Monitoring<br>Parameter/Monitoring<br>Method | Timing |
|---|--------|--|--|----------------|------------|---|--------|
|   |        |  |  | Execution      | Monitoring |   |        |
|   |        |  | for which they are trained and competent to undertake. Signage and barriers shall be used to alert workers of any hazards. |                |            |   |        |
| CC = Construction Contractor, FTMM = First Treet Manufacturing Modaraba |        |  |  |                |            |   |        |



**Table 8-2: Management and Monitoring Plan – Operational Phase**

| Sr.No                       | Impact   |     | Mitigation Measures  | Responsibility               | Monitoring                          | Timing                    |
|-----------------------------|--|-----|--|------------------------------|-------------------------------------|---------------------------|
| <b>General Requirements</b> |  |     |  |                              |                                     |                           |
| 1.                          | <b>General Environmental and Social Management</b> | 1.1 | Implement good management practices through the development of a social and environmental management system (SEMS), including: <ul style="list-style-type: none"> <li>• grievance procedures</li> <li>• audit programme</li> <li>• stakeholder engagement plan</li> <li>• monitoring plan</li> <li>• training programme</li> </ul> | FTMM Management Higher       | Implement good management practices | In place for operations   |
| 2.                          | <b>Legal Compliance</b>                            | 2.1 | Undertake all monitoring required under Pakistan Environmental legislation/ Standards as specified in this EIA and associated environmental documentation.   | FTMM Management              | Monitor Compliance                  | All phases of project     |
| 3.                          | <b>Training</b>                                    | 3.1 | All workers (including contractors) will be given Environmental Health and Safety training and informed of their obligations described in this EMP.  | FTMM Management /Contractors | Monitor Compliance                  | All phases of the project |
| 4.                          | <b>Contractor Management</b>                       | 4.1 | The Company will inform contractors of their HSE responsibilities, including requirements within this EMP. Applicable Health, Safety and Environmental requirements shall be specified within contractual agreements.  | FTMM Management              | Monitor Compliance                  | All phases of the project |



| Sr.No                             | Impact                 |     | Mitigation Measures  | Responsibility   | Monitoring  | Timing                |
|-----------------------------------|------------------------|-----|--|------------------|---|-----------------------|
| 5.                                | EHS Audit              | 5.1 | Establish an Environment, Health and safety audit programme to monitor the EHS performance and confirm compliance with the mitigation measures outlined for relevant project activities. A multidisciplinary audit team (of FTMM Environmental, Health and Safety specialists) should visit each of the sites periodically, and in particular shortly following commencement of works.   | FTMM Management  | Monitor Compliance  | All phases of project |
| <b>Environmental Requirements</b> |                        |     |  |                  |   |                       |
| 6.                                | Air Emissions          | 6.1 | <ul style="list-style-type: none"> <li>• All equipment, generators, and vehicles used during the project will be properly tuned and maintained in good working condition in order to minimize exhaust emissions.</li> <li>• Imposing speed limits and encouraging more efficient journey management will reduce the dust emissions produced by vehicular traffic.</li> <li>• All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.</li> </ul> | FTMM HSE Manager | Monitor compliance  | Operation phase       |
|                                   | Air Emissions (Odours) | 6.2 | <ul style="list-style-type: none"> <li>• Installation of rendering equipment in closed spaces and operate under negative pressure compared to ambient air</li> </ul>   | FTMM HSE Manager | Implement odour minimization measures. Monitor compliance | Operation phase       |



| Sr.No | Impact                   |     | Mitigation Measures   | Responsibility      | Monitoring  | Timing          |
|-------|--------------------------|-----|---|---------------------|---|-----------------|
|       |                          |     | <p>conditions</p> <ul style="list-style-type: none"> <li>• All process buildings will be constructed from high quality cladding, generally with a concrete protective wall section along the base, in which all doors will be kept closed and only operated to facilitate access to the buildings.</li> <li>• All side sheeting on the main production building will be constructed with double skin type of cladding.</li> <li>• Operating procedures will be developed and implemented include instructions to all operators to ensure that all access doors to the building are kept closed except when in use.</li> <li>• Separate personnel doors will be provided for the operators entering and leaving the buildings and these doors are kept closed at all times.</li> </ul> |                     |   |                 |
|       | Air Emissions Monitoring | 6.3 | Monitoring of air emissions should be carried out regularly to ensure compliance with the NEQS and IFC/World Bank emission guidelines.  | FTMM<br>HSE Manager | Records of operational Parameters / periodic monitoring of stack emissions from generators, any combustion process. | Operation phase |
|       |                          | 6.4 | Routine odour monitoring should be carried out at pre determined sampling locations, including site boundary and residential areas. The frequency and   | FTMM<br>HSE Manager | Periodic monitoring of odours and reporting and record of any odour incident.                                       | Operation phase |



| Sr.No | Impact                 |     | Mitigation Measures   | Responsibility      | Monitoring         | Timing          |
|-------|------------------------|-----|---|---------------------|--------------------|-----------------|
|       |                        |     | location of obnoxious odours should be recorded during any odour incidents.   |                     |                    |                 |
| 7.    | Water Resources        | 7.1 | <ul style="list-style-type: none"> <li>Follow good housekeeping practices with all machinery that may potentially discharge into or come in contact with the surface water.</li> <li>Fuels and lubricants will be stored in areas with impervious floors that can contain spills.</li> </ul>  | FTMM                | Monitor compliance | Operation phase |
|       |                        | 7.2 | Monitor water use and explore opportunities to minimise water use through water conservation measures.  | FTMM<br>HSE Manager | Monitor compliance | Operation phase |
|       | Groundwater Monitoring | 7.3 | Groundwater monitoring will be carried out at locations (where necessary) where there is a risk of soil and/or groundwater contamination.   | FTMM<br>HSE Manager | Monitor compliance | Operation phase |
| 8.    | Waste Water            | 8.1 | <ul style="list-style-type: none"> <li>Waste water treatment plant will be installed to treat all process wastewater.</li> <li>Take actions to remove solid waste before it enters the wastewater stream:</li> <li>Use floor drains and collection channels with grids, screens, and / or traps to reduce the amount of solids entering the wastewater stream;</li> <li>Manure from the stockyard and from vehicle cleaning should be removed while in solid form;</li> <li>Prevent direct runoff to water courses</li> </ul> | FTMM                | Monitor compliance | Operation phase |





| Sr.No | Impact                            |      | Mitigation Measures   | Responsibility | Monitoring  | Timing          |
|-------|-----------------------------------|------|---|----------------|---|-----------------|
|       |                                   | 8.2  | Monitoring of effluents should be carried out as per requirement of SMART to ensure compliance with the NEQS and IFC/World Bank guidelines.   | FTMM           | Monitor compliance / wastewater sampling and testing records. | Operation phase |
|       |                                   | 8.3  | No hazardous untreated effluents will be released to the environment.   | FTMM           | Monitor compliance  | Operation phase |
| 9.    | <b>Waste Management (General)</b> | 9.1  | <ul style="list-style-type: none"> <li>• Separate waste bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton.</li> <li>• Recyclable material will be separated at source.</li> <li>• Non-hazardous non-recyclable wastes will be disposed off on designated site.</li> <li>• No waste will be dumped at any location outside the plant boundary.</li> <li>• All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with restricted access and proper marking.</li> <li>• An emergency response plan will be developed for the hazardous waste (and substances).</li> <li>• All containers of hazardous waste will be appropriately labeled.</li> </ul> | FTMM           | Monitor compliance  | Operation phase |
| 10.   | <b>Traffic Management</b>         | 12.1 | <ul style="list-style-type: none"> <li>• Develop and implement traffic management plan will be developed in accordance with FTMM procedures.</li> <li>• Project vehicles will follow the speed limits prescribed by FTMM. Drivers will receive</li> </ul>   | FTMM           | Develop and implement traffic management plan.                | Operation phase |



| Sr.No | Impact   |      | Mitigation Measures  | Responsibility   | Monitoring         | Timing                    |
|-------|--|------|--|------------------|--------------------|---------------------------|
|       |  |      | specific training on this requirement.<br>• Night time driving of project vehicles will be limited where possible.<br>• Vehicles will remain confined to defined access.<br>• Speed limit of 10 km/h will be maintained on the section of the access road that is adjacent to the village. |                  |                    |                           |
| 12    | Noise  | 13.1 | • All on-site personnel will use required personal protective equipment (PPE) in high noise areas.<br>• Equipment noise will be reduced at source by proper maintenance and repair of construction machinery and equipment.  | FTMM Managers    | Check compliance   | Operation phase           |
| 13    | Disturbance to Wildlife and Clearing of Natural Vegetation | 14.1 | • Vegetation loss will be kept to an absolute minimum.<br>• Ensure that a 'no-hunting, no-trapping, no-harassing. Wildlife policy will be strictly observed, unless threatening to human life.<br>• Wildlife protection rules will be implemented during all project activities.           | FTMM             | Check compliance   | Operation phase           |
| 14    | Energy Use   | 15.1 | Install electricity meters and monitor them regularly to measure efficiency.   | FTMM HSE Manager | Monitor compliance | Operation phase           |
| 15    | Hazardous Materials (Fuel Storage)                         | 16.1 | • Adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids will be provided.<br>• Any refueling/transfer of hazardous liquids will be undertaken above  | FTMM HSE Manager | Monitor compliance | All phases of the project |



| Sr.No                                 | Impact                    |      | Mitigation Measures   | Responsibility  | Monitoring         | Timing                |
|---------------------------------------|---------------------------|------|---|-----------------|--------------------|-----------------------|
|                                       |                           |      | impervious surfaces.<br>• Portable spill containment and cleanup equipment on site. Workers will be trained in the use of the equipment.<br>• Provision of suitable personal protection equipment.<br>• Hazardous materials should be securely stored and have appropriate signage. They should also be accompanied with accessible hazard data sheets.   |                 |                    |                       |
| <b>Health and Safety Requirements</b> |                           |      |   |                 |                    |                       |
| 17                                    | Workers Health and Safety | 17.1 | The Company will ensure a safe and healthy working environment, promoting best occupational health and safety practice. Provision of adequate Personal Protective Equipment and enforcement of its use.<br>Adoption of safe working practice, in accordance with FTMM requirements, for working:<br>• in confined spaces<br>• at heights<br>• with moving machinery<br>• dusty environments<br>• electrical equipment<br>• as a vehicle driver<br>Workers shall only perform tasks that they are trained and competent to | FTMM Management | Monitor Compliance | All phases of project |



| Sr.No | Impact                       |      | Mitigation Measures  | Responsibility   | Monitoring  | Timing                          |
|-------|------------------------------|------|--|------------------|---|---------------------------------|
|       |                              |      | undertake.<br>Signage and barriers shall be used to alert workers of any hazards.  |                  |   |                                 |
| 18    | Emergency Response           | 18.1 | FTMM develop, implement and maintain emergency response procedures and contingency plans for the following eventualities, including as a minimum:<br><ul style="list-style-type: none"> <li>• Fire</li> <li>• Loss of power</li> <li>• Failed Water Treatment system</li> <li>• Failed of heating and ventilation systems</li> </ul> | FTMM Management  | Develop and implement emergency response procedures and contingency plan. | Pre – operations and operations |
| 19    | Hygiene standards            | 19.1 | The highest levels of hygiene shall be maintained. Strict disinfection and sterilization procedures will apply.  | FTMM HSE Manager | Monitor compliance  | Operation phase                 |
| 20    | Medical Facilities/First Aid | 20.1 | All facilities will have an emergency first aid kit on site and trained first aiders.  | FTMM Management  | Monitor Compliance  | All phases of project           |
| 21    | Site security                | 21.1 | Facilities will have adequate security/barriers to prevent accident of injury to member s of the public/wild animals.  | FTMM Management  | Monitor Compliance  | All phases of project           |
| 22    | Signage                      | 22.1 | Appropriate health and safety (and hygiene) signage shall be in place at all facilities  | FTMM             | Monitor Compliance  | All phases of project           |
| 23    | Housekeeping                 | 23.1 | Sites shall be properly managed with a good standard of housekeeping to reduce the risks of accidental injury.   | FTMM             | Monitor Compliance  | All phases of project           |



| Sr.No                                     | Impact                          |      | Mitigation Measures  | Responsibility  | Monitoring         | Timing                |
|---|---------------------------------|------|--|-----------------|--------------------|-----------------------|
| 24  | Incident Tracking               | 24.1 | A system will be used to monitor Health and safety incidents, including near misses. Incidents should be logged and investigated with any corrective actions communicated throughout the Company.  | FTMM Management | Monitor Compliance | All phases of project |
| Social Requirements                       |                                 |      |  |                 |                    |                       |
| 25  | Socioeconomic / Local Community | 25.1 | <ul style="list-style-type: none"><li>• Suitable number of unskilled and semi-skilled jobs will be reserved for the local communities.</li><li>• All community grievances will be recorded and maintained in a Community Complaint's Register. In addition to this close liaison will be maintained between the community and the site representatives of FTMM throughout the project activities.</li><li>• Awareness and cultural introductions to educate the contractor workforce on the requirement of minimizing social interaction with local communities.</li><li>• Unnecessary interaction of local population with the non-local project staff will be avoided.</li><li>• Discharging firearms will be explicitly prohibited.</li></ul> | FTMM Management | Monitor Compliance | All phases of project |
| FTMM = First Treet Manufacturing Modaraba |                                 |      |  |                 |                    |                       |



## **8.7 ENVIRONMENTAL MONITORING AND REPORTING**

Environmental monitoring can be categorised into two types; 1) compliance monitoring and 2) effects monitoring. The environmental monitoring programme is summarised in **Table 8.3**.

### **8.7.1 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 FTMM.
- Document and communicate the observations to the concerned person(s) at FTMM so that any corrective measures, if required, can be taken in a timely manner.
- 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 operation i.e. FTMM and the contractors. FTMM staff and contractors will carry out the inspections on a routine basis. This will also include routine monitoring of effluent and emissions and operational parameters to ensure effective operations of proposed battery unit and auxiliary systems.

### **8.7.2 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 monitoring programme will be undertaken:

- **Ambient Air Quality** – The monitoring will be carried out at key locations covering both environmental receptors and workers occupational exposures.
- **Noise** – measurement of noise levels within the proposed battery unit and the surroundings (boundary) will be carried out on a quarterly basis to ensure that the noise levels are within the standards stated in the EIA.



- **Effluent** - sampling and analysis of effluent discharge after wastewater treatment into inland or municipality sewerage line.
- **Groundwater** –as a good environmental practice, groundwater monitor wells may be established around to monitor any unlikely change in groundwater properties.

**Table 8–3: Environmental Monitoring Programme**

| <i>Environmental Component</i> | <i>Monitoring</i>   | <i>Standards</i>     | <i>Timings &amp; Parameters</i>   |
|--------------------------------|---|----------------------|---|
| <b>Air</b>                     | Stack emission monitoring                                 | NEQS, WHO Guidelines | Monitoring of air pollutants as per SMART reporting during operation phase. |
|                                | Vehicle emissions monitoring                              | NEQS                 | Vehicle emissions monitoring following NEQS.                                |
|                                | Ambient Air Quality Monitoring (including odour as well). | NEQS, WHO Guidelines | Ambient Air Quality monitoring for parameters consistent with NEQS and WHO. |
| <b>Noise</b>                   | Ambient noise monitoring                                  | NEQS, WHO Guidelines | Monitoring as per requirements of SMART and WHO                             |
| <b>Water</b>                   | Wastewater  | NEQS, WHO Guidelines | Chemical analysis of wastewater as per requirements of NEQS/SMART.          |

## 8.8 COMMUNICATION AND DOCUMENTATION

An effective mechanism for storing and communicating environmental information during the project is an essential requirement of an EMP. The key features of such a mechanism are:

- Precise recording and maintenance of all information generated during the monitoring.
- Communicating the information to a central location
- Processing the information to produce periodic reports
- Providing information and answering queries to stakeholders.





### **8.8.1 MEETINGS AND REPORTS**

The following HSE meetings will take place during the project:

- Kick-off meeting
- Daily meetings
- Weekly meetings

The purpose of the kick-off meeting will be to present the environmental management plan to the senior staff of the project team, contractors and stakeholders and discuss its implementation.

A daily meeting will be held to discuss the environmental conduct of the operation, non-compliances noted by the field HSE Advisor, and their remedial measures. Minutes of the meeting will be recorded in the form of action tracking register.

The purpose of the weekly HSE meeting will be to review the weekly performance of the operation by reviewing the number of non-conformances and the environmental incidents that occurred during the week, progress on daily action items, and to agree recommendations for additional controls, mitigation measures or monitoring requirements. The meeting will be recorded in the form of a weekly HSE report.

Weekly and monthly HSE reports will be communicated to the FTMM management and senior members of the contractors. The report will include:

- Summary of weekly project activities.
- Non-compliances observed and mitigation measures taken or required.

### **8.8.2 SOCIAL COMPLAINTS REGISTER**

FTMM will maintain a register of complaints regarding environment received from local communities and measures taken to mitigate these concerns. All community complaints received will be sent to the HSE Manager for further action.

### **8.8.3 CHANGE RECORD REGISTER**

All changes to the EMP or the project will be handled through the Change Management Plan provided in **Section 8.10** of the EMP. These changes will be registered in a Change Record Register.

### **8.8.4 PHOTOGRAPHIC RECORD**

FTMM will maintain a photographic record of all areas to be used during the project. As a minimum the photographic record will include the photographs of project areas prior to



and after activities (restoration). FTMM will ensure that a photographic record including the following is maintained.

- All areas used by the project activities; before use, during use and after restoration.
- Key non-compliances.
- Key project activities.

#### **8.8.5 AUDIT REPORTS**

FTMM will keep a record of all audits and inspections commissioned or undertaken by the company to check conformance with the EMP.

### **8.9 ENVIRONMENTAL TRAINING**

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.

#### **8.9.1 OBJECTIVES OF THE TRAINING PROGRAMME**

The key objective of training programme 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.

#### **8.9.2 ROLES AND RESPONSIBILITIES**

FTMM Field HSE Representative and the contractor's HSE Advisor will primarily be responsible for providing HSE training to all project personnel on potential environmental issues of the project. Contractor will prepare a project specific training manual for this purpose. Contractors on their part will be required to provide induction training/ briefing to all their staff before the start of any activity in the project area.

#### **8.9.3 TRAINING LOG**

A training log will be maintained by FTMM and contractors. The training log will include;

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



#### 8.9.4 TRAINING NEEDS ASSESSMENT

In addition to the training specified in the training log special/ additional trainings will be provided during the operation phase of project activity. The criteria to assess the need of training will be based on the following:

- When a specified percentage of staff is newly inducted in the project;
- When any non-compliance is repeatedly reported, refresher training will be provided regarding that issue;
- When any incident/accident of minor or major nature occurs;
- Arrival of new contractor / sub contractor;
- Start of any new process / activity.

#### 8.9.5 TRAINING MATERIAL

FTMM HSE department and the contractor's HSE Advisor will develop and prepare training material regarding HSE awareness, EIA, EMP and controls to be followed during the project. Separate training material will be prepared for each topic. A generic scope of the training which covers the requirements of the EIA and the EMP is discussed below in **Table 8.4.**

**Table 8-4: A General Scope of Training Program**

| <i>Staff</i>   | <i>Training Contents</i>   | <i>Schedule</i>                              |
|--|--|--|
| <b>Selected management staff from FTMM and contractors</b> | Introduction to project EIA and EMP.<br>EMP communication, documentation and monitoring and reporting requirements.<br>Key findings of the EIA<br>Mitigation measures<br>EMP<br>Social and cultural values of the area | Prior to the start of the project activities |
| <b>All site personnel (including locally hired staff)</b>  | Environmental sensitivity of the project area<br>Wildlife and vegetation<br>Mitigation measures<br>Contingency plan<br>Waste disposal<br>Community issues  | Prior to the start of the project activities |



|                                    |  |  |
|------------------------------------|--|--|
|                                    | Social and cultural values   |  |
| Construction supervisors           | EMP communication, documentation and monitoring requirements.<br>Good construction practices.<br>Dust emissions control during construction phase. | Prior to start of construction activities      |
| O&M Contractor's supervisory staff | EMP communication, documentation and monitoring requirements.  | Prior to start of operation                    |
| Emergency response teams           | Fire fighting.<br>Emergency response   | Prior to start of operation                    |
| Drivers                            | Road safety<br>Road restrictions<br>Vehicle restriction<br>Defensive driving<br>Cultural values and social sensitivity                             | Before and during the field operations         |
| Camp staff                         | Camp operation<br>Waste disposal<br>Housekeeping   | Before and during the field operations         |
| Restoration teams                  | Restoration requirements<br>Waste disposal<br>Oil spill contingency plan.  | Before the start of the restoration activities |

## 8.10 CHANGE MANAGEMENT PLAN

The EIA recognises that changes in the operations or the EMP may be required during the operation and therefore a Change Management Plan has been provided to manage such changes. The management of changes is discussed under two separate headings, changes to the EMP and changes to the Operation.

### 8.10.1 CHANGES TO THE EMP

The EIA and the EMP have been developed based on the best possible information available at the time of the EIA study. However, it is possible that during the construction and operation phase some aspects of the EMP may need to be changed owing to their non-applicability in a certain area of operation or the need for additional mitigation measures based on the findings of environmental monitoring during the construction and operation phase. In such cases following actions shall be taken.



- A meeting will be held between FTMM and the concerned contractor. During the meeting the proposed deviation from the EMP, planning and designing will be discussed and agreed upon by all parties.
- Based on the discussion during the meeting, a change report will be produced collectively, which will include the original EMP clause/plan or design, the change that has been agreed upon, and the reasons for the change.
- The report will be signed by all the parties and will be filled at the site office. A copy of the report will be sent to FTMM and contractor head offices.
- All relevant project personnel will be informed of the change.

### 8.10.2 CHANGES TO THE OPERATION

The change management system recognises three orders of changes.

#### *First-Order Change*

A first order change is one that leads to a significant departure from the project described or the impacts assessed in the EIA and consequently require a reassessment of the environmental impacts associated with the change. Examples of such change include change in location of the proposed plant.

In such an instance, the environmental impacts of the proposed change will be reassessed, and the results sent to the Punjab EPA for approval.

#### *Second- Order Change*

A second-order change is one that entails project activities not significantly different from those described in the EIA, and which may result in project impacts whose overall magnitude would be similar to the assessment made in this report.

In case of such changes, the environmental impact of the activity will be reassessed, additional mitigation measures specified if necessary, and the changes reported to the Punjab EPA.

#### *Third –Order Change*

A third-order change is one that is of little consequence to the EIA findings. This type of change does not result in impact levels exceeding those already assessed in the EIA; rather these may be made onsite to minimize the impact of an activity. The only action required in this case will be to record the change in the change record register.



## 9 CONCLUSION

Battery industry represents an important and growing sector where the uses of toxic and hazardous materials are quite frequent. Lead is one of the vital ingredients of the lead acid batteries. There is immense growth in the demand for the lead batteries. Lead-acid batteries are used in our everyday life like in cars, public transportation and UPS to ensure our safety by providing necessary back-up power for everything from computers to hospital emergency lighting. These batteries also provide quiet, pollution-free emergency power for critical operations in facilities like air traffic control towers, hospitals, railroad crossings, military installations, submarines, and weapons systems

The proposed project is a step to cater the demand of the market. Whereas the proposed project will help in achieving this objective, the environmental study of the project area is conducted to evaluate the potential environmental effects due to the proposed projects, provide mitigation measures required to minimise or obviate these impacts, ensure their implementation and monitoring. These requirements have been addressed in this EIA under following contents:

- The proposed project activities;
- Alternatives considered in finalizing the project description;
- Environmental conditions of the project area;
- Legislative requirements related to the project;
- Potential environmental effects of the proposed project activities on the physical, natural and socio-economic receptors;
- Mitigation and monitoring measures that will help in avoiding or minimizing these impacts.

The EIA concludes that the potential residual impacts of the proposed operation can be minimised by careful implementation of the EMP and all statutory requirements will be fulfilled by the project proponent.



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## ANNEX-A. PROJECT TEAM

| Sr.No. | Name              | Designation  | Role and Responsibility  |
|--------|-------------------|--|--|
| 1      | Ms. Tasneem Ilyas | Director Operations Mineral & Environmental Services | Project Manager and Technical Peer Review<br>EIA Expert, Technical Peer Review.                                      |
| 2      | Mr. Ali Hashim    | Deputy Manager Environment                           | Legal framework development  |
| 3      | Ms. Ammara Naqvi  | Deputy Manager Environment<br>EIA/HSE Expert         | EIA /IEE Expert, Impact Assessment and Mitigation Measures, Environmental Management Plan, Technical Report Writing. |
| 4      | Mr. Abdul Rehman  | Environmentalism                                     | EIA /IEE Expert, Environmental Baseline, Technical Report Writing.   |
| 5      | Ms. Aiesha Riaz   | Environmentalism                                     | Environmental Baseline, Technical Report Writing.  |
| 6      | Mr. Saad Shahid   | Chemist  | Water Pollution  |
| 7      | Mr. Aftab Zahoor  | Field Chemist  | Water and soil baseline  |
| 8      | Mr. Hamza Shahid  | Geologist  | Geology and Hydrogeology   |
| 9      | Mr. Maqbool Aalam | Field Officer  | Environmental Monitoring   |



## ANNEX-B: ENVIRONMENTAL MONITORING RESULTS

### Meteorological Data

Client : First Treet manufacturing Modaraba  
Sampling Point : Proposed Project Site  
Date of Intervention : October 16-17, 2015

| Time  | Temp | Wind Dir | Wind Speed | Hum | Pressure (mm of Hg) |
|-------|------|----------|------------|-----|---------------------|
|       | °C   |          | m/s        | %   |                     |
| 13:00 | 32   | NW       | 2.6        | 45  | 759.0               |
| 14:00 | 32   | NW       | 1.7        | 45  | 758.9               |
| 15:00 | 34   | NW       | 2.4        | 46  | 759.1               |
| 16:00 | 35   | NW       | 1.8        | 47  | 759.2               |
| 17:00 | 32   | NW       | 1.9        | 47  | 759.4               |
| 18:00 | 30   | NW       | 0.7        | 48  | 759.5               |
| 19:00 | 29   | N        | 0.6        | 48  | 759.6               |
| 20:00 | 28   | N        | 1.7        | 50  | 759.5               |
| 21:00 | 28   | N        | 1.6        | 50  | 759.4               |
| 22:00 | 28   | N        | 1.4        | 51  | 758.3               |
| 23:00 | 27   | N        | 0.9        | 52  | 758.4               |
| 24:00 | 27   | N        | 1.8        | 52  | 758.2               |
| 01:00 | 26   | NW       | 0.4        | 54  | 759.4               |
| 02:00 | 26   | NW       | 0.8        | 54  | 758.8               |
| 03:00 | 25   | NW       | 0.9        | 56  | 758.9               |
| 04:00 | 26   | W        | 0.6        | 55  | 758.9               |
| 05:00 | 25   | W        | 0.9        | 53  | 759.1               |
| 06:00 | 26   | W        | 1.2        | 50  | 759.2               |
| 07:00 | 27   | W        | 1.9        | 48  | 759.2               |
| 08:00 | 28   | W        | 1.3        | 47  | 759.1               |
| 09:00 | 30   | NW       | 2.2        | 45  | 758.9               |
| 10:00 | 32   | W        | 2.4        | 42  | 758.7               |
| 11:00 | 33   | W        | 1.8        | 41  | 758.7               |
| 12:00 | 34   | NW       | 1.9        | 40  | 758.4               |



### Average Obtained Concentrations of Priority Pollutants

Client : First Treet manufacturing Modaraba  
Sampling Point : Proposed Project Site  
Date of Intervention : October 16-17, 2015

| Parameter                              | Unit                  | LDL  | Average Obtained Concentration | Limits As Per NEQS                    |
|--|-----------------------|------|--------------------------------|---------------------------------------|
| Nitrogen Dioxide (NO <sub>2</sub> )    | (µg/ m <sup>3</sup> ) | 0.01 | <0.01                          | 80 (µg/ m <sup>3</sup> )              |
| Sulfur Dioxide (SO <sub>2</sub> )      | (µg/ m <sup>3</sup> ) | 0.01 | <0.01                          | 120 (µg/ m <sup>3</sup> )             |
| Carbon Monoxide (CO)                   | (mg/m <sup>3</sup> )  | 1.00 | 0.9                            | 5 (mg/m <sup>3</sup> )<br>For 8 Hours |
| Particulate Matter (PM <sub>10</sub> ) | (µg/m <sup>3</sup> )  | 2.00 | 95.5                           | 150 µg/m <sup>3</sup>                 |



## ANNEX-C: METEOROLOGICAL DATA OF FAISALABAD (2009-2013)

### MEAN MONTHLY PRECIPITATION (MM)

| YEAR | JAN  | FEB  | MAR  | APR  | MAY  | JUN  | JUL   | AUG   | SEP   | OCT  | NOV  | DEC  |
|------|------|------|------|------|------|------|-------|-------|-------|------|------|------|
| 2009 | 12.2 | 18.4 | 12.0 | 34.8 | 12.1 | 5.0  | 60.6  | 163.9 | 49.4  | 8.5  | -1.0 | 0.0  |
| 2010 | 1.4  | 8.7  | 8.0  | 3.5  | 7.8  | 5.8  | 243.1 | 224.3 | 40.6  | 0.0  | 0.0  | 1.5  |
| 2011 | 0.0  | 34.4 | 8.1  | 16.8 | 10.3 | 68.7 | 151.4 | 89.9  | 165.3 | -1.0 | 0.0  | -1.0 |
| 2012 | 6.6  | 8.0  | 1.0  | 39.1 | 3.7  | 0.2  | 98.2  | 19.4  | 138.5 | 28.2 | 0.0  | 18.4 |
| 2013 | 2.5  | 59.5 | 4.8  | 25.4 | 7.0  | 98.6 | 3.0   | 159.0 | 2.0   | 13.0 | 3.3  | 0.0  |

### MEAN MONTHLY MINIMUM TEMPERATURE (°C)

| YEAR | JAN | FEB | MAR  | APR  | MAY  | JUN  | JUL  | AUG  | SEP  | OCT  | NOV  | DEC |
|------|-----|-----|------|------|------|------|------|------|------|------|------|-----|
| 2009 | 6.1 | 8.6 | 13.3 | 18.4 | 24.4 | 25.7 | 26.8 | 26.4 | 23.5 | 16.5 | 9.9  | 5.0 |
| 2010 | 4.7 | 8.3 | 15.5 | 21.0 | 25.0 | 26.5 | 26.5 | 25.6 | 23.2 | 19.0 | 10.2 | 4.5 |
| 2011 | 3.8 | 8.7 | 13.3 | 18.3 | 25.6 | 27.5 | 26.7 | 26.5 | 24.5 | 18.6 | 13.5 | 4.6 |
| 2012 | 3.5 | 5.5 | 12.6 | 19.2 | 24.6 | 27.7 | 27.7 | 26.9 | 24.3 | 17.2 | 11.4 | 6.6 |
| 2013 | 4.3 | 8.9 | 13.7 | 19.6 | 24.2 | 27.5 | 28.6 | 27.3 | 25.3 | 21.1 | 10.8 | 7.1 |

### MEAN MONTHLY MAXIMUM TEMPERATURE (°C)

| YEAR | JAN  | FEB  | MAR  | APR  | MAY  | JUN  | JUL  | AUG  | SEP  | OCT  | NOV  | DEC  |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 2009 | 20.2 | 23.4 | 28.3 | 34.0 | 40.4 | 41.0 | 38.0 | 37.0 | 35.6 | 33.5 | 26.2 | 22.6 |
| 2010 | 16.6 | 22.5 | 30.9 | 38.8 | 40.7 | 40.4 | 36.5 | 34.9 | 34.3 | 33.6 | 27.8 | 21.7 |
| 2011 | 16.9 | 21.4 | 27.9 | 33.1 | 40.9 | 39.4 | 36.0 | 35.0 | 33.7 | 33.1 | 28.6 | 22.5 |
| 2012 | 18.6 | 20.2 | 27.7 | 33.4 | 39.4 | 41.9 | 39.0 | 37.1 | 34.3 | 31.5 | 26.9 | 20.5 |
| 2013 | 17.8 | 20.6 | 28.1 | 34.1 | 40.4 | 40.1 | 38.1 | 35.9 | 36.9 | 33.8 | 26.5 | 21.5 |



*MEAN MONTHLY RELATIVE HUMIDITY (MEAN) AT 1200 UTC (%)*

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2009 | 55  | 47  | 39  | 29  | 21  | 24  | 48  | 55  | 47  | 34  | 47  | 43  |
| 2010 | 67  | 44  | 37  | 19  | 19  | 27  | 55  | 70  | 53  | 42  | 40  | 48  |
| 2011 | 50  | 53  | 39  | 28  | 23  | 37  | 57  | 63  | 63  | 40  | 47  | 42  |
| 2012 | 42  | 33  | 31  | 36  | 20  | 26  | 45  | 53  | 57  | 41  | 46  | 54  |
| 2013 | 47  | 57  | 40  | 27  | 19  | 37  | 49  | 59  | 45  | 46  | 45  | 55  |

*MEAN MONTHLY WIND SPEED AT 1200 UTC (KNOTS)*

| YEAR | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2009 | 1.1 | 2.5 | 3.8 | 6.9 | 4.9 | 7.1 | 6.4 | 7.6 | 4.6 | 0.9 | 0.8 | 0.5 |
| 2010 | 1.9 | 3.7 | 4.5 | 5.4 | 5.9 | 6.8 | 5.9 | 5.2 | 4.0 | 2.2 | 0.4 | 0.5 |
| 2011 | 1.8 | 2.6 | 3.9 | 6.0 | 5.7 | 5.4 | 4.2 | 4.8 | 4.0 | 3.2 | 0.7 | 0.8 |
| 2012 | 2.5 | 4.4 | 4.2 | 5.4 | 4.6 | 7.0 | 6.3 | 6.5 | 5.4 | 2.3 | 0.7 | 1.1 |
| 2013 | 1.4 | 4.5 | 4.7 | 6.1 | 6.7 | 6.4 | 5.8 | 6.1 | 6.3 | 2.5 | 0.7 | 1.0 |

**NOTE:**

**-1.0:** TRACE

**TRACE:-** RAINFALL AMOUNT LESS THAN 0.1MM