ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

M/S AFROCK POWER (PRIVATE) LIMITED

Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad

REPORT PREPARED BY

Evergreen

Environmental Solutions

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REPORT SUBMITTED BY

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Chapter 1 EXECUTIVE SUMMARY

Title and Location of the Project:

The Environment Impact Assessment (EIA) Report is for M/S Afrock Power (Private) Limited The location of the project is Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad

Project Proponent:

The proponent of the proposed project is **Teela Khan S/O Mudir** who is Managing Director as well

Organization Preparing the EIA Report

In order to comply with the IEE/EIA regulations, 2022 as per Punjab Environmental Protection Act (PEPA), 1997 (Amended,2017), the proponent has entrusted Evergreen Environmental Solution to carry out Environmental Impact Assessment (EIA) Report for the proposed project named M/S Afrock Power (Private) Limited.

As the category of the project falls under the **Schedule-II-B(12)** of Punjab Environment Protection Agency's (review of IEE&EIA) regulations, 2022, the guidelines for preparation and review of environmental reports. So, an environmental impact assessment of the unit is required.

To establish the background environmental conditions of the project area, a detailed survey of the site was conducted. This included but not limited to topography, geology, hydrogeology, hydrology, climate, flora and fauna, socio-economic conditions, archaeology, present infrastructure. Information describing the existing environment was gathered from various sources including the client, statutory bodies, and local interest groups and published work.

The project is manufacturing of a Lead Acid Battery, /Lithium Ion Batteries Unit. The final product will be The Product will be following type of batteries Lead Acid Batteries, Tubular Batteries,. VRLA Batteries, Maintenance Free Batteries, Lithium Batteries , Dry Charge Batteries. The main objectives of the proposed project are:

- To Provide better quality OF Batteries
- To provide better & clean source of energy.
- To provide employment to the people

- To upgrade the socio-economic conditions of the people.
- To participate in revival of economy through exports

Guidelines for sensitive and critical areas were reviewed, so that the proposed project is planned and sited in a way that protects the values of sensitive and critical areas. The project site is not located in these sensitive and critical areas.

There is no environmentally sensitive area in the macro environment. No trees or greenery would be removed and no significant impact would occur on the demographic pattern or on the social and cultural values of the settled population.

It was evident from the assessment of impacts that no significant damage to wildlife, vegetation or habitats is anticipated from the proposed project. Similarly, no cultural/historical or archeological sites would be affected by the project. Furthermore, no adverse socio-economic impact of the project is envisaged.

Different methods are used for the impact identification. These include: assessment through the stages of the project, checklists, matrices and networks. To minimize the effects of adverse impacts the EIA recommends mitigation measures. These mitigation measures include the use of alternative options, management and physical controls, or compensation in monetary terms. The proposed mitigation measures are 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 industry practices while operating in sensitive environment.

For the effective implementation and management of the mitigation measures, an environmental management plan (EMP) has been prepared. The EMP satisfies the requirement of the Pakistan environmental protection act. The EMP outlines the aims and objectives, defines the responsibilities of the project owners and contractor(s), and lays down the required communication, reporting procedures and mechanism through which the proposed measures will be monitored.

The report also covers monitoring plan; it will help to ensure compliance with the relevant legislation, implementation of the mitigation measures and long-term minimization of negative environmental impacts. The monitoring plan present a schedule with a description of any proposed phasing of activities, recommended mitigation measures and proposed methods of compliance.

After screening of probable environmental impact, it can be concluded that;

- Project activities are environmental friendly.
- Project activities will cause temporary impacts on local environment all of which are reversible. During operational stage the project will not pollute the environment in normal circumstances

except when an incident of spillage occurs. The impact of such incidents will be mitigated by surveillance, proper maintenance, immediate reports, safety and management plan

- No significant damage to wildlife, vegetation or habitats is anticipated from the proposed project.
- No cultural/historical or archaeological sites would be affected by the project.
- No adverse socio-economic impact of the project is envisaged
- By adopting recommended mitigation and safety measures minor environmental impacts of the project can be eliminated

Environmental Impact Assessment report concludes that the setting up of facility and the associated activities will lead to minor environmental effects which could be mitigated as illustrated in the report. The project will not add to degradation of environment at the project area. Therefore, the proposed project is considered viable, of enormous potential benefits and environmentally friendly, as supported by this EIA report. Accordingly, the EIA in the present form may be approved.

1. Title of the project	M/S Afrock Power (Private) Limited
2. Description of the project	Construction of Solar, Lithium-ion battery & Electric Vehicles Unit By M/S Afrock Power (Private) Limited, located at Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad . The Process Will involve Assembling of Raw Material and different parts to produce solar PV Modules, Lithium-ion Battery and Electric Vehicless
3. Location of the project	Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad
4. Name of the proponent	**Teela Khan S/O Mudir** (Managing Director/Proponent) **Address (Res):** Regi Lalma, Muhalla Naikabad, Peshawar CNIC: 17301-6556497-3
5. Contact Person	Teela Khan Contact Details: 0333-4984983

6. Name of organization preparing the report	Ever Green Environmental Solution Address: Office No.5, 1st Floor, 7/8 New Civil Lines, Regency Road, Faisalabad. Tel: +923314117050 Email: miannawazepa@gmail.com
7. Nature & Present Status of Land	Open Land, Declared Industrial Area, SEZ, Fiedmc, Sahianwala, Jhumra,Faisalabad
8. Google Coordinates	31.679497, 73.197171
9. Intended Use	Construction of Solar, Lithium-ion battery & Electric Vehicles Unit
10. Category of Project	The projects falls under Schedule-II ,Category-B (12) of IEE & EIA Regulations, 2022.
11. Total Proposed Area	13.02 acres
12. Estimated Cost of the Project	Rs. 2,144,802,400
13. Details of Raw Material	Silicon, Glass, EVA, Back Sheet, Aluminum Frame, Silver Plastic, Conductors. Lithium ,Nickel, Cobalt, Graphite, Electrolytes, Copper, Aluminum Foils, Battery Management system Components. Steel & Aluminum Alloys, Lithium-ion Battery, Copper, Plastics & Composites, Rare earth elements (Neo Dymium, Dysprosium)
14. Detail & Flow sheet of process	Attached.
15. Finished Product	The Product will be Solar, Lithium-ion battery & Electric Vehicles
16. Detail of Boiler & Generators	2500 KVA + 200 KVA
17. Detail of sources of air Emission	Generator
18. Detail of Air/Pollution Control Devices to be installed	Effective Wet Scrubbers will be installed at boiler (if required). Sound proof canopy and muffler will be installed in and around the generator. All possible effective measures will be adopted to control air emissions and to keep them within permissible limits of PEQS.
19. Source of Water	Ground Water – 4□□ pipe. 15 HP

20. Wastewater	• Wastewater produced during the process will be treated through Effluent Treatment Plant (ETP) and then discharged into the FIEDMC sewerage system for Central Effluent Treatment Plant of FIEDM for further treatment ant to meet PEQS. • Domestic/Municipal Waste Water will also be generated from kitchen, washrooms and also from cleaning of floors. • The same will be collected in septic tanks and after screening will be disposed-off into sewerage system of FIEDMC for further treatment.
21. Name of wastewater receiving body	FIEDMC sewerage system
22. Solid waste Management	Approx. 24 Ton /Year of Solid waste will be generated through the Process/ unpacking of different materials. The same will be collected and stored at a designated site and disposed-off properly through Fiedmc or a suitable contractor.
23. Source of Power	WAPDA & Standby Generator
24. Detail of Safety measures/plans to be adopted	Attached with the report
25.Machinery	Detailed Machinery List is Attached

1. **Brief Summary:**

Teela Khan S/O Mudir, as the Chief Executive/ proponent, has planned to setup a facility under the company name " M/S Afrock Power (Private) Limited" for the Construction of Solar, Lithium-ion battery & Electric Vehicles Unit . The Process Will Involve Assembling of Raw Material and different parts to produce solar PV Modules, Lithium-ion Battery and Electric VehiclessTotal area of the project comprises of **13.02 acres .** The proposed project area is an open plot and construction will start after getting the NOC from the Environmental Protection Department. The total estimated cost of the project is **Rs. 2,144,802,400**. Electricity will be used as an electric source, directed from WAPDA. Groundwater will be used to cover water requirements. Appx 1000 gallons/day water will be used during construction phase while during operational phase water will only used for industrial process and domestic purpose. This will pass through septic tanks and effluent treatment plant then after treatment will be discharged into

sewerage system of FIEDMC for central effluent treatment plant to meet PEQS.

There is no environmentally sensitive area in the macro environment. No trees or greenery would be removed and no significant impact would occur on the demographic pattern or on the social and cultural values of the settled population.

2. The Major Impacts & their Mitigation Measures:

The EIA report comprises baseline data on the existing condition of the physical and biological environment, the anticipated environmental impacts, and proposed mitigation measures. Field surveys were undertaken to assess the physical and biological environment. Data has been collected from secondary sources to supplement the findings of field survey. All the issues such as the ecology, management of construction, and sanitation, use of equipment and machineries, environmental health and safety, occupational hazards, social and environment management and monitoring plan have been dealt with in detail in the respective sections of the report. However, these are briefly enumerated below to have the quick assessment of the situation.

Potential Negative Impacts	Recommended Mitigation Measures	Monitoring Responsibility	Parameters for Monitoring
Dust emissions	On exposed construction surface during windy periods fugitive dust generation will be suppressed by spraying water.	Proponent/ contractor	Air quality
	The construction material will be covered with polyethylene sheets to prevent dust emissions.		
Soil erosion	Exposed surface will be Resurfaced and stabilized as soon as possible.	Proponent/ contractor	Soil
Solid waste generation	Solid waste may include waste/unused construction materials, which should be Disposed of properly.	Proponent/ contractor	Solid waste management
Vehicular Traffic and Noise	Vehicless and other noisy equipment will be kept in good conditions and their regular Maintenance will be done.	Proponent/ contractor	Noise level
	Noisy construction activities will be carried out only during normal working hours.		
Health and Safety of WorkForce	The contractor will ensure that the workers are trained in safety procedures for all relevant Aspects of construction.	Proponent/ contractor	Health and safety
Water supply	Water use will be planned depending upon the supply and timing to avoid and inconvenience.	Proponent/ contractor	Water supply

	Water conservation practices will be adopted.		
Surface and Groundwater	The water in the area is abundantdue to the project area's proximity to the Canal. Groundwater is available in the majority of the area.at project site, the septic tank/water treatment plant will be installed the safe disposal of	Proponent/contractor	Surface and groundwater

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- **Operational phase:**

  Following are the kind of hazardous elements during the operational period.

Potential Negative Impacts	Recommended Mitigation Measures	Monitoring Responsibility	Parameters for Monitoring
Soil Contamination	Maintain Vehicles speeds. Avoid and control major spills.	Proponent	Soil
Air emissions	In operational phase, dust generation by Vehicless will be suppressed by spraying water. Properly tune and maintain equipment to minimize air emissions. Enclosure of dust producing equipment, and use of local	Proponent	Air quality

	exhaust ventilation; Use of dust extraction and recycling systems to remove dust from work areas;		
	Construction of fabric filters to prevent outdoor emissions. Monitoring of Ambient air parameters (PM_{10}, SO_2, and Nox) emissions should be carried out to ensure compliance with the PEQS and World Bank emission guidelines No use of equipment and material containing asbestos, poly-chlorinated biphe nyls (PCBs), and ozone depleting substances (ODSs).		

Noise Impacts	Apply proper engineering control to noise producing sources like generator (Canopy and muffler will be installed to reduce the noise impact on the surrounding) All on-site personnel's will use required personal protective equipment (PPE) in high noise areas that will be clearly marked Monitoring will done on regular basis to ensure the compliance of noise quality.	Proponent	Noise Monitoring
Waste water	A waste management plan will be developed before the start of the project activities.	Proponent	Wastewater management
	No untreated wastewater will be discharge into open environment Records of all waste generated during the project activity periodwill be maintained. Quantities of waste disposed, recycled, or reused will be logged on a WasteTracking Register. On-site audits of the waste management will be undertaken on a regular		

	basis during the project activity.		
Flora and fauna	The unit includes a plan of the green yard area which is a positive impact on the flora and fauna. There is no significant fauna in that area. However, it is suggested that maximum number of trees should be planted by the management inside and outside the boundary wall in order to enhance aesthetics of the area.	Proponent	Biodiversity
Social impacts	During the operation stage, there will be no social issue for the nearby localities. Moreover, the residents may get opportunities to work in the refining unit which is a major positive impact of the project.	Proponent.	Social impacts

Occupational health and safety	There may be occupational health and safety risks associated with different operational activities. Health risks may occur in case of unsafe and/or unfavorable work conditions The mitigation meas uresinclude: The workers should get trained in safety procedures for all relevant aspects of processes. Enforcement of work safety measures. Housekeeping around and inside the industry area will be ensured Formal emergency procedures will be developed. First aid kits and other personal protective equipment (safety gloves, goggles, welding shields etc.) Should be kept available.	Proponent	Health & safety

3. **Proposed Monitoring:**

The EMP is prepared to ensure that the activities are undertaken in a responsible & non detrimental manner with the objectives

of:

i. Providing a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance.

ii. Guiding and controlling the implementation of findings and recommendations of theenvironmental assessment.

iii. Detailing specific actions deemed necessary to assist in mitigating the environmental impact.

Ensuring that safety recommendations.

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List of Abbreviations

BOD	Biological Oxygen Demand
^oC	Degree Centigrade
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CC	Construction Contractor
dBA	Decibel
DC	Design Consultant
DCR	District Census Report
DO	Dissolved Oxygen
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environment Protection Agency
EMMP	Environmental Management & Monitoring Plan EPA Environment
EPD	Environment Protection Department
GOP	Government of Pakistan
HSE	Health, Safety & Environment
IEE	Initial Environment Examination
Km	Kilometer
M^3/h	Cubic Meter per Hour
Mg/L	Milligram Per Liter
PEQS	Punjab Environmental Quality Standards NEQS
NEQS	National Environmental Quality Standards
NOC	No Objection Certificate
NO_x	Nitrogen Oxides
OHS	Occupational Health and Safety
PEPA	Pakistan Environmental Protection Act
PPE	Personal Protective Equipment
PM	Particulate Matter
SO_x	Sulfur Oxides
SWM	Solid Waste management

List of Abbreviations

TDS	Total Dissolved Solids
TMA	Tehsil Municipal Authority
TOR	Term of References
TSS	Total Suspended Solids
WHO	World Health Organization
WAPDA	Water and Power Development Authority

List of Annexures

Glossary

Agency	A business or organization providing a particular service on behalf of another business, person, or group.
Biodiversity	The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.
Climate	The weather conditions prevailing in an area in general or over a long period.
Control Shed	In Controlled Poultry Farm the day-old chicks (DOCs) are raised on rich protein chemicals for about a period of six weeks.
Conservation	Official supervision of rivers, forests, and other natural resources to preserve and protect them through prudent management.
Consultant	A person who provides professional advice or services to companies for fee.
Construction Waste	Waste generated from the buildings and construction industry and includes material like bricks, concrete, tiles, debris, ceramics and more.
Cultural Heritage	Valued objects and qualities such as historic buildings and cultural traditions that have passed from previous generations.
Demographic	A single vital or social statistic of a human population, as the number of births or deaths.
Drainage	Natural or artificial removal of surface and sub-surface water from an area.
Ecology	The branch of biology that deals with the relations of organisms to one another and to their physical surroundings.
Endangered Species	A species of animal or plant that is seriously at risk of extinction.
Environment	Relationship of natural world (human beings, animals, and plants) with physical surroundings (air, land, water).
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, considering inter-related socio-economic, cultural, and human-health impacts, both beneficial and adverse.
Emission	The act of sending out gas, heat, light, etc.
Framework	A framework is a real or conceptual structure intended to serve as a support or guide for the building of something that expands the structure into something useful.
Fresh Water	Fresh water is any naturally occurring water except seawater and brackish water. Fresh water includes water in ice sheets, ice caps, glaciers, icebergs, bogs, ponds, lakes, rivers, streams, and even underground water called groundwater.

Glossary

Groundwater	Subsurface water in the zone in which permeable rocks, and often the overlying soil, are saturated under pressure equal to or greater than atmospheric.
Hatchery	A hatchery is a facility where eggs are hatched under artificial conditions, especially those of fish or poultry.
Impact	The action of one object coming forcibly into contact with another.
Monitoring	A systematic and objective observation of an organisation's activities and services conducted and reported on regularly.
Nature	The phenomena of the physical world collectively, including plants, animals, the landscape, and other features and products of the earth, as opposed to humans or human creations.
Preservation	Preservation is the strict setting aside of natural resources to prevent the use or contact by humans or by human intervention. In terms of policy making this often means setting aside areas as nature reserves (otherwise known as wildlife reserves), parks, or other conservation areas.
Proponent	A person who advocates a theory, proposal, or course of action.
Policy	A policy is a deliberate system of principles to guide decision and achieve rational outcomes.
Pollution	The result of the release into air, water, or soil from any process or of any substance, which can cause harm to man or other living organisms supported by the environment.
Regulation	Regulation is an abstract concept of management of complex systems according to a set of rules and trends.
Resource	A stock or supply of money, materials, staff, and other assets that can be drawn on by a person or organization to function effectively.
Seismic Hazards	A seismic hazard is the probability that an earthquake will occur in each geographic area, within a given window of time, and with ground motion intensity exceeding a given threshold.
SWM	Solid Waste Management or waste disposal are all the activities and action required to manage waste from its inception to its final disposal. This includes amongst other things collection, transport, treatment, and disposal of waste together with monitoring and regulation.
Stakeholder	A stakeholder is a party that has an interest in a company and can either affect or be affected by the business. The primary stakeholders in a typical corporation are its investors, employees, and customers.
Topography	Topography is the study of the shape and features of the surface of the Earth and other observable astronomical objects including planets.

Glossary

Vegetation	Plants considered collectively, especially those found in a particular area or habitat.
Wastewater	Wastewater is any water that has been affected by human use. Wastewater is used water from any combination of domestic, industrial, commercial or agricultural activities, surface runoff or storm water, and any sewer inflow or sewer infiltration.

CHAPTER-1 INTRODUCTION

1.1 General

Teela Khan S/O Mudir as the chief executive/proponent has planned to setup a facility under the company name "M/S Afrock Power (Private) Limited" for the Construction of Solar, Lithium-ion battery & Electric Vehicles Unit . As the category of the project falls under the Schedule-II-B(12) of Punjab Environment Protection Agency's (review of IEE&EIA) regulations, 2022, the guidelines for preparation and review of environmental reports. So, an Environmental Impact Assessmentof the unit is required. For this purpose, the proponent has entrusted Ever Green Environmental Solutions to prepare environmental impact assessment for the unit.

1.2 Background

Pakistan's energy sector is undergoing a significant transition due to increasing electricity demand, rising fuel import costs, climate change concerns, and commitments toward sustainable development. The country faces persistent challenges such as power shortages, reliance on fossil fuels, and greenhouse gas emissions. In response, renewable energy technologies—particularly solar power, lithium-ion battery storage, and electric Vehicless—have emerged as critical components of Pakistan's future energy and transportation framework.

Solar energy has gained rapid momentum in Pakistan due to its abundant solar irradiance, favorable climatic conditions, and declining costs of photovoltaic (PV) technology. Solar power systems are increasingly being deployed for residential, commercial, industrial, and utility-scale applications, helping reduce dependence on grid electricity and imported fuels. Government initiatives, net-metering policies, and incentives for renewable energy adoption have further accelerated the growth of the solar sector. The integration of solar energy contributes to energy security, reduces carbon emissions, and supports Pakistan's commitments under international climate agreements.

Lithium-ion battery technology plays a vital role in enhancing the efficiency and reliability of renewable energy systems. Unlike conventional lead-acid batteries, lithium-ion batteries offer higher energy density, longer life cycles, faster charging, and lower maintenance requirements. These batteries are widely used for solar energy storage, electric Vehicless, backup power systems, and industrial applications. The growing adoption of lithium-ion batteries in Pakistan supports grid stability, enables effective utilization of renewable energy, and reduces environmental pollution associated with traditional battery technologies. Furthermore, the development of lithium-ion battery manufacturing and assembly facilities can promote

technological advancement, reduce import dependency, and create skilled employment opportunities.

The electric Vehicles (EV) sector represents a transformative shift in Pakistan's transportation system. Conventional Vehicless powered by petrol and diesel are major contributors to air pollution, greenhouse gas emissions, and fuel import expenditure. Electric Vehicless offer a cleaner, energy-efficient, and cost-effective alternative. Recognizing this potential, the Government of Pakistan has introduced the National Electric Vehicles Policy (NEVP), encouraging local manufacturing, infrastructure development, and adoption of EVs. The expansion of EV manufacturing and charging infrastructure will contribute to improved air quality, reduced noise pollution, and long-term economic savings.

The combined development of solar energy systems, lithium-ion battery storage, and electric Vehicles units aligns with Pakistan's strategic objectives for sustainable energy, environmental protection, and economic growth. These technologies collectively promote cleaner production, reduce environmental degradation, and support the transition toward a low-carbon economy.

To contribute to this rapidly evolving sector, **Teela Khan** , as the **Proponent**, has planned to establish a facility under the company name **"M/S Afrock Power (Private) Limited"** for the installation of **Solar Energy Systems, Lithium-ion Battery Unit, and Electric Vehicles Unit**. The proposed project aims to support renewable energy adoption, promote clean transportation solutions, and introduce modern energy storage technologies in Pakistan. Through environmentally responsible operations and compliance with national environmental regulations, the project seeks to contribute positively to sustainable development while minimizing potential environmental and social impacts.

PRESENT STATUS OF THE INDUSTRY:

The **solar energy sector in Pakistan** is experiencing rapid growth and is playing an increasingly significant role in the country's energy mix. Large volumes of solar photovoltaic (PV) modules have been imported over recent years, with tens of gigawatts of capacity brought into the country and a substantial share already installed in residential, commercial, and industrial settings. By early 2025, net-metered rooftop solar installations reached several gigawatts, contributing to a shift toward decentralized energy generation alongside large-scale solar parks and projects in multiple provinces. Solar has become one of the dominant sources of electricity supply, driven by frequent grid instability, rising power tariffs, and favorable renewable energy policies.

In parallel, **battery energy storage systems (BESS)**—largely based on lithium-ion technology—are gaining traction as essential complements to solar PV deployment. The demand for lithium-ion batteries is rising sharply, primarily through imports from China and other international suppliers, to support solar storage as well as EV adoption. Recent industry data indicates that Pakistan imported over 1.25 gigawatt-hours (GWh) of lithium-ion battery

packs in 2024, with additional volumes arriving in early 2025; projections suggest that battery imports could grow significantly through 2030 to meet expanding energy storage needs.

To support this transition, the Government of Pakistan has initiated policy development aimed at localizing lithium-ion battery manufacturing and strengthening the domestic supply chain. High-level consultations and working groups have been established to formulate incentives, tariff adjustments, and performance-based support for domestic production of batteries, including lithium iron phosphate (LFP) technology, which is considered safer and well-suited for both energy storage and EV applications.

The **electric Vehicles (EV) industry** is at an early but dynamic stage of development. Implementation of the National Electric Vehicles Policy 2025–2030 has provided a framework of incentives, tax reductions, and subsidies designed to stimulate EV adoption and encourage local assembly and manufacturing. Foreign manufacturers, notably Chinese automakers such as BYD, have entered the Pakistani market and begun supplying EVs and plug-in hybrids, with plans to establish local assembly plants and expand model offerings. This market entry reflects growing consumer interest and investment, although infrastructure challenges—such as limited public charging networks and the high initial cost of EVs—remain ongoing constraints.

IMPORTANCE OF THIS SECTOR:

The solar energy, lithium-ion battery, and electric Vehicles (EV) sector holds critical importance for Pakistan's sustainable development, energy security, environmental protection, and economic growth. As the country faces increasing electricity demand, rising fuel imports, urban air pollution, and climate-related challenges, the transition toward clean and efficient energy technologies has become a national priority. This sector directly supports Pakistan's long-term objectives of reducing dependence on fossil fuels and mitigating environmental degradation.

Solar energy plays a vital role in diversifying Pakistan's energy mix by harnessing an abundant, renewable, and indigenous resource. The expansion of solar power generation reduces reliance on conventional thermal power plants, lowers greenhouse gas emissions, and decreases pressure on the national grid. Solar energy systems contribute to improved energy availability in both urban and rural areas, enhancing energy resilience and supporting socio-economic development.

Lithium-ion battery technology is a key enabler of renewable energy integration and modern energy management. Efficient energy storage systems help address the intermittent nature of solar power by ensuring reliable electricity supply during non-generation periods. Compared to conventional lead-acid batteries, lithium-ion batteries offer higher efficiency, longer operational life, reduced maintenance requirements, and lower environmental impact per unit of energy stored. The development of this sector supports cleaner energy storage solutions and promotes technological advancement within the country.

The electric Vehicles sector is essential for transforming Pakistan's transportation system toward sustainability. Road transport is a major contributor to air pollution, greenhouse gas emissions, and fuel consumption. The adoption of electric Vehicless significantly reduces tailpipe emissions, improves urban air quality, and lowers noise pollution. Furthermore, EVs contribute to reduced fuel import bills, conserving foreign exchange and improving energy independence. The growth of EV manufacturing and infrastructure also stimulates industrial development and job creation.

From an environmental perspective, this integrated sector contributes to the reduction of carbon emissions, improved air quality, and decreased environmental pollution. Environmentally responsible development of solar energy systems, battery storage facilities, and EV units supports Pakistan's commitments under international climate agreements and national environmental policies. When properly regulated, these technologies present comparatively lower environmental and health risks than conventional energy and transport systems.

Economically, the sector promotes industrial diversification, investment opportunities, and skill development. Establishing local facilities for solar equipment, lithium-ion batteries, and electric Vehicless encourages technology transfer, reduces import dependency, and strengthens the domestic manufacturing base. The sector also supports small and medium enterprises (SMEs) and creates employment across engineering, technical, and service domains.

In the context of environmental impact assessment, this sector is of high importance due to its potential to deliver long-term environmental benefits while requiring careful planning and management of construction, operational, and waste-handling impacts. Proper environmental assessment and implementation of mitigation measures ensure that the development of solar energy, lithium-ion battery, and electric Vehicles units contributes positively to sustainable development without causing adverse environmental or social effects.

Purpose of the report :

Environmental Impact Assessment (EIA) report is being submitted to the environmental protection agency (EPA), government of the Punjab, Lahore in compliance with the legal requirements for Punjab environmental protection act-1997 (amended 2012), section-12 for obtaining the environmental approval (ea) at the project site. The other relevant regulations and guidelines considered while preparing this EIA report will include:

- Policy and procedures for filling, review and approval of environmental assessments.
- Guidelines for the preparation and review of environmental reports.
- Guidelines for public participation.
- Guidelines for sensitive and critical areas.
- Detailed Sectoral guidelines.

Different environmental aspects like social, physical, biological etc and other related features of the project are highlighted in this EIA report. Measures necessary to be adopted to mitigate any environmental impacts on any part of the environment around are also described. All the important information is also provided as described under the format used to help decision makers, EPA Punjab in the present case, before issuing the desired environmental approval.

1.3 Details of the Proponent

Name: Teela Khan S/O Mudir

Address: Regi Lalma, Muhalla Naikabad, Peshawar

CNIC No. : 17301-6556497-3

1.4 Consultant Contact Address

M/S Ever Green Environmental Solutions

Address: Office No.5, 1st Floor, 7/8 New Civil Lines, Regency Road, Faisalabad

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Tel: +92331-4117050

1.5 Contact Person Detail:

Name Teela Khan

Contact Number 0333-4984983

STUDY TEAM

Name of Staff	Area of Expertise	Position Assigned	Task Assigned
Ali Nawaz	Project Management/ Environmental Expert	Team Leader	To coordinate with the consultant staff on different project activities and issue instructions from time to time. Overall Management of the consultancy contract, liaison with client and to ensure successful implementation and completion of work.
Dr. Maqsood Ahmad	Environmental Expert	Senior Environmental Engineer	Responsible for Conducting Surveys, Collection of baseline data, identification of impacts on the collected data and proposing mitigation measures, environmental management plan studies relating environment, and Preparation of IEE Report and EIA Reports.
Mian Muhammad Nawaz	Principle Environmentalist	Senior Environmentalist	The responsibilities include site visit, and collection of baseline data, Conducting Surveys, studies relating environment.
FFoqia	Environmental Sciences/Expert	Senior Environmentalist	The responsibilities include meeting with the client, site visit, and collection of baseline data, Conducting Surveys, studies relating environment, and Preparation of IEE/EIA Report.
Ali Hassan	Environmental Sciences	Sociologist/ Environmentalist	Responsible to conduct public consultation meetings, data collection of the social impact analysis survey and its report study for proposed site required for IEE/EIA.
Rabia Nawaz	English linguistics	Content writer	Compilation of IEE/EIA Reports and Google Earth views of Project.
Sameer Ali	Barrister/Legal Expert	Legal Advisor	To provide legal assistance in Environmental issues.

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

Teela Khan S/O Mudir, as the chief executive/proponent, has planned to setup a facility under the company name -"M/S Afrock Power (Private) Limited." Construction of Solar, Lithium-ion battery & Electric Vehicles Unit . The Process Will Involve Assembling of Raw Material and different parts to produce solar PV Modules, Lithium-ion Battery and Electric Vehicless

Total area of the project comprises 13.02 acres . located at Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad . After getting NOC from EPA, the proponent will do the construction of the facility. The total cost of the project is **RS. 2,144,802,400**. Electricity will be used which will be directed from WAPDA.. Groundwater will be used to cover water requirements. 10 gallons/day water will be used during construction phase while during operational phase water will only used for domestic purpose which will pass through septic tanks and discharged into FIEDMC sewerage system.

There is no environmentally sensitive area in the macro environment. No trees or greenery would be removed and no significant impact would occur on the demographic pattern or on the social and cultural values of the settled population.

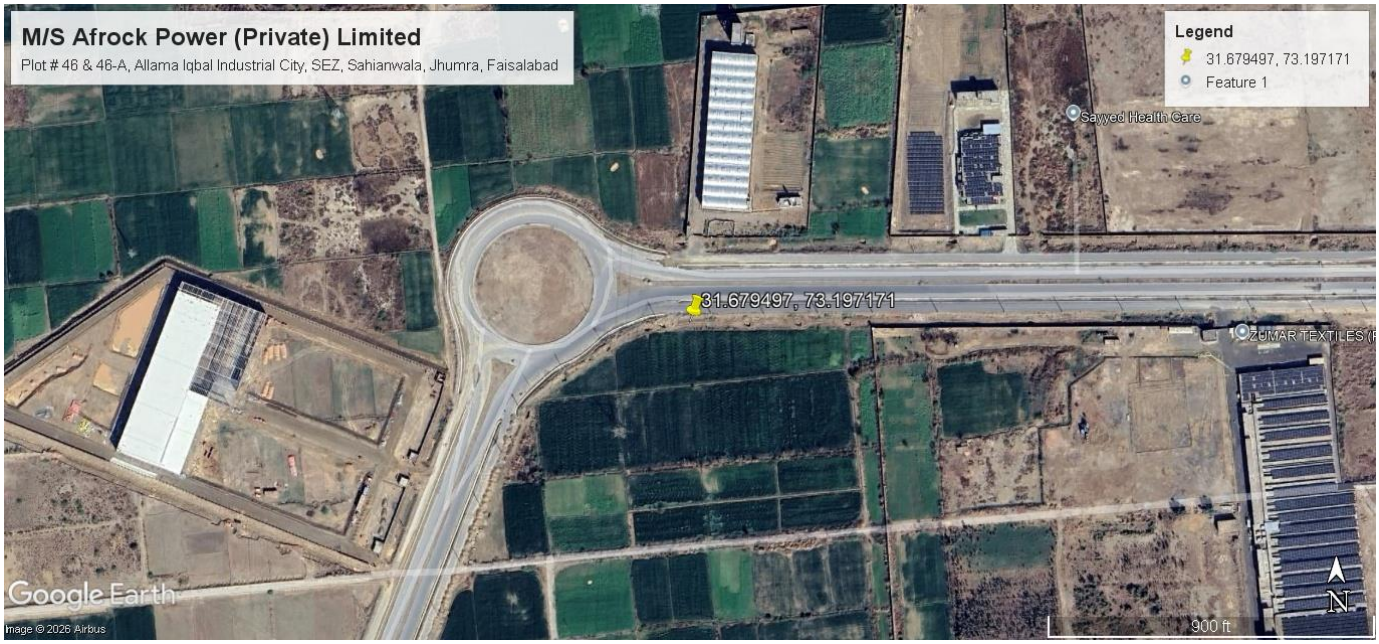


Figure 1-1: Project Location

1.5 Objective of the Report:

Objectives to conduct EIA are as following:

- √ A legal binding in accordance to Pakistan Environmental Protection Act (PEPA 1997).
- √ To identify the potential environmental issues pertaining to the proposed site.
- √ To evaluate the ability of the site in view of social acceptance and environmental soundness.
- √ To provide the maximum information to the proponent and other stakeholders about the existing environmental conditions and the implications of the proposed project.
- √ Collection of available data, reports, drawings and other relevant information about area ofproposed project.
- √ Review of applicable existing environmental legislation and national environmental qualitystandards (NEQs).
- √ Propose mitigation measure to eliminate or to reduce the negative impact to an acceptable level.
- √ Development of well-resourced environmental management and monitoring plans to identify mitigation strategies targeted towards avoidance, minimization and rehabilitation of the impacts

.SCREENING:

The subject proposal is Construction of Solar, Lithium-ion battery & Electric Vehicles Unit By M/S Afrock Power (Private) Limited, Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad . The Process Will Involve Assembling of Raw Material and different parts to produce solar PV Modules, Lithium-ion Battery and Electric Vehicless The Final product will be Solar, Lithium-ion battery & Electric Vehicles and the estimated total cost is Rs. 2,144,802,400.

Screening was performed at the first stage of the EIA process which resulted in a key EIA decision, namely to either conduct the assessment (based on the likely impacts) or not conduct it (in the anticipated absence of such impacts). Screening was done as early as possible in the development of the proposal in order for the proponent and other stakeholders to be aware of possible EIA obligations.

The standardized approach i.e. defined in applicable regulations was applied. The proposed project wasassessed based upon a set of criteria determined by Environmental Protection Department (EPD) i.e.

Review of IEE/EIA Regulations, 2022 provided by the Government of Pakistan, Ministry

of Environment, Local Government and Rural Development were considered for the purpose of screening mainly. Accordingly, the project falls under Schedule II, Category B(12) of the IEE/EIA Regulations, 2022, made under which the Environmental Impact Assessment (EIA) study is mandatory for getting Environmental Approval. The Director General, EPA Punjab is the authority to issue the requisite Environmental Approval were also considered after proper review of the project.

Moreover, following factors were also considered at the earlier stage:

- Magnitude of change in environmental conditions
- Diversity of new features with the existing environment.
- Potential for trans-boundary or over large area impact
- Number of people effected
- Likelihood of effecting receptors of other types (fauna and flora, businesses, facilities) be affected?
- Probability of affecting valuable or scarce features or resources
- Risk of breached environmental standards.
- Risk of affected protected sites, areas, features
- High/low probability of the effect occurring
- Long/short duration of effect
- Either effect is permanent or temporary
- Is the impact continuous rather than intermittent
- If it is intermittent will it be frequent than rare
- Reversibility of impacts
- The likelihood to avoid, or reduce or repair or compensate for the effect
- After detailed analysis on the basis of these factors, the proposed project was found suitable for Environmental Impact Assessment (EIA) Study rather than Initial Environmental Examination (IEE) study.

1.6 Scope of the Study

The scope of work encompasses the following aspects:

- Reconnaissance of the proposed project site
- Collection of available data, drawings and other relevant information about the area of site
- Assess and establish the potential environmental and socioeconomic impacts and identify theissues of concern

- Review of applicable existing environmental legislation and Punjab Environmental QualityStandards (PEQs)
- Propose mitigation measures to eliminate or to reduce the negative impacts to an acceptable level
- Categorization of significant impacts requiring further consideration
- Prepare Environmental Impact Assessment (EIA) report and describe environmentalmanagement plan (EMP)

1.7 Approach and Methodology

The methodology adopted to carry out the environmental Impact Assessment study is based on the guidelines of Pak-EPA.

1.8 Delineation of Area of Influence (AOI)

To conduct the EIA study, delineation of the study area is very important to decide the primary and secondary impacts of the project. The delineation of the study area normally depends upon the nature of the project like consolidated area etc. Keeping in view the potential impacts of the project; the study area is designated 0.5 km beyond the projects area's limits. However, in case of severity of impacts, e.g. impact on water quality, air and biological resources.

1.9 Reconnaissance Survey of AOI

Prior to start the detailed environmental and social survey of the project area, a reconnaissance survey was undertaken by a team of environmental and social experts to familiarize themselves with the local conditions. This trip also helped to plan the detail survey investigations. The main information regarding general topography of the area, social settings were recorded.

1.10 Environmental Baseline Survey

To conduct the study a multidisciplinary team comprising of engineers, environmentalists was deputed. Prior to start of the baseline environmental survey, a checklist was prepared based on the reconnaissance survey. The major items which were considered for physical, biological and social environment are

discussed in the subsequent paragraphs.

A. Physical environment
B. Biological environment

In order to collect the baseline information about the water and air quality as well as noise levels,monitoring was carried out in the proposed area.

- **Physical Environment**

Under the physical environment, the following main parameters were covered

a) Soils including type of soils, erosion, stability and contamination during project implementation.
b) Buildings including commercial, residential and semi-commercial use for complete/ partialrelocation.
c) Drainage aspects of the project area.
d) Air quality.
e) Noise quality.
f) Climatic conditions.

- **Biological Environment**

Under the biological environment, the following main parameters were covered:

a) Forests existing near the site
b) Existing vegetation on the project site
c) Trees to be cut due to project construction
d) Wet lands within the vicinity of the area
e) Migratory species specially migrating birds
f) Endangered species of flora and fauna
g) Wild life near the project site
h) Beneficial plants and animals in the project site
i) Aquatic life including fish resource.

1.11 Social Baseline Survey

The social baseline survey was carried out to accomplish the following specific objectives:

- To identify the potential project affected persons in the project demarcated area

- To identify poor and vulnerable groups, and strategies to ensure that such groups should getbenefit from the project
- To identify the need for developing a resettlement policy framework for the

potential affectsThe social impact assessment was based on two surveys:

- A socioeconomic baseline survey to develop overall socio-economic conditions of the populationsettled along the project corridor.
- A survey to identify the number and status of potential projected-affected persons (PAPs) settledin that area.

1.12 Collection of Data from Primary Source

The primary data was collected by developing various study parameters keeping in view the nature of EIA study. The data was collected by applying the various study tools and techniques.

1.13 Collection of Data from Secondary Source

The available published information related to project area, relevant policies and guidelines prepared by various government organizations were obtained and reviewed. This review provided a base to go head.

1.14 Impact Assessment and Mitigation Measures

After thorough review of data collected, extent of proposed project activities and detailed discussion with stakeholders and design team, the potential impacts of the project were assessed and measures were proposed to mitigate the negative impacts and to enhance the positiveimpacts.

1.15 Preparation of Environmental Management Plan

An environmental management plan (EMP) depicting the mitigation measures and monitoring plan was also developed.

1.16 The Report Structure

This EIA document is structured as follow:

Section-1: Introduction: containing general information about the project and process ofcarrying out the study.

Section-2: National Environmental Policy, Legal and Administrative Framework: describes the national policy, laws and regulations governing this EIA.

Section-3: The Project Description: describes an overall detail of the works to be done.

Section-4: The Description of the Environment: gives information on physical, biological and social conditions collected through survey of the project area.

Section-5: Environmental Impacts due to Project & Mitigation Measures: identifies various environmental impacts and their preventive actions. This makes the basis of the EMP.

Section-6: Environmental Management Plan (EMP): contains comprehensive prescriptions regarding environmental impacts and their mitigation measures. This also includes institutional arrangements and environmental management & monitoring plan.

Section-7: Stakeholders Consultations: explain the process of public consultation and disclosure of the project in related stakeholder. It makes this document a legal public document.

Section-8: Conclusion and Recommendation: concludes the EIA report with some practical recommendations.

Chapter 2
Legislative, Regulatory and Institutional Frameworks

2.1 General

This section deals with the policy and legal framework which apply for protection, conservation, restoration, rehabilitation and also related to sustainable development in context of project implementation and its operation. The project is expected to comply with all the legislation related to the environmental aspects as regards of Pakistan.

2.2 National Policy Framework

Following elements of national policy framework are considered the most relevant to this project

2.2.1 National Conservation Strategy

The Pakistan National Conservation Strategy (NCS), which was approved by the federal cabinet in March 1992, is the principle policy document on environmental issues in the country (EUAD/IUCN, 1992). The NCS outlines the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources.

The NCS has 68 specific programs in 14 core areas in which policies intervention is considered crucial for the preservation of Pakistan's natural and physical environment. The core areas that are relevant in the context of the proposed project are:

- Pollution prevention and abatement,
- Restoration of rangelands,
- Increasing energy efficiency,
- Conserving biodiversity,
- Supporting forestry and plantations, and
- The preservation of natural heritage.

2.2.2 National Environmental Policy, 2005

The national environmental policy act 2005 aims to protect, conserve, and restore the

environment in order to improve quality of the life of citizens through sustainable development and resource conservation.

The main objectives of the policy are:

- Conservation, restoration and efficient management of natural resources.
- Integration of the environmental considerations in policy making and planning process.
- Capacity building of government agencies and other stakeholders at all levels for the better environmental management
- Meeting international obligations effectively in line with the national aspirations.
- Creation of a demand for environment through mass awareness and community mobilization.

2.2.3 The National Forest Policy 2001 of Pakistan

This policy covers the Renewable Natural Resources (RNR) of Pakistan i.e. forests, rangelands, watersheds, wildlife, biodiversity and their habitats. The policy seeks to launch a process for eliminating the fundamental causes of the depletion of RNR through the active participation of all the concerned agencies and stakeholders, to realize the sustainable development of natural resources. It is an umbrella policy providing guidelines to the federal government, provincial governments and territories for the management of their RNR. In consonance with it, the provincial and district governments may devise their own policies in accordance with their circumstances.

The goal of this policy is to foster the sustainable development of RNR of Pakistan, for the maintenance and rehabilitation of its environment and the enhancement of sustainable livelihoods of its rural masses especially women, children and other deprived groups.

The elements of the policy are as follow:

- Population planning in critical eco system
- Providing substitutes to firewood in the wooded mountains
- Reducing the impact of socio-economic causes
- Reducing poverty, poverty of opportunity, and powerlessness
- Renovating and invigorating the institutions of RNR
- Supporting local government in the sustainable development of their rnr
- Policies for fragile natural ecosystem
- River rain forests

- Integrated plantations
- Preservation of relict and unique ecosystem
- Wildlife
- Rangelands and desert ecosystem
- Planting of trees and fodders on farmlands

2.3 Pakistan Environmental Protection Act (PEPA), 1997 and administrative framework

2.3.1 General

PEPA 1997 is a fairly comprehensive legislation and provides legislative framework for protection, conservation, rehabilitation and improvement of the environment. It contains concrete action plans and programs for the preservation of pollution and promotes sustainable development.

The silent features of this law are:

- No proponent of a project shall commence construction or operation unless he has filed with the government agency designed by federal environment protection agency (EPA) provincial EPAS an EIA, and has obtained a no objection certificate (NOC) environmental approval (ea).
- Establishment and formation of the Pakistan environmental protection council.
- Powers and functions of the federal and provincial environmental protection agencies.
- Prohibition of certain discharges or emissions.
- National environmental quality standards (NEQS) for wastewater, air emissions and noise.
- This act also empowers federal government to issue notices and to enforce them for the protection of the environment and resource conservation.

For the effective implementation of the provisions of PEPA 1997, Pak-EPA headed by a director general has been constituted. On the same pattern, EPAS/EPDS have been created in all provinces. The capability of regulatory institutions for environmental management largely achieves the success of environmental assessment for ensuring that development projects are environmentally sound and sustainable. For decision-making and policy formulation in the environmental and conservation issues, the institutional framework is described in following paragraphs.

2.3.2 Federal Government Institutions

With the approval of the 18th amendment in the constitution of 1973 of the Islamic republic of Pakistan, the subject of environment has largely been delegated to the provinces. The federal ministry of environment has been abolished and instead the ministry of national disaster management has been shaped under which Pakistan environmental protection council; Pakistan environmental protection agency; Pakistan environmental planning and architectural consultants limited; global environmental impact study center, Islamabad policy, legislation plans, strategies and programs with regard to disaster management including environmental protection and preservation, coordination, monitoring and implementation of environmental agreements with other countries, international agencies and forums have been put. Now the new ministry namely climate change division has been established.

The Pakistan environmental protection agency (PEPA) looks after the environment related issues for the federally controlled areas territories. Lacking laws at the provincial levels; the laws, rules, regulations those already available at the federal level and operational at the provincial levels will continue as such.

Hereunder, the major legal framework is given:

Two organizations, the Pakistan protection council (PEPC) and the EPA, are primarily responsible for administrating the provisions of PEPA 1997. The PEPC oversees the functioning of the EPA. Its members include representatives of the government, industry and non-governmental organizations. The EPA is required to ensure compliance with the NEQS, established monitoring and evaluation system, and both identify the need as well as initiate legislation whenever necessary. It is thus the primary implementing agency in the hierarchy. The provincial EPAS/EPDS are the provincial arms of federal EPA.

2.4 Pakistan Environmental Protection Agency Regulations, 2000 for Review of Initial Environmental Examination (IEE)/Environmental Impact Assessment (EIA)

Under section 12 of the 1997 act, a proposed falling under any category specified in schedule 1 and 2 requires the proponent to file an IEE or EIA, as the case may be, with the federal agency. Within ten working days of the EIA or IEE having been submitted, the federal agency will conform that the documents submitted are complete for the purpose of review. During this time should the federal agency requires the proponent to submit any additional information; the IEE

or EIA will be returned to the proponent for revision, clearly listing those aspects that need further discussion. Subsequently, the federal agency shall make every effort to complete an IEE review within 45 days and EIA review within 90 days of filling of the complete information of report. After the successful review, the EPA will issue the NOC/EA according to the rules and regulations as prescribed in regulation 2000.

During the project execution the proponent are required to comply with the recommendations of the IEE/EIA and also the conditions of the NOC/EA set forth by the relevant EPA, in present case, EPA, Lahore, Punjab. During the construction or post IEE monitoring and reporting is mandatory according to clause 19 of regulation -2000. These regulations require proponent of all projects to submit environment monitoring reports during and on completion of construction, and regular operation of the project. Any additional requirements of the report as desired by the EPA are also necessary for the proponent, however, the format and contents of such reports are not specified in the laws.

2.4.1 Pakistan Environmental Impact Assessment Procedures

These guidelines are descriptive documents describing the format and content of IEE/EIA reports to be submitted to federal and provincial EPA/EPD for obtaining NOC. Following are the major areas, which are covered by these guidelines:

- The environmental assessment report formation (scoping, type and category of project, description of project, alternatives, site selection, baseline data).
- Assessing impacts (identification, analysis and significance).
- Mitigation and impact management and preparing an environmental management plan.
- Reporting (format, main features, shortcomings, other forms of presentation).
- Review and decision making (role, steps, remedial options, checks and balances).
- Monitoring and auditing (systematic follow up, effective data management).
- Project management (inter-disciplinary teams, programming and budgeting).

2.4.2 Guidelines for Public Consultation

The federal EPA provides these guidelines to deal with possible approaches to public consultation and techniques for designing an effective program of consultation that reaches out to all major stakeholders and ensures the incorporation of their concerns in any impact assessment study. These guidelines cover:

- Consultation, involvement and participation of stakeholders
- Effective public consultation (planning, stages of EIA where consultation is appropriate)
- Facilitation involvement (including the poor, women and non-governmental organizations (NGOs)

2.4.3 National Environmental Quality Standards (NEQs), 2000

The NEQs 2000 specify the following standards:

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment facilities, and the sea (three separate sets of numbers)
- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources
- Maximum allowable concentration of pollutants (two pollutants) in gaseous emissions from Vehicles exhaust
- Maximum allowable noise levels from Vehicless

These standards apply to the gaseous emissions and liquid effluents. Standards for ambient air quality have not been prescribed as yet.

2.4.4 National Ambient air Quality Standards (NAAQSS)

The ministry of environment, government of Pakistan vide its notification, Islamabad, the 18th October, 2010 under S.R.O. 102 (1)/2010 established standards which provide the maximum allowable limits, in the ambient air, of Sulphur dioxide (SO2), oxides of nitrogen, Suspended Particulate Matter-(spm), Respirable particulate matter-pm10, Respirable particulate matter-pm25, lead and Carbon monoxide (co).

Table 2-1: National Environmental Quality Standards Ambient Air

Pollutants	Time-weighted Average	Concentration in Ambient air		Method of Measurement
		Effective from 1st July 2010	Effective from 1st January 2013	

Sulphur dioxide (so2)	Annual average	80 g/m3	80 g/m3	Ultraviolet fluorescence
	24 hours	120 g/m3	120 g/m3	
Oxides of nitrogen as (no)	Annual average	40 g/m3	40 g/m3	Gas phase Chemiluminescence
	24 hours	40 g/m3	40 g/m3	
Oxides of nitrogen as	Annual average	40 g/m3	40 g/m3	Gas phase Chemiluminescence
(no2)	24 hours	80 g/m3	80 g/m3	
Suspended particulate matter (spm)	Annual average	400 g/m3	360 g/m3	High volume sampling (average flow rate not less than 1.1 m3/minute
	24 hours	550 g/m3	500 g/m3	
Respirable particulate matter pm10	Annual average	200 g/m3	120 g/m3	Beta ray absorption
	24 hours	250 g/m3	150 g/m3	
Respirable particulate matter pm 2.5	Annual average	25 g/m3	15 g/m3	Beta ray absorption
	24 hours	40 g/m3	35 g/m3	
		25 g/m3	15 g/m3	
Lead (pb)	Annual average	1.5 g/m3	1.0 g/m3	Ass method after sampling using epm 2000 or equivalent filter paper
	24 hours	2.0 g/m3	1.5 g/m3	

*annual arithmetic means 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.

2.4.5 National Standards for Drinking water Quality (NDWS)

The ministry of climate change, government of Pakistan vide its notification, Islamabad, the 18th October, 2010 under S.R.O, 102(1)/2010 established standards for drinking water quality. The major quality parameters fixed depend upon bacteria, chemical and physical ones.

Table 2-2: National Standards for Drinking Water Quality

Properties/Parameters	Standard Values For Pakistan
All water intended for drinking (e.coli or thermo tolerant coliform bacteria)	Must not be detectable in any 100ml samples
Treated water entering the distribution system (e.coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100ml samples
Treated water in the distribution system (e.coli or thermo tolerant or coliform or total coliform bacteria)	Must not be detectible in any 100ml samples. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.
Physical	
Color	Non objectionable/acceptable
Taste	Non objectionable/acceptable
Odor	Non objectionable/acceptable
Turbidity	< 5 ntu
Total hardness as caco3	< 500 mg/l
Tds	< 1000
Ph	6.5 – 8.5
Chemical	
Essential inorganics	Mg/litre
Aluminum (al)	< 0.2
Antimony (sb)	< 0.005 (p)
Arsenic (as)	< 0.05 (p)

Barium (ba)	0.7
Properties/Parameters	**Standard Values for Pakistan**
Boron (b)	0.3
Cadmium (cd)	0.01
Chloride (cl)	<250
Chromium (cr)	<0.05
Copper (cu)	2
Toxic Inorganic	**Mg/l**
Cyanide (cn)	0.05
Fluoride (f)	1.5
Lead (pb)	0.05
Manganese (mn)	0.5
Mercury (hg)	0.001
Nickel (ni)	0.02
Nitrate (*no3)**	50

Properties/parameters	**Standard values for Pakistan**
Organic	**Mg/l**
Pesticides	Psqca no. 4639-2004, page no. 4 table no.3 serial no. 20-58 may be continued.
Phenolic compound (as phenols)	Who standards: 0.002
Polynuclear aromatic hydrocarbon (as pah)	Who standards 0.01v (by gc/ms method)
Radioactive	
Alpha emitters bq/l or pci	**0.1**
Beta emitters	**1**

2.4.6 National Environmental Quality Standards-Noise

The ministry of climate change, government of Pakistan vide its notification, Islamabad, and the 18th October, 2010 under S.R.O 102 (1) / 2010 established standards for noise. These standards are based on category/zone i.e. residential area, commercial area, industrial area and silence zone. The limiting values for day and night have also been fixed for all categories/zones.

Table 2-3: National Environmental Quality Standards - Noise

Category of area/zone	Day time	Night time
Residential Area	55	45
Commercial Area	65	55
Industrial Area	75	65
Silence Zone	50	45

Limit in db (a) leq*

Notes:

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

- Db (a) leq: time weighted average of the level of sound in decibels on scale which is relatable to human hearing.

2.4.7 National Resettlement Policy and Ordinance

As referred above, at present the only legislation relating to land acquisition and compensation in the land acquisition act (LAA) of 1894. Experience with large-scale infrastructure development projects implemented by institutions such as WAPDA has demonstrated the need for a cohesive national policy resettlement for resettlement. Following a national consultative process, a national resettlement policy and a related ordinance were drafted known as draft resettlement policy, 2002 which still has to be approved by the government.

The salient applicable features of the draft resettlement policy are given below:

- √ The Pak-EPA will be responsible for both environment- related as well as resettlement-related matters.
- √ The responsibilities for implementation at a provincial level are to be delegated to the concerned provincial EPAS with overall control of the provincial planning and development (p & d) departments.
- √ All categories of 'loss' arising from development projects that entail resettlement, need to be addressed; these include not only loss of land, built-up property, other infrastructure, and crops and trees, but also loss of income, job opportunities, and access to natural resources etc.
- √ Vulnerable groups whose issues need to be addressed in particular include: women, children, destitute persons, tribal communities, squatters, those with usurper rights, and landless groups.
- √ There should be a special emphasis on consultation with affected groups when preparing a resettlement action plan.

2.5 Other Environment Related Statues

This section outlines the other statues apart from Pakistan protection act, 1997, which are relevant to project.

2.5.1 The Land Acquisition Act (LAA) -1894

At this point, the only legislation relating to land acquisition and compensation is the LAA of 1894. The LAA is however, limited to a cash compensation policy for the acquisition of land and

built up property, and damage to other assets, such as crops, trees, and infrastructure. The LAA does not consider there habitation and resettlement of disrupted populations and the restoration of their livelihoods. The project will involve acquisition of propriety land. The land will be acquired under the LAA 1894. In the act there are provisions for normal acquisition of land under section 6 (4) or emergency acquisition under section 17 (4).

2.5.2 Pakistan Explosives Act, 1884

Under the explosives act, the project contractors are bound by regulations on handling, transportation and using explosives during quarrying, blasting, and other purposes.

2.5.3 The Forest Act, 1927

The forest act empowers provincial governments to prohibit the clearing of forest for cultivation, grazing, hunting, removing forest produce; quarrying and felling, lopping and toping of trees, branches in reserved or protected areas.

2.5.4 Pakistan Penal Code, 1860

The Pakistan penal code deals with offences where public or private property and/or human lives are affected due to the intentional or accidental misconduct of an individual or body of people. In the context of environment, the penal code empowers the local authorities to control noise, noxious, emissions and disposal of effluents. The NEQS enforced by the EPAS supersede the application of this legislation on industries and municipalities.

2.5.5 Provincial Wildlife Act, 1974

In addition to empowering the provincial wildlife departments to establish game reserves, parks, and wildlife sanctuaries, this act regulates the hunting and disturbance of wildlife**.**

2.6 International and National Non-Governmental Organizations.

International and national non-government organization (NGOs), such as the international union for conservation of nature and natural resources (IUCN) and the world wide fund for nature (WWF), have been active in Pakistan for some time. Both of these NGOs have worked closely

/with the governments at the federal as well provincial levels and have positively contributed to the cause of environment. They have played significant role with regard to the formulation of environment and conservation policies and last but not least, another most prominent NGO namely "Sustainable Development Policy Institute (SDPI)" has also played very significant role in upholding the cause of environmental protection in Pakistan. Environmental NGOs have been particularly active in the governments environmental and conservation policies, even at the provincial and federal levels, have been formulated in consultation with leading NGOs, who have also been involved in drafting new legislation on conservation.

2.6.1 Explosive Act, 1884

This act deals with explosives in prohibiting either absolutely of subject to conditions, the manufacture, possession or importation of any explosive which is so dangerous in character that, in the opinion of the appropriate government, it is expedient for public safety to issue the notification.

2.6.2 Punjab Local Government Ordinance, 2001

Schedules 4 and 8 of this ordinance pertain to environmental pollution. Under the ordinance, the local councils are authorized to restrict projects causing pollution to air, water or land. They may also initiate schemes for improving the environment.

2.6.3 Pakistan Penal Code, 1860

This defines the penalties for violations concerning pollution of air, water bodies and land. Sections 268 to 291 are about offences affecting public health. The offences relating to public health safety and environment are as under;

- Sec 268: public nuisance
- Sec 269: negligent act likely to spread infection of disease dangerous to life:
- Sec 270: malignant act likely to spread infection of disease dangerous to life:
- Sec 278: making atmosphere noxious to health:
- Sec 284: negligent conduct with respect to poisonous substance:
- Sec. 290. Punishment for public nuisance in cases not otherwise provided for:

- Sec. 291. Continuance of nuisance after injunction to discontinue.

2.6.4 Punjab Land Use Rules 2009

In January 2009 the Punjab government notified "Punjab land use rules 2009" for the clarification of Lahore master plan. In these rules permissible land use according to area type is define2.18 antiquities act 1975

The law relates to protection of antiquities / monuments / national / international heritage. The compliance of this act is mandatory for the construction of generators. Under section 22 of the act no development plan or scheme or new construction can be done within distance of 200ft from the boundary of the monuments/ national heritage. There is no historical site / monuments in the proximity of the project.

Chapter-3 Description of the Project

3.1 General

This section deals with project components. It describes the category of the project, cost & magnitude of the project, operation equipment's etc. The information presented in this section is based on project site survey.

3.2 Type and Category

The project involves Manufacturing of Solar, Lithium-ion battery & Electric Vehicles Unit By M/S Afrock Power (Private) Limited, Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad . The Process Will Involve Assembling of Raw Material and different parts to produce solar PV Modules, Lithium-ion Battery and Electric VehiclessThe project falls under the Schedule-II-B(12) of Punjab environment protection agency's (review of IEE&EIA) regulations, 2022, the guidelines for preparation and review of environmental reports. So, an Environmental Impact Assessment of the unit is required. For this purpose, the proponent has entrusted WELCOS consultants to prepare Environmental Impact Assessment of the unit.

3.3 Objectives of the Project

Since the demand for Solar PV Modules, Lithium-ion Battery and Electric Vehicless in the market keeps rising every day, M/S Afrock Power (Private) Limited. plans to deal with this by the Manufacturing of Solar, Lithium-ion battery & Electric Vehicles Unit . The final product will be Solar, Lithium-ion battery & Electric Vehicles.

3.4 Alternatives Considered and Reasons for their Rejection

An analysis of available alternatives are necessary establish that most suitable management and technology options will be adopted for the project while minimizing environmental impacts.

This section covers the project alternatives which were examined for the proposed project At Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad This evaluation explains the selection of the most feasible alternative in terms of economics, environment and health & safety. In

particular it outlines the following options that were considered for this project:

- The "No Development Option".
- Alternative Site Option.
- Technology Alternatives

3.4.1 No Development Option

The 'no-development' alternative is basically a consideration of the original and undisturbed environment without any development from the proposed project. This option is considered to ensure that all possibilities have been taken into consideration before deciding on a final course of action and also to provide a baseline situation against which the other suggested alternatives can be measured. The construction of unit could have certain adverse impacts on the environment, if the effluents and emissions discharged from it go uncontrolled and un-treated, however. The 'no-development' alternative would have no significant alterations in the day-day lives of the residents living nearby, nor would it have any further dampening effects on the physical or socio-economic environment of the proposed project area, however this project is being undertaken by M/S Afrock Power (Private) Limited. to produce The Product will be following type of batteries Lead Batteries, Tubular. VRLA, Maintenance Free, Lithium, Dry Charge so it would be beneficial not only to the proponent as it would mean an increase in the sales and profits but would also generate development and employment opportunities in the area.

3.4.2 Alternative Site Selection

Different sites were evaluated for the Manufacturing of the Lead Battery, Tubular, VRLA,Maintenance Free, Lithium 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, thus avoiding additional transportation costs for the proposed project.
- Proximity of environmentally sensitive receptors should be avoided.

Since adverse impacts on the environment are often associated with construction and development activities, a site selection survey is often carried out to choose the best possible site for the project.

After careful consideration, it was decided to install the Solar, Lithium-ion battery & Electric Vehicles Unit at Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad This would not only ensure adequate area for construction but

would also provide access to the resources required for maintaining the project operations. The proposed project site was selected primarily for the following merits

- Sufficient area is available for the proposed development
- The proposed project site is located At Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad It is a 2hour drive from Lahore and about 4 hours from Rawalpindi-Islamabad,
- The project site is well connected to the rest of the country by a network of road and railway lines thus providing ease of freight and transportation of raw materials.

3.4.3 Technology/Process Alternative

M/S Afrock Power (Private) Limited. the aim of this proposed project is to meet the current demand of Batteries for the country. M/S Afrock Power (Private) Limited. will be making use of the latest, resource conserving technology for its processes, Also a list all the local and Imported Machinery have been provided.

.

3.5 Location of the Project

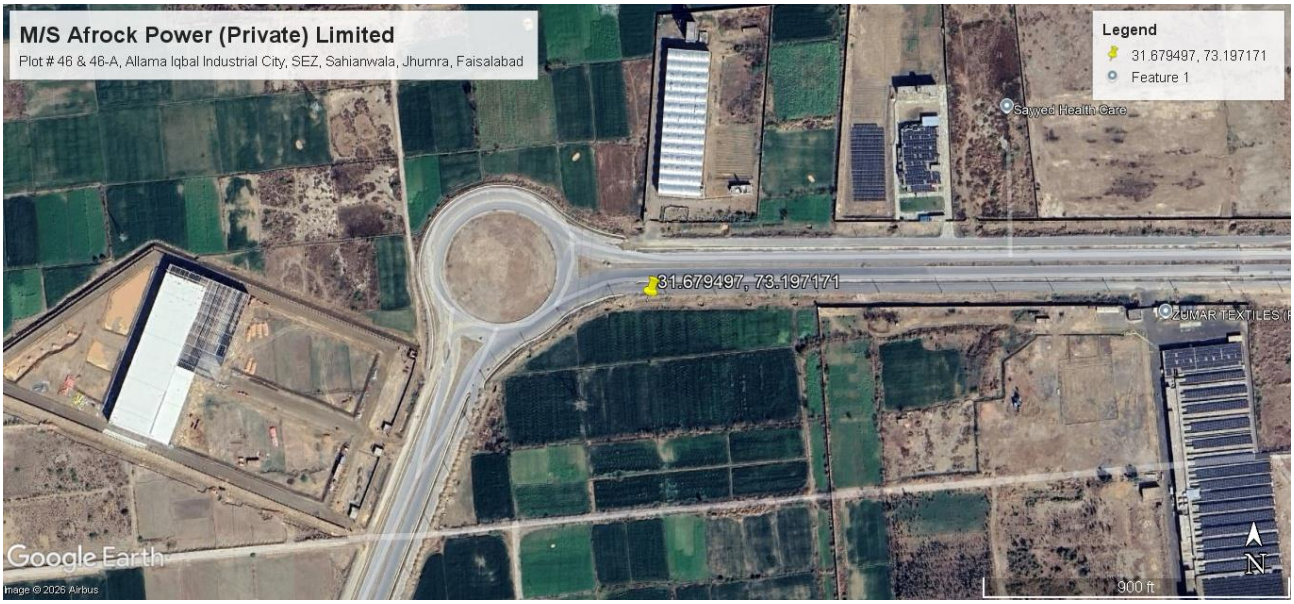
PLOT # 46 & 46-A, ALLAMA IQBAL INDUSTRIAL CITY, SEZ, SAHIANWALA, JHUMRA, FAISALABAD

3.6 Land Use

The total area of the project comprises of **13.02 acres .** Land use is industrial in nature.

3.7 Road Access

The main access towards the project is though Allama Iqbal IC , Chak Jhumra



3.8 Vegetation Features of the Site

Tree plantation campaigns have motivated the farmers to grow trees along the field borders or along the water channels. Trees were estimated to be growing in the project area. Amaranthus viridus (Pig weed), Achyranthus aspera (Prickly chaff flower), Boerhaavia diffusa (Punarnava), Convolvulus arvensis (Fieldbindweed), Mentha longifolia (wild mint), Euphorbia prostrate (Prostrate sand mat), Galium verum (Lady's Bedstraw or Yellow Bedstraw), Anagallis arvensis (Scarlet Pimpernel) , Coriandrum sativum (Coriander) are present in the area. Roadside plantations running parallel or across the project area include Shisham, Kikar, Farash (Tamarixaphylla) and Eucalyptus. Bohr (Ficusbengalensis), Neem (Azadiractaindica), Ber and Bakain are commonly planted at the farm houses. Other vegetation present is Mungbean, Maize, Brassica, Sunflower, Mulberry, Rice, and sorghum.

3.9 Cost and Magnitude of Operation

The total cost of the project is 2,144,802,400.

3.10 Schedule of Implementation

The construction of the building will be done after getting environmental approval from the environmental protection department.

Activities	Times Frame

	Four Week		Four Week			Four Week		Four Week		Four Week	
Preliminary Phase (Land Acquiring etc)											
Design Phase											
Pre-Construction Activities Finalization											
Construction Phase											
Purchasing Phase											
Machinery Installation											
Commissioning Phase											
Recruiting Of Staff											
Operation Phase											

3.11 Description of the Project

The proposed project aims at the Manufacturing of Solar, Lithium-ion battery & Electric Vehicles Unit By M/S Afrock Power (Private) Limited, Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad . The Process Will Involve Assembling of Raw Material and different parts to produce solar PV Modules, Lithium-ion Battery and Electric Vehicless

3.12 Unit Process:

The proposed project involves the manufacturing and assembly of batteries through a controlled and sequential production process. The unit operations are designed to ensure product quality, operational efficiency, and compliance with environmental, health, and safety requirements as prescribed under applicable EIA guidelines. The major process steps are described below:

1. Pure Lead Handling

Pure lead ingots are received as the primary raw material and stored in a designated covered area. The lead is inspected for quality before being transferred to the melting and processing sections. Proper handling procedures are adopted to minimize lead spillage and worker exposure.

2. Oxide Mill (Air)

Pure lead is processed in an oxide mill where it is converted into lead oxide through controlled oxidation using air. This process is critical for battery plate preparation. Air pollution control systems, such as bag filters or cyclones, are installed to capture lead dust and prevent atmospheric emissions.

3. Paste Mixer

Lead oxide is transferred to the paste mixing unit, where it is mixed with water and additives to form a uniform paste. This paste is used for coating battery plates. The mixing process is carried out in enclosed equipment to reduce dust generation and occupational exposure.

4. Antimonial Lead Preparation

Antimonial lead alloy is prepared by adding controlled quantities of antimony to molten lead. This alloy enhances the mechanical strength and performance of battery grids. The process is conducted in temperature-controlled furnaces equipped with ventilation and fume extraction systems.

5. Load Alloy

The prepared lead alloy is transferred to holding pots or alloy loading units. The molten alloy is maintained at specified temperatures to ensure consistent quality during the grid casting process.

6. Cast Grid

Molten lead alloy is poured into grid molds to form battery grids. These grids serve as the structural framework for battery plates. After casting, grids are cooled, inspected, and transferred for further processing. Scrap generated during casting is collected and recycled internally.

7. Pasted Plates

The lead paste prepared earlier is applied uniformly onto the cast grids using automated or semi-automated pasting machines. The pasted plates are then stacked and allowed to set under controlled conditions to ensure adhesion and proper curing.

8. Washing

Pasted plates are washed with water to remove excess paste and surface impurities. Wastewater generated during this process is collected and routed to an effluent treatment system in accordance with environmental regulations.

9. Drying

Washed plates are transferred to drying chambers where moisture is removed under controlled temperature and ventilation conditions. This step prepares the plates for further finishing operations.

10. Cutting

Dried plates are trimmed and cut to required dimensions. Cutting scrap is collected and recycled back into the production process to minimize material loss.

11. Finished Plates

After inspection and quality checks, the plates are classified as finished plates and transferred to the assembly section. Any defective plates are segregated and recycled.

12. Battery Assembling

Finished positive and negative plates are assembled with separators into battery containers. Inter-cell connections are made, and terminals are installed. This process is carried out in designated assembly areas following safety and quality standards.

13. Battery Formation and Finishing

Assembled batteries undergo formation, where electrical charging activates the plates. After formation, batteries are cleaned, tested for performance, sealed, labeled, and packed as finished products ready for dispatch.

3.13 Raw Materials

The daily Raw material consumption is as follow:

- Silicon Glass, EVA, Back Sheet, Aluminum Frame, Silver Plastic, Conductors.
- Lithium ,Nickel, Cobalt, Graphite, Electrolytes, Copper, Aluminum Foils, Battery Management system Components.

- Steel & Aluminum Alloys, Lithium-ion Battery, Copper, Plastics & Composites, Rare earth elements (Neo Dymium, Dysprosium) Fiber Glass Mat, Refined Lead, Antimonial etc,

Detail of process

The proposed battery manufacturing unit is designed to operate through a series of integrated and sequential processes. Each process step is carried out under controlled conditions to ensure product quality, occupational safety, and environmental protection. The detailed process is described below:

1. Raw Material Receipt and Storage

Pure lead ingots, antimony, additives, and other auxiliary materials are received from approved suppliers. Raw materials are stored in designated, covered, and well-ventilated areas with impervious flooring to prevent soil contamination. Material handling is carried out using mechanical means to minimize manual exposure.

2. Lead Melting and Oxide Production

Pure lead ingots are transferred to melting kettles, where lead is melted at controlled temperatures. The molten lead is then fed into the oxide mill, where it reacts with air to form lead oxide powder. This oxidation process is carefully regulated to achieve the desired oxide characteristics. Dust collection systems are installed to capture airborne lead particles, ensuring compliance with air quality standards.

3. Lead Paste Preparation

The lead oxide produced is conveyed to the paste mixer. In this unit, lead oxide is mixed with water, sulfuric acid (where applicable), and performance-enhancing additives to produce a homogeneous paste. The mixing operation is carried out in enclosed mixers to prevent dust release. Paste consistency is monitored to ensure uniform application on battery grids.

4. Lead Alloy and Antimonial Lead Preparation

In parallel, antimonial lead alloy is prepared by adding precise amounts of antimony to molten lead. The alloying process improves grid strength, corrosion resistance, and electrical

conductivity. Molten alloy is maintained in holding furnaces at controlled temperatures to ensure consistency during grid casting.

5. Grid Casting

Molten lead alloy is poured into grid casting machines, where it is molded into battery grids of specified dimensions. After casting, grids are cooled and visually inspected. Any defective grids and excess lead are collected and recycled within the facility, reducing raw material consumption and waste generation.

6. Plate Pasting

The prepared lead paste is applied onto the cast grids using automated or semi-automated pasting machines. Both positive and negative plates are pasted according to design specifications. The pasted plates are stacked and transferred to curing chambers, where controlled temperature and humidity conditions allow proper setting and strengthening of the paste.

7. Plate Washing

After curing, pasted plates are washed with clean water to remove excess paste and surface residues. This step ensures improved plate performance and cleanliness. Wastewater generated during washing is collected through a closed drainage system and routed to the effluent treatment plant (ETP) for treatment prior to reuse or discharge in accordance with NEQS.

8. Plate Drying

Washed plates are dried in drying ovens or chambers under controlled temperature and airflow conditions. Drying ensures removal of moisture and prepares the plates for final sizing and assembly. Ventilation systems are provided to manage heat and air quality.

9. Plate Cutting and Finishing

Dried plates are trimmed and cut to the required dimensions using precision cutting equipment. Cutting scrap and trimmings are segregated and recycled back into the lead processing section. Finished plates undergo quality inspection to ensure compliance with product standards.

10. Battery Assembly

Finished positive and negative plates are assembled with separators into battery containers. Plate groups are aligned and inter-cell connections are made through lead welding or casting. Battery terminals are installed, and containers are sealed to prevent leakage.

11. Battery Formation (Charging)

Assembled batteries are subjected to formation charging, where controlled electrical current activates the battery plates. This step is critical for battery performance and capacity development. Acid fumes, if generated, are managed through ventilation and neutralization systems.

12. Finishing, Testing, and Packaging

After formation, batteries are cleaned, labeled, and tested for voltage, capacity, and leakage. Approved batteries are packed and stored in a designated finished goods area for dispatch. Defective batteries are segregated and routed for recycling or reprocessing.

3.14 Energy requirement

The electricity requirement will be fulfilled by WAPDA which is approx. 4500 KW.

3.15 Water requirement

50 gallons per day will be the required amount of water during the constructional phase while during Operational phase approx50 M Gallon/year of water is required.

3.16 Wastewater Treatment:

The waste water generated during the process will be treated through Effluent Treatment Plant then it will be discharged into FIEDMC sewerage system.

3.17 Restoration and Rehabilitation Plans

As the project site is outside the premises of city and it is in an open area so there is no

displacement of any human settlement due to the construction and operations of the said project. No fresh land is to be occupied; hence no restoration and rehabilitation is required. Ornamental trees and flower plants will be planted on inside peripheral of the premises to restore the land.

3.18 Government Approval by Project

The Environmental Approval according to Section-12 of Pakistan Environmental Protection Act-1997 is the mandatory requirement of the project.

4 DESCRIPTION OF THE ENVIRONMENT

4.1 GENERAL

The existing environment in the project area has been studied with respect to the physical, biological and socio-economic resources. .

4.2 PHYSICAL ENVIRONMENT

This part examines the physical resources such as topography, soil, climate, surface and ground water resources and quality, ambient air quality and geology of not only the project site but also the city to assess whether the project under assessment can or does have any impacts on any of these parameters. The description of physical environment of Faisalabad and the project site is presented in the following:

4.2.1 Geography

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 Chenab River flowing at about 32.0 Kilometers (20 miles) to its west. The Faisalabad Urban area covers approximately 90.65 square kilometers (35 square miles). The city is linked with major urban centers by Roads, Rail and Airway.

4.2.2 Topography

Faisalabad city 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 (about 1 to 1.5 feet per mile). The city is situated at an elevation of about 183.35 meters or 612 feet above the Sea level. The topography is however marked by valleys, local depression and relatively high ground. (Reference: The 2004 Baseline Survey on Millennium Development Goals in AACs Chapter 6 Faisalabad, Pakistan). Topographical map of Faisalabad city is shown in Figure 4-1.

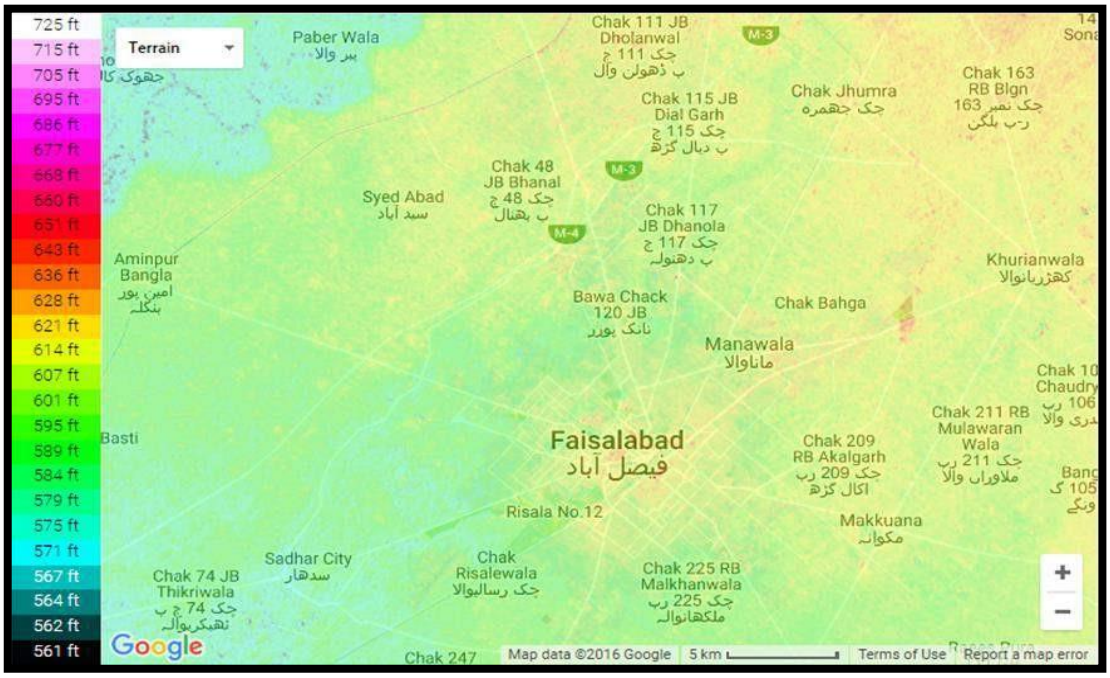


Figure 4-1: Topographical Map of Faisalabad City[18]

4.2.3 *Geology and Soil*

The district of Faisalabad is part of the alluvial plains between the Himalayan foothills and the central core of the Indian subcontinent. The alluvial deposits are typically over a thousand feet thick. The interfluves are believed to have been formed during the Late Pleistocene and feature river terraces. These were later identified as old and young floodplains of the Ravi River on the Kamalia and Chenab Plains. The old floodplains consist of Holocene deposits from the Ravi and Chenab rivers.

The soil consists of young, stratified silt loam or very fine sandy loam which makes the subsoil weak in structure with common kankers at only five feet. The course of the rivers within Faisalabad are winding and often subject to frequent alternations. In the rainy season, the currents are very strong. This leads to high floods in certain areas which do last for several days. The Rakh and Gogera canals have encouraged the water levels in the district however the belt on the Ravi River has remained narrow. The river bed does include the river channels which have shifted the sand bars and low sandy levees leading to river erosion.

[18] *http://en-in.topographic-map.com/places/Faisalabad-7981801/*

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 originates from the mountain ranges of the north and has been deposited by the present and ancestral streams. The deposition is predominantly fluvial sediments. (Reference: The 2004 Baseline Survey on Millennium Development Goals in AACs Chapter 6 Faisalabad, Pakistan).

4.2.4 Climate

Faisalabad is situated at a high elevation, which gives arid climate. Extremely hot summers give way to very cold winters, and there is very little rainfall throughout the year what rain there is tends to be concentrated in the months of July and August. The weather in the city is monitored by the Pakistan Meteorological Department. The Pakistan Meteorological Department regularly provides forecasts, public warnings and rainfall information to farmers with the assistance of the National Agromet Centre. Faisalabad has been classified as a hot desert climate (BWh) by the Köppen-Geiger climate classification system. Record-breaking rainfall of 264.2 millimetres (10.40 in) was recorded on 5 September 1961 by the Pakistan Meteorological Department. Observations from the Meteorological Observatory at the University of Agriculture indicate that overall rainfall levels in the city have increased by 90.4 millimetres (3.56 in) over the course of thirty years.

I. Temperature

The project area is semi-arid and characterized by large seasonal variations of temperature. The summer season lasts from April to September with an average temperature of 31.25°C (88.25°F). The extreme maximum and minimum temperature in Summer being 48.0°C (118.4°F) and 9.0°C (48.5°F) respectively. During the winter months, the daytime temperature generally ranges between 19.4°C (67.02°F) to 33.9°C (93.02°F) and night temperatures are generally in the range of 4.8°C (40.64°F) to 17.7°C (63.96°F). Extreme minimum temperature sometimes reaches to –2°C (28.4°F). It generally begins to be active from mid-December and has a tendency to concentrate over this region. In the fold of these disturbances sometimes well

marked cold fronts are formed. (Reference: The 2004 Baseline Survey on Millennium Development Goals in AACs Chapter 6 Faisalabad, Pakistan).

II. Rainfall

Rainfall also varies markedly and it's predictably is not certain from year to year. A wet year may be followed by a dry year. Rainfall in the regions mainly occurs in July and August when the monsoon depression travels westward. Precipitation has marked seasonal fluctuation. The average annual rainfall based on the 32 years observation is 384.683 mm (15.145 inches), almost all of which occurs in the two months of July and August (Reference: The 2004 Baseline Survey on Millennium Development Goals in AACs Chapter 6 Faisalabad, Pakistan).

III. Humidity

July, August and September are the most humid months in the area, whereas May and June are the least humid months. Average monthly relative humidity values at various locations in the project area are 55%.

4.2.5 Wind

The Fig. 4.2 for Faisalabad shows how many days within one month can be expected to reach certain wind speeds.

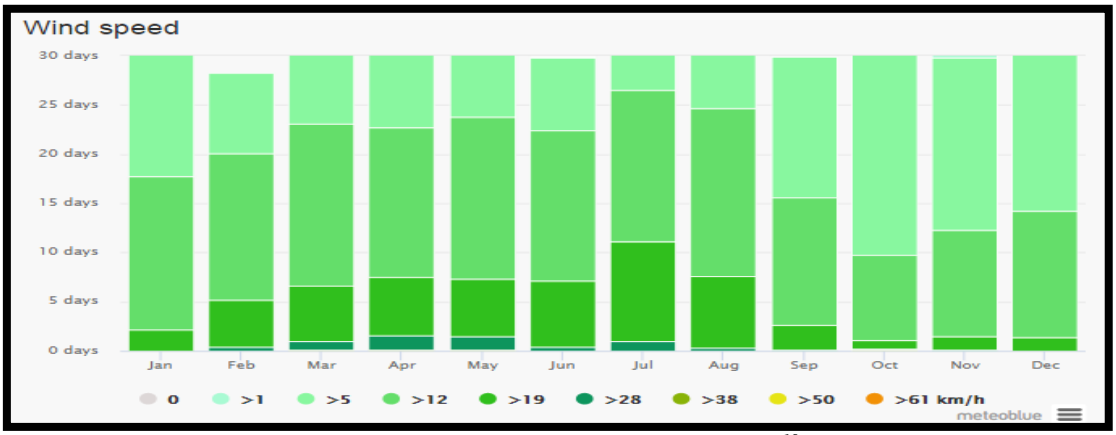


Figure 4-2: Wind Speed in Faisalabad[19]

[19] *https://www.meteoblue.com/en/weather/forecast/modelclimate/faisalabad_pakistan_1179400*

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

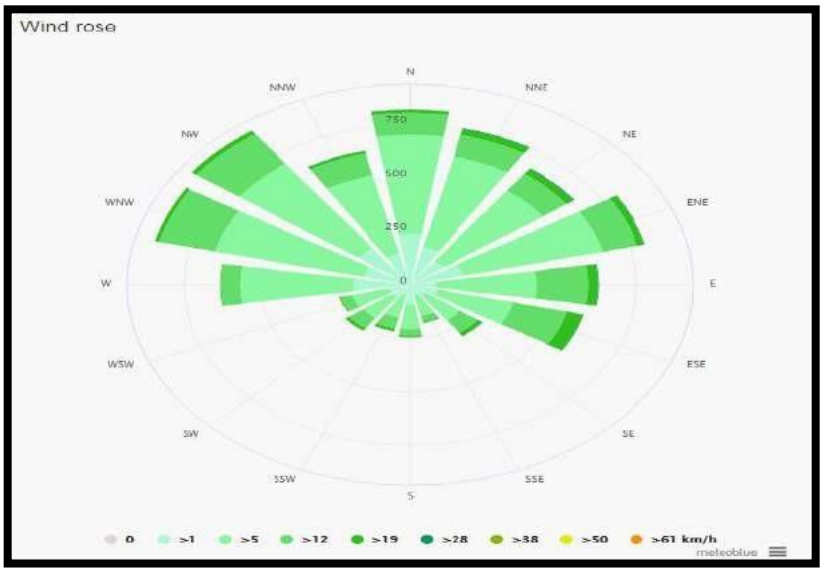


Figure 4-3: Wind Rose for Faisalabad[20]

4.2.6 *Sunshine Hours*

The graph shows the monthly number of sunny, partly cloudy, overcast and precipitation days. Days with less than 20% cloud cover are considered as sunny, with 20-80% cloud cover as partly cloudy and with more than 80% as overcast.

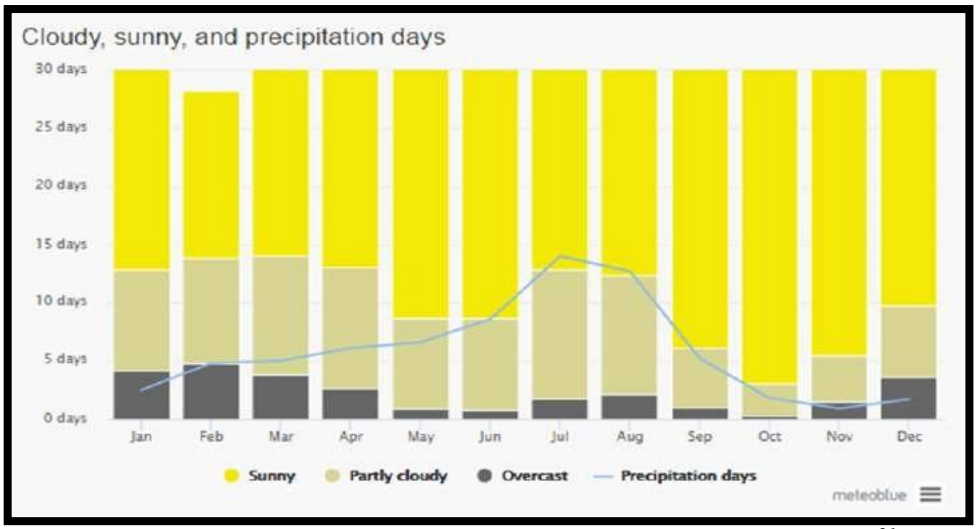


Figure 4-4: Cloudy, Sunny and Precipitation Days for Faisalabad[21]

[20] *https://www.meteoblue.com/en/weather/forecast/modelclimate/faisalabad_pakistan_1179400*
[21] *https://www.meteoblue.com/en/weather/forecast/modelclimate/faisalabad_pakistan_1179400*

4.2.7 *Seismology*

According to seismic zoning of Pakistan the project area lies in Zone-1 and represents minor damage. Earthquake with high intensity for a fundamental period of more than 1 second may cause damage to infrastructure. Seismic zoning map of Pakistan is given in Figure 4-5.

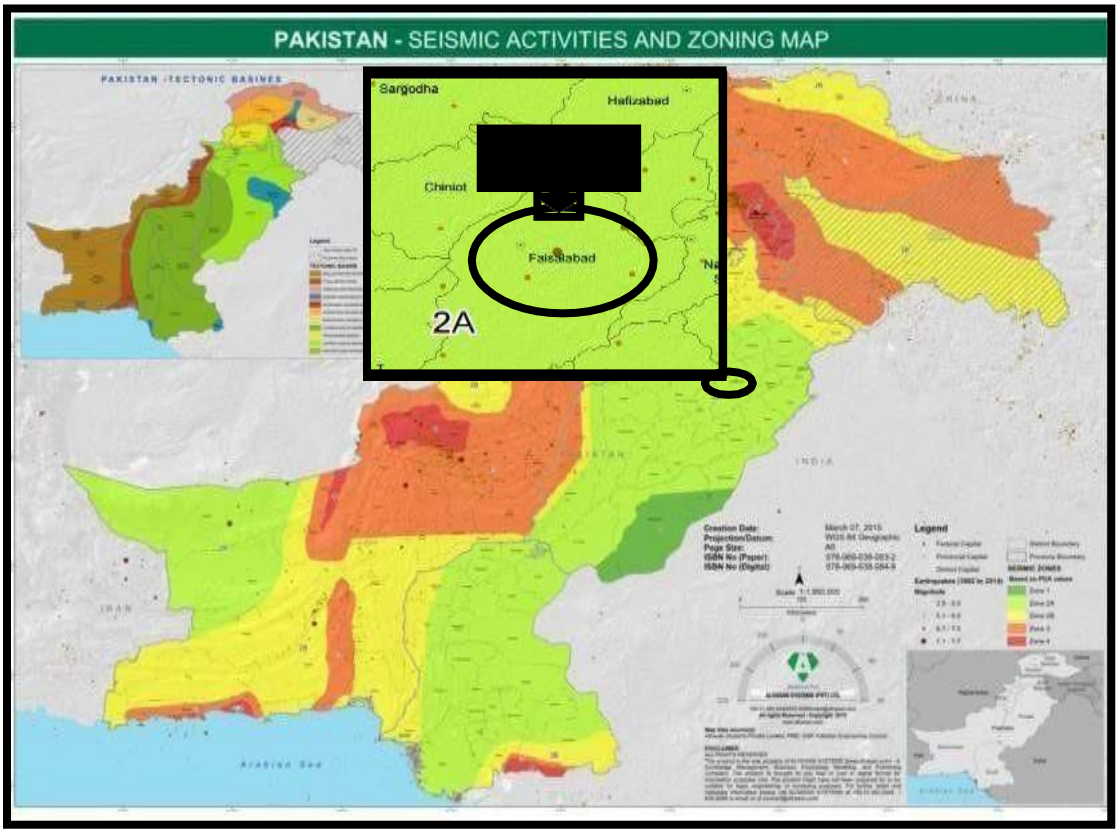


Figure 4-5: Seismic Zoning Map

4.2.8 *Noise Level*

Noise levels were monitored with the help of a potable digital sound meter. The hourly average data was provided by global environmental lab test results. The minimum and maximum noise levels observed at the given locations .Noise levels monitoring report is attached. It is evident from the noise monitoring data that noise levels are within limits.

4.2.9 *Ambient Air Quality*

The ambient air quality was monitored at different locations. The ambient air quality test report is attached.

4.2.10 *Surface Water or 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 the physical environment of an EIA Study to define its magnitude, quality and occurrence throughout the entire project corridor.

The project area lies in the district of Faisalabad; the groundwater table normally exists approximately 100ft below the ground level and contains high level of salinity. A limited quantity of potable water is accessible to the citizens from different scarce resources. In the absenteeism of proper sweet water sources, the WASA Faisalabad must pump and bring the sweet water from the city district (Chiniot) where ample quantity of drinking water is available (Source: WASA, Faisalabad). Chemical and Microbiological analysis results of surface and ground water are attached.

4.3 *BIOLOGICAL ENVIRONMENT*

Mainly a country's wilderness areas and scenic landscapes with their associated flora and fauna form natural capital of a country. Both collectively and within each level, the range or variety of the resources is referred to as the "biological diversity". The contribution of the "Natural capital" is recognized at three distinct levels including genera, species, and community -habitat and ecosystem. Pakistan comprises of a total of nine major ecological zones and the term has relevance for each of Pakistan's administrative units—district, province, and particularly country. The greater the number of genera, species and habitats and ecosystems present within these units, the greater is the biodiversity. It is in this background that the biodiversity of the area is discussed below:

Faisalabad is enriched with the presence of natural flora and fauna; although with the growing population and development activities, the presence of some has been somewhat affected. There are however no significant or well-shaped trees and shrubs

on the project site. There are some trees only along the main roads.

4.3.1 Flora

There are no natural forest trees, grassland or ecological important place. But the natural vegetation has been replaced by the agricultural crops. So, this sector consists generally of agricultural land irrigated by canals and tube wells. Some of the older stands of trees, especially fruit trees, still survive the onslaught of urbanization on this previously natural and agricultural area. There is wild growth of Mesquite bushes in the areas near the project area.

Floral species can be divided into following groups:

- Fruiting Plants
- Non-Fruiting Plants
- Crops

Floral Species of the project area with their scientific names are given in Table 4-1 to Table 4-3 below. Pictorial View of the floral species is given in Figure 4- 6.

Table 4-1: List of Common Fruiting Plants of the Project Area

Sr. No.	Plant Specie	Local Name
1.	Mangiferaindica	Mango
2.	Psidiumguajava	Guava
3.	Morus	Mulberry
4.	*Phoenix sylvestrisRoxb*	Khajoor
5.	Syzygiumcumini	Jambolan
6.	Ziziphusmauritiana	Beri

Table 4-2: List of Common Fruiting Plants of the Project Area

Sr. No.	Plant Specie	Local Name
1.	*Acacia nilotica*	Kikar
2.	*DalbergiasissooRoxb.*	Talhi
3.	*Albizzialebbek*	Sharin
4.	*Azadirachtaindica (L.) Adelb.*	Neem
5.	*Eucalyptus*	Sfaida
6.	*Meliaazedarach*	Bakain

Table 4-3: List of Common Fruiting Plants of the Project Area

Sr. No.	Plant Specie	Local Name
1.	*Sorghum bicolor*	Jawar
2.	*Triticumaestivum*	Gandum
3.	*Veazea nays*	Makae
4.	*Allium cepa*	Peyaz
5.	*Lycopersicomsesculeupum*	Tamator
6.	*Saccharumofficinarum*	Ganna
7.	*Oryza sativa*	Chawal
8.	*Zea mays*	Makai

Pictorial View of Flora:

Banana Tree

Date Tree

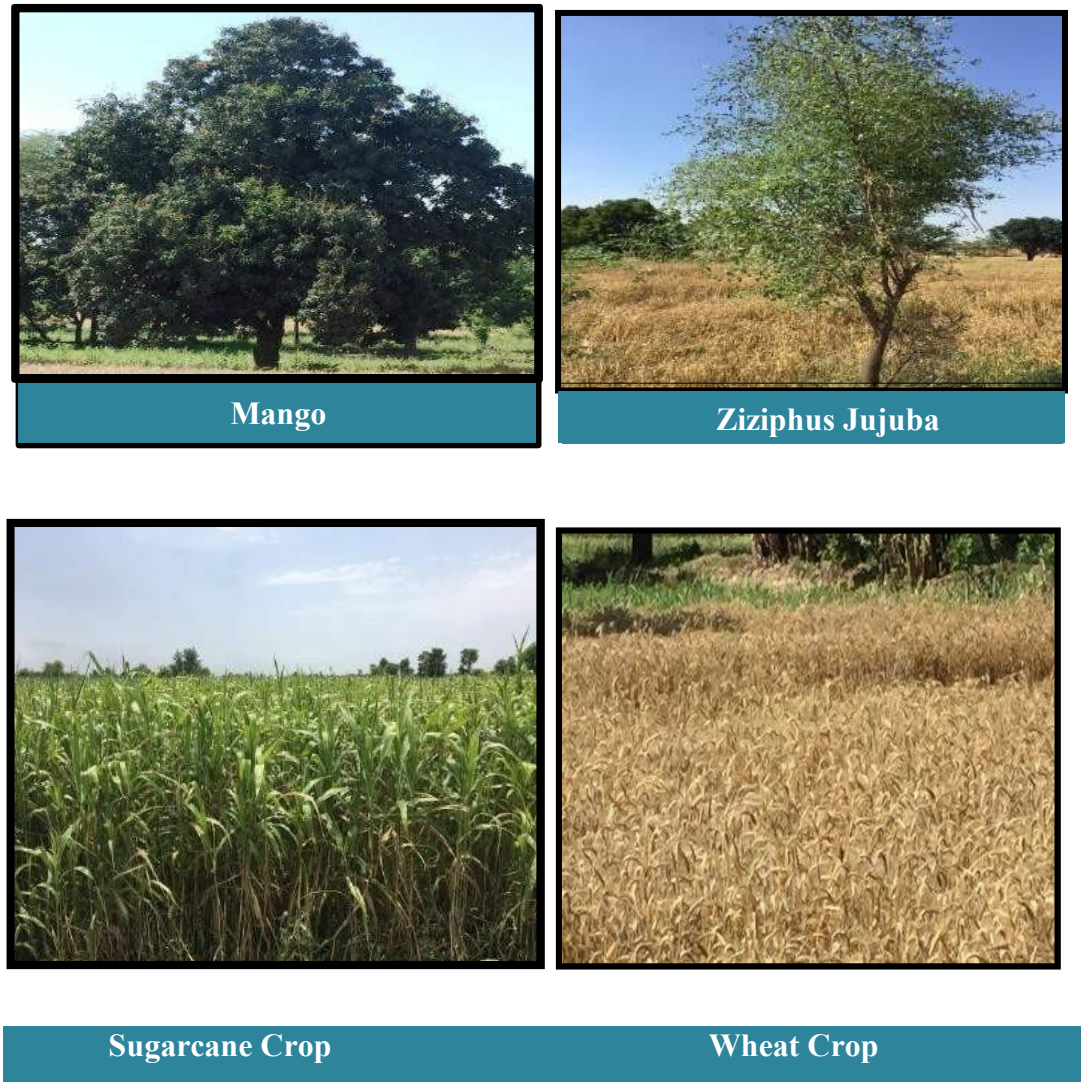


Figure 4-6: Pictorial View of Flora

4.3.2 Fauna

The project area, on account of nature of vegetation and topography, is rich in vegetation and wildlife. Fauna of the project area consists of:

- Mammals,
- Reptiles,
- Amphibians
- Birds

The details of fauna are given in following Tables 4-4 to Tables 4-6 and Figure 4-7.

Table 4-4: List of Mammals of the Project Area

Sr. No	Mammal Species	Local Name
1.	*Canisaurius*	Jackal
2.	*Lepuscapensis*	Cape Hare
3.	*Musmusculus*	House Mouse
4.	*Rattusrattus*	House Rat
5.	*Felissilvestris ornate*	Jungli Cat

Table 4-5: List of Amphibians of the Project Area

Sr. No	Amphibian Species	Local Name
1.	*Ranatigrina*	Frog
2.	*Bufobufo*	Common Toad

Table 4-6: List of Birds of the Project Area

Sr. No	Birds Species	Local Name
1.	*Acridotheresginginianus*	Bank Myna
2.	*Laniusvittatus*	Bay-backed Shrike
3.	*Phylloscopuscollybita*	Chiffchaff
4.	*Vanellusindicus*	Red Wattled Lapwing
5.	*Upupaepops*	Hoopoe
6.	*Corvussplendens*	House Crow
7.	*Passer domesticus*	House Sparrow
8.	*Coraciasbenghalensis*	Indian Roller
9.	*Egrettagarzetta*	Little Egret
10.	*Pycnonotuscafer*	Red-vented Bulbul

Pictorial View of Fauna:

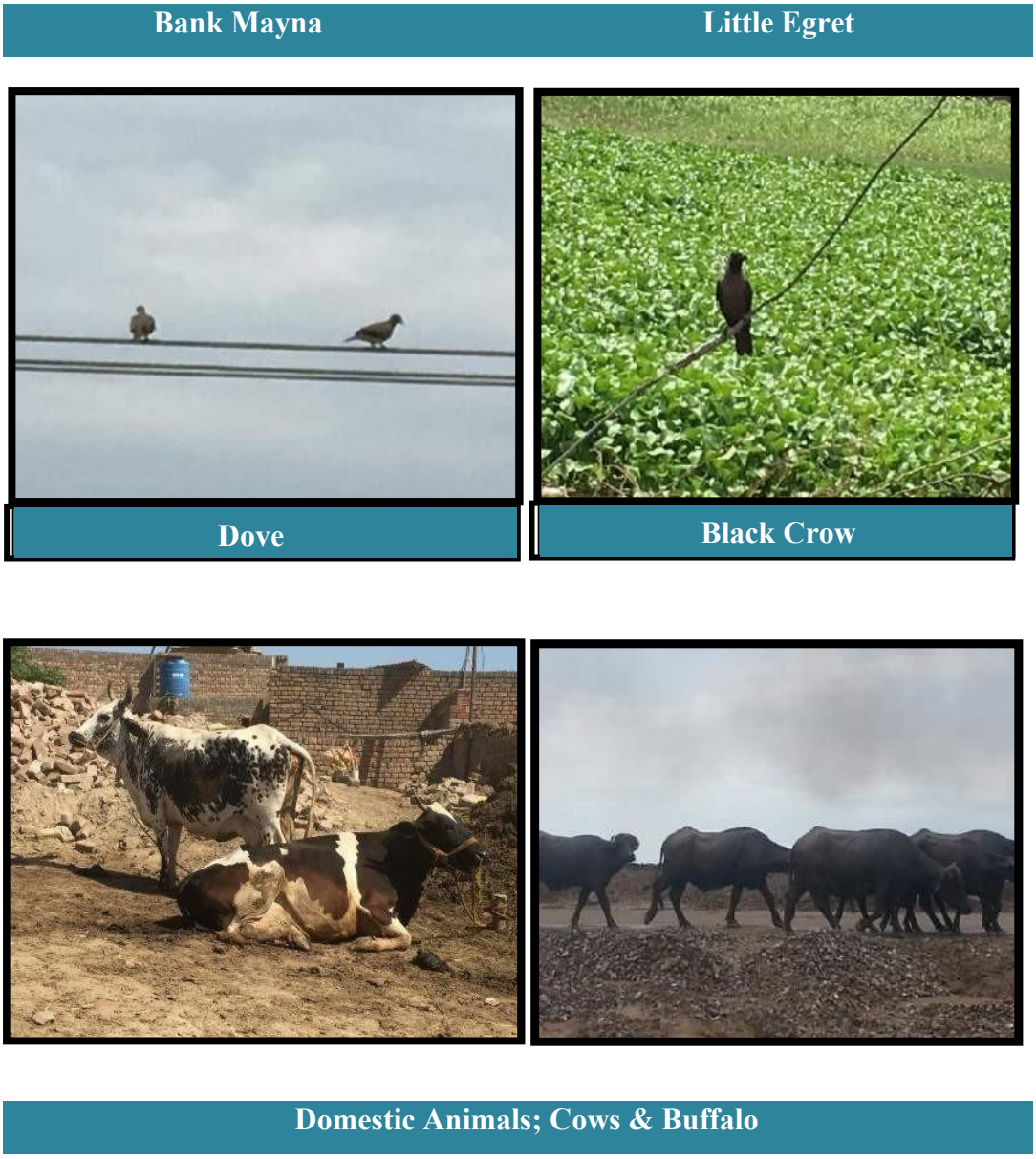


Figure 4-7: Pictorial View of Fauna

4.3.3 *Endangered Species*

There are no faunal or floral species included in the red data book of IUCN.

4.4 *SOCIO-ECONOMIC ENVIRONMENT*

The project site is located at open area; hence direct disturbance to communities will be minimum from the project activities. However, thephysical extent of the study area extends up to 5km surrounding the Industrial City (referred as project area) considering the physical, ecological and socioeconomic boundaries beyond which the project is not likely to significantly

influence local communities, and with a view of covering a substantial sample size for collection of reliable and authentic socio-economic data.

The objectives of the given study are outlined as follow:

- To carry out the assessment of social impact.
- Acquire socioeconomic data to evaluate and identify the project interventions.
- Assess needs of community related environmental concerns.
- To assess adverse and beneficial socioeconomic and health impacts of the activity.
- To suggest remedial measures and solutions to improve socio economic conditions.
- To analyze socio economic conditions of community, with special reference to environment and conservation of natural resources.

4.4.1 Baseline Information

a) Gender Ratio of Respondents

The respondents contacted were only males as it is hard to interact with females due to local traditions. List of respondents have been attached as **Annexure-IV**.

b) Age Group of Respondents

33% respondents were between the age group of 15-25, 29% were between age group of 26-35, 13% were between age group of 36-45 and 25% were above the age group of 45 respectively. These age groups of respondents indicate that the people contacted were mature enough to have better understandings of the proposed project. Figure 4-8 presents the percentages of respondent's age group.

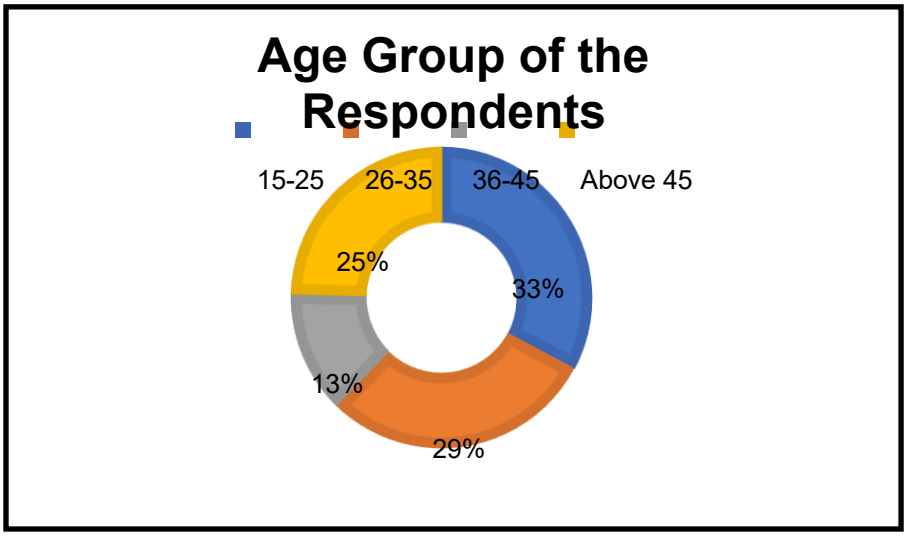


***Figure 4-8: Age distribution of neighboring community inhabitants of project* area.**

c) Caste

The cast of peoples live in Project Area Araien, Jutt, Rajpoot, Bhatti and Malik etc.

d) Language

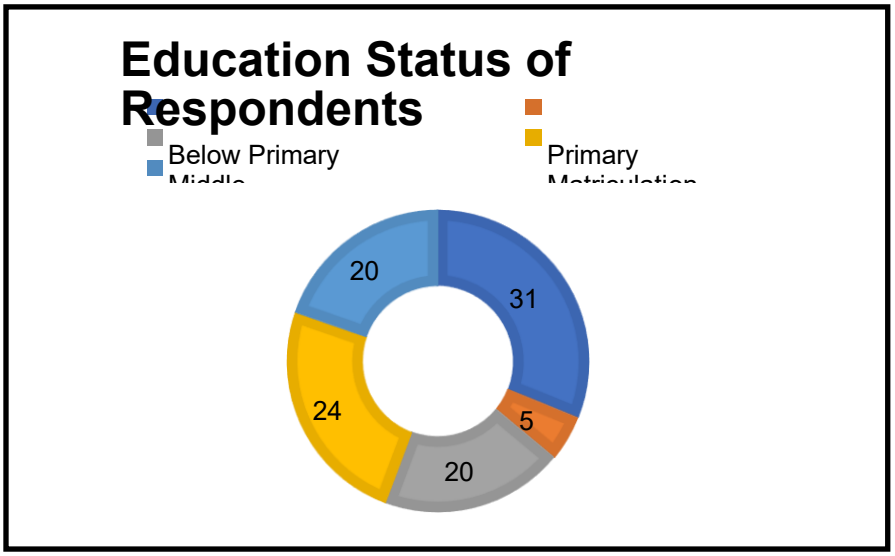
The principal mother tongue of the district is Punjabi. The variety of Punjabi spoken in the urban centers of the district is known as Lyallpuri and is very closely related to the varieties spoken in Jalandhar, Lahore, Sahiwal, and Gujranwala. Urdu is the first language of only 1.2%, but it has official status and is used in education and administration.

e) Religion

Almost whole population of the project area is Muslim. Cultural festivals are mostly linked with traditional religious events. Pilgrimages to shrines (or Ziarats) are common in project area.

f) Educational Status and Facilities

Basic level educational facilities both for males & females available in this area located near the proposed project. But these facilities are not sufficient to meet the educational requirements of the people of the project area. From survey results, it was



found that 24% of the respondents were educated up to matric. 20% were educated up to Intermediate and above. Large number of respondents i.e. 31% includes those respondents who were not educated even up to Primary Level. Figure 4-9 shows the literacy rates of the respondents.

Figure 4-9: Percentage of Literacy Level of the respondents

g) *Social Amenities*

The situation of facilities available at the house of the respondents is depicted in Table 4.7. It shows that hundred percent (100%) of the respondents had the facility of electricity available at their houses, Sui gas facility was also present in most of the houses whereas facility of sewerage, telephone and water supply was limited.

Table 4-7: Social Amenities

Sr. No.	Social Facility	Percentage (%)
1	Electricity	100
2	Sewerage	32.8
3	Telephone(Land Line)	4.90
4	Water Supply	26.2
5	Sui Gas	68.8

h) *Professional Status*

Majority of the respondents were self-employed i.e., 82% whereas a notable number of respondents i.e., 8% were private employee. Major professions in

associated areas are Shopkeepers/Businessman, goods sellers and Labor man. The detailed statistics regarding occupational status of the respondents are presented in **Figure 4-10**.

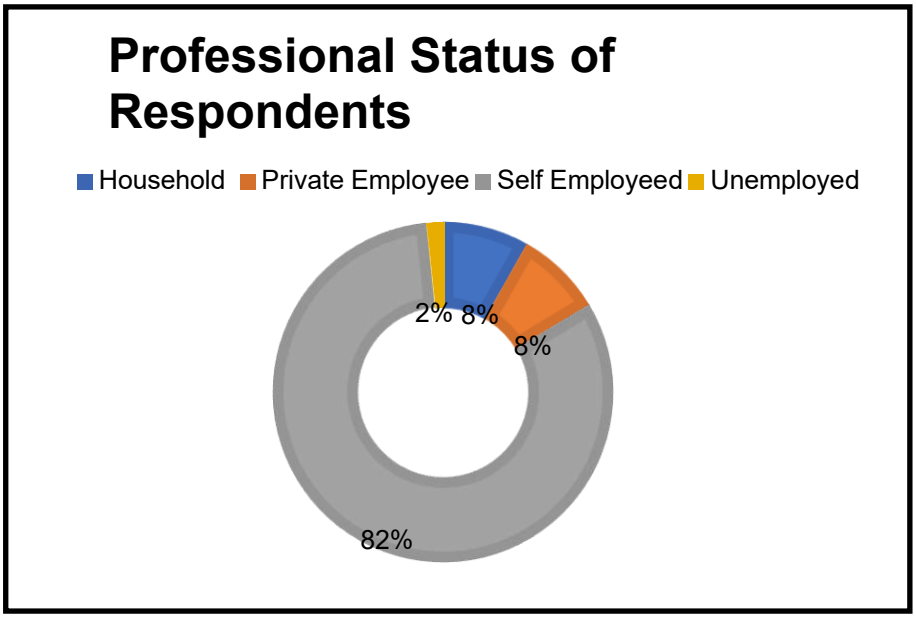


Figure 4-10: Percentages of Professional Status

i) Monthly Income

Out of all the respondents, most were earning between income ranges of 10,001-15,000 i.e., 31 %. Whereas 17% were earning below 5000 and 16% respondents were those whose income level was above 20,000. Figure 4-11 shows the income status of the respondents.

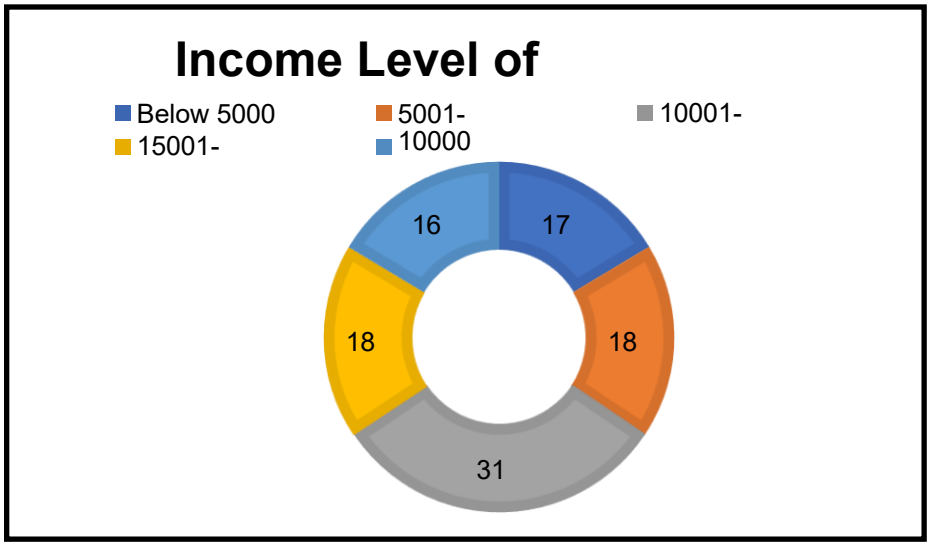


Figure 4-11: Percentages of Income Level

j) Monthly Expenses

Figure 4-12 indicate that about 23% of the respondents had their monthly expenses less than Rs. 5,000 whereas 28% respondents had monthly expenses ranging between Rs. 10,001 - 15,000. It is evident from the comparison that monthly expenses of most of the people are more or above than the income which indicates little or no savings at all.

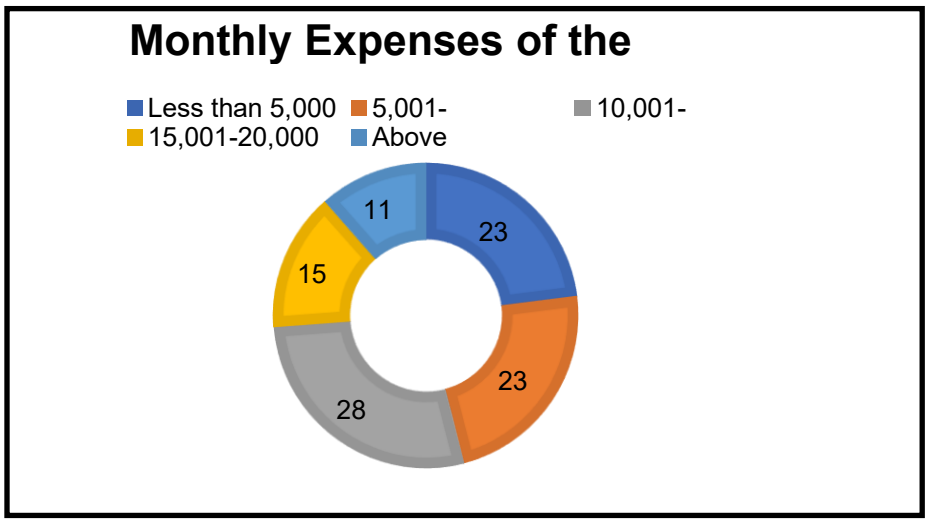


Figure 4-12: Percentages of Monthly Expenses

k) Type of Construction of the Houses

Figure 4-13 present the type of construction of houses of the respondents. It shows that majority of the houses of the respondents in that area are pacca i.e., 92% whereas only 3% houses were of semi-pacca type, and 5% houses were kacha. This also depicts the variation in the economic and cultural norms of the people living in the area.

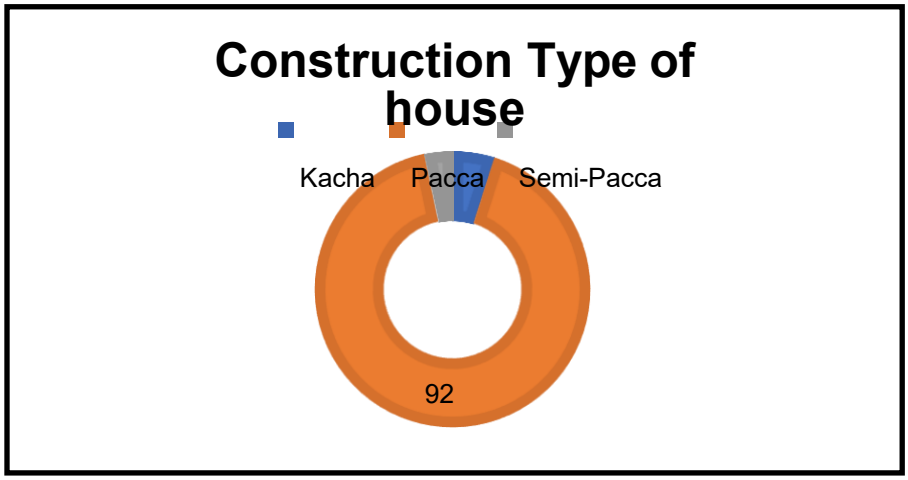


Figure 4-13: Percentages of Housing Condition

I) Acceptance/ Opposition for the project

Figure 4-14 reflect that majority of the respondents i.e., 93% were in project favor and 7% respondents were not in favor as they were asked about the project.

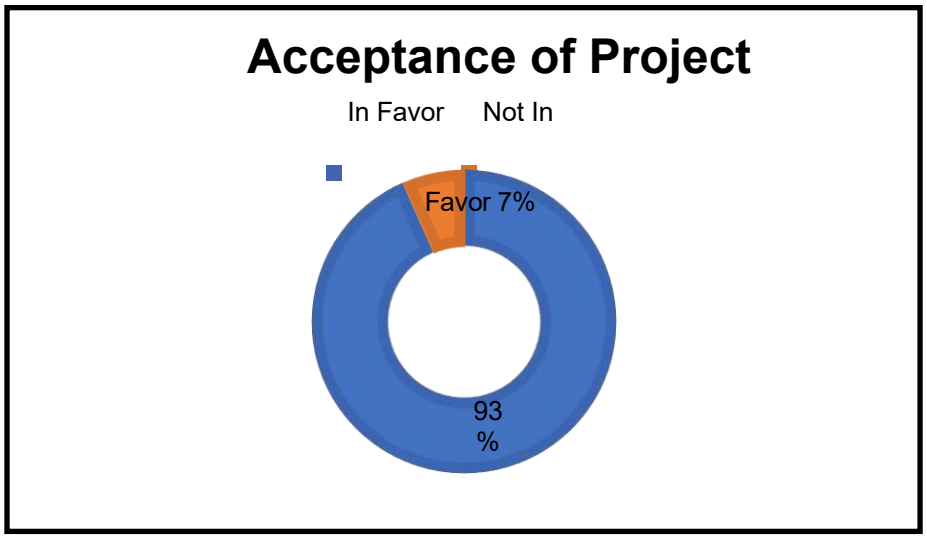


Figure 4-14: Percentages of Acceptance or Opposition

4.5 CULTURE AND TRADITION

The food of the inhabitants is of great variety. Maize, wheat and rice are eaten in the project area. The use of Desi ghee and lassi is very popular in the rural areas. Milk is also available abundantly. The people of the area are fond of meat, especially various forms of beef. The use of ornaments among the females is also common. The females decorate themselves with ear-rings and bangles.

4.6 PHYSICAL CULTURAL RESOURCES

During the field survey, it was confirmed that no physical or cultural resources like shrine, mosque or historical place are falling within the Right of Way (ROW). However, several mosques, shrine and graveyards are in nearby settlements which bear significant importance for the concerned localities. These cultural resources are discussed below:

- *Shrines*

The mausoleum of Baba Bahar Saien, Jeevan Wali Sarkar, Baba Mehmood ul Hassan Shah and Leeran Wali Sarkar are present at the distance of few Kilometers from the Industrial City. These shrines are visited by local people to pay homage to the saint.

- *Mosques*

Mosques are usually constructed with the mutual contributions of the concerned communities. People come in the mosques to offer prayers and these mosques hold great value to the community. Ali Mortaza Masjid, Gulzar e madina, Bilal Masjid, Jamia Masjid Noor and Bahar e Madina are present near the area.

➢ *Graveyards*

Graveyards are important cultural heritage of the area and are visited by the descendents of the departed people. Almost every locality has its own graveyard for example Banga Chak 160 and 159 Bilal Jumro Graveyard.

➢ *Archaeological Sites*

There are no archeological site present near the project area.

4.7 ADMINISTRATIVE JURISDICTION

The city of Faisalabad administered by the following administration:

- City district government,
- Six tehsils' administrations

4.8 IRRIGATION

Irrigation in the area is primarily sustained through canal and tube-well irrigation. The Jhang Branch, Rakh Branch and Gogera Canal are the major sources of water supply for irrigation in te area. Rice is prevalent in the tehsils of Chak-Jumra and Jaranwala while cotton is more commonly found in samundari.

4.9 AGRICULTURE

Agriculture is one of the most important economic activities in the project area. Major crops of the area are:

- In Rabi: Wheat, Fodder and some seasonal vegetables
- In Kharif: Rice, Sugarcane, Fodder and Seasonal Vegetables

4.10 ECONOMY

District Faisalabad is an industrial and commercial city having multi- occupations. The population of the area 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 many 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, livestock is a secondary source of income. It is safe to assume that livestock farming is practiced uniformly in both types of areas. Economy of the project area is dependent primarily on two occupations i.e., agriculture (maximum) and livestock (limited extent), while some locals are also involved in manual labor.

4.11 *QUALITY OF LIFE VALUES*

Guidelines prescribed by the federal government for preparation of environmental report stipulate that an environmental study must also address issues relating to socio-economic, cultural and aesthetic values of the community in the project area.

5 IMPACT ASSESSMENT METHODOLOGY

This section discusses the potential environmental impact for the establishment Solar, Lithium-ion battery & Electric Vehicles Unit by M/S Afrock Power (Private) Limited.. The impacts may include soil contamination, water resources depletion, biological resources disturbance and socio- economic impacts and, where applicable, identifies mitigation measures that will reduce significantly, if not eliminate, its adverse impact. The assessment carried out in this Section is based on potential impacts onoverall environmental receptors within the project area.

5.1 OBJECTIVES

The objective of screening is identification of the adverse as well as beneficial impacts and then mitigating the effect of adverse impacts up to acceptable limits or within PEQS. Following are the objectives of screening out all significant environmental and social impacts:

- To find different alternatives and ways of carrying out the project activities, this may cause adverse environmental and social impacts on the surroundings.
- To enhance the Environmental and Social benefits of project.
- To avoid, minimize and remediate adverse impacts.
- To ensure that residual adverse impacts are kept within acceptable limits.

In the sub-sections below the impacts assessment methodology for the operation of above stated project at Allama Iqbal Industrial City, SEZ, Sahianwala, Chak Jhumra, Faisalabad has been defined. It includes the magnitude, the extent of the impact and the nature of the anticipated impact that is likely to be occurred from the proposed project activity.

5.2 METHODOLOGY

This Section discusses the project's potential environmental impact of establishment of proposed unit. The adverse impact may occur on; the area's geomorphology, soil, water resources, air resource, biological resources and socio-economic condition and where applicable, identifies mitigation measures that will reduce significantly, if not eliminate, its adverse impact. The assessment carried out in the sub-sections below is

based on potential impacts on overall environmental receptors within the project area. Impacts are evaluated based on magnitude, immediacy and sustainability.

5.2.1 Evaluation of the Residual Impacts

Incorporation of suggested mitigation measures may reduce the magnitude of the environmental impacts of above stated project but sometimes, it may fail in bringing them within the acceptable limits. This step refers to the identification of the anticipated remaining impacts after mitigation measures have been applied.

It can be concluded in view of these reasons that the selected site is best suited for the project and the technology adopted to produce passenger Vehicless. The said project will not pose any adverse impact or threat on any component of the environment. The impact assessment criteria are given below along with their impacts:

Negligible/No Impact: The impact which has unapparent and negligible influence on natural and socio-economic environment.

Low Adverse Impact: The impact, which has a slight influence on the natural and socio-economic environment

Moderate Adverse Impact: The impact, which can be eliminated/ mitigated after applying the appropriate mitigation measures

Severe Adverse Impact: The impact, which can be partially/ but not fully mitigated by applying the mitigation measure.

Positive/Beneficial Impact: The impact, which improve/enhance the natural and socio-economic environment

The following scale has been used for evaluation of impacts:

LA = Low Adverse (low/short-term damage to the environment
MA = Moderate Adverse (moderate damage to the environment)
HA = High Adverse (severe damage to the environment)
LB = Low Beneficial (low beneficial to the environment)

MB = Moderate Beneficial (moderate beneficial to the environment)
HB = High Beneficial (more beneficial to the environment)
N/A = Not Applicable

O = Insignificant / No Impact

Environmental matrix for evaluation of anticipated environmental impacts is

given in tabular form in Table 5.1 and 5.2.

Table 5-1: Environmental Impacts Evaluation Matrix during the Construction Phase

Sr. #	Project Activities	Physical Environment									Biological Env.		Socioeconomic Environment						
		Topography	Drainage	Soil Quality	Landscape	Surface Water Quality	Groundwater Quality	Land use	Solid Waste	Air Quality	Noise & Vibration	Flora	Fauna	Worker Health & Safety	Disruption of Public Utilities	Employment	Relocation	Loss of Agricultural activities	Cultural/Religious Values	Breeding grounds for disease vector
1	Removal of Vegetation/tress/crops	LA	LA	LA	LA	O	O	LA	O	LA	LA	MA	LA	O	O	B	O	LA	O	O
2	Construction camps, workshops etc.	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	LA	O	B	O	LA	O	LA
3	Excavation operations	LA	LA	LA	LA	LA	O	MA	LA	LA	LA	LA	LA	LA	LA	B	O	LA	O	LA
4	Transportation of construction materials	O	O	O	O	O	O	O	LA	LA	LA	O	LA	LA	LA	B	O	O	O	O
5	Dumping of excavated material	LA	LA	LA	LA	LA	LA	LA	LA	LA	O	LA	LA	LA	O	B	O	LA	O	LA
6	Open storage of construction materials, fuel etc.	LA	LA	LA	LA	LA	LA	LA	LA	LA	O	LA	LA	LA	O	B	O	LA	O	LA
7	Earthwork operations	LA	LA	LA	LA	LA	LA	B	LA	LA	LA	LA	LA	LA	O	B	O	LA	O	LA
8	Construction of Required Utilities	LA	O	O	LA	O	O	B	LA	LA	LA	O	O	LA	O	B	O	O	O	O
9	Installation of power generators/Construction machinery/ equipment.	O	O	LA	LA	O	O	O	LA	LA	MA	LA	LA	LA	O	B	O	O	O	O

O - Insignificant / no impact **LA = Low Adverse** **MA = Medium Adverse** **HA = High Adverse**

NA - Not Applicable **B = Beneficial**

Table 5-2: Environmental Impacts Evaluation Matrix during the Operational Phase

Sr. No.	Environmental Aspects / Project Activities	Physical Environment										Biological Env.		Socioeconomic Environment	
		Topography	Soil Quality	Landscape	Surface Water	Groundwater	Land use	Solid Waste	Air Quality	Odor	Noise & Vibration	Flora	Fauna	Public Health & Safety	Employment
1	Ground water extraction	O	LA	O	O	LA	O	O	O	O	LA	LA	LA	LA	O
2	Water treatment	O	O	O	O	O	O	LA	O	O	LA	O	O	B	B
3	Production lines (washing , Filling)	O	O	O	O	LA	LA	LA	LA	LA	LA	O	O	O	B
4	Packing , palletizing, stretch wrapping	O	O	O	O	O	O	LA	O	O	LA	O	O	LA	B
5	Wastewater Treatment	B	B	B	B	B	B	LA	B	LA	O	B	B	O	B
6	Generator operations	O	LA	LA	O	LA	LA	LA	LA	LA	LA	O	LA	LA	B
7	Transportation/ Distribution	O	LA	LA	O	O	O	LA	LA	O	LA	O	LA	LA	B

Legend

O - Insignificant / no impact **LA = Low Adverse** **MA = Medium Adverse**
NA - Not Applicable **B = Beneficial**

6 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURESGENERAL

This chapter provides a review of the potential impacts that could occur because of the project activities. These impacts could be both positive and negative in nature and have been classified accordingly by a thorough review of the construction and operational phases of the project. This assessment numerates the magnitude of these impacts with the aid of environmental matrices and presents effective mitigation measures to counter their adverse nature.

6.1 PURPOSE OF ENVIRONMENTAL MITIGATION MEASURES

For the project to be running successfully and compliance with environmental regulations mitigation of impacts caused by the project is required. The purpose of the need of mitigation can be answered by various questions as follows:

1. What is the problem?

When the resources of the environment are being used ruthlessly, it results in degradation of the environment to the extent that the environment loses its resilience and the carrying capacity reduces the resources found and the recovery process is too slow or nearly no recovery is possible.

2. When will the problem occur and when should it be addressed?

The problems that would occur fall within the project premises, and near the boundaries of the project location. The impacts would range up to the distance where project related activities are performed or up-to the geographical zone where the effects spread. Impacts would show their presence soon after the project development starts.

3. Where the problem should be addressed?

The problems should be addressed where they originated. That is at the project location.

4. How should the problem be addressed?

Problems can be addressed by using environmentally friendly practices. Such practices can be followed by following mitigation plans.

6.2 ANTICIPATED ENVIRONMENTAL IMPACTS DURING PRE-CONSTRUCTION / DESIGN PHASE

The impacts have been identified using matrix method. Major impacts which have been considered while evaluating any environmental impacts caused due proposed project location and design are as under:

6.2.1 Impacts due to project location

The nearest residential community is located at safe distance from project site. There is no human settlement, heritage building, social structure, grassland or preserved area in the project vicinity that could be damaged, dislocated or dismantled due to the project activity in proposed area. Hence, the impact of location is in-significant as the project site is away from the surface water body residential area and no protected area.

Mitigation

The mitigation measures will include:

- The selected site located at adequate distance from the various sensitive receptors.
- The site is accessible through metaled road network
- The selected site is in industrial area and due to establishment of aforesaid project no change in the land use of area is being envisaged.
- The site is owned by the proponent and no dispute is associated.
- Air emissions generated from the said will be controlled by adopting pollution abatement technology such as wet scrubbers.
- The wastewater will be treated prior to its disposal in Industrial Estate sewerage system.
- The generated solid waste will be collected by EPA verified Contractor and it will be disposed of in compliance with PEQS.

It is envisaged that no mitigation measures will require as the said project had been constructed in industrial area and no adverse

Unit **impacts on its surroundings due to significant distances from all sensitive receptors.**

6.2.2 Impacts related to the project design:

During designing phase of aforesaid project optimized the use of best available technology to prevent or minimize potentially significant environmental impacts associated with the project as well as to ensure high level business and environmental performances were adopted. In pre-construction/design phase, a management system was provided at design level to control all anticipated impacts.

The aforesaid project will adhere to all standards, technical and legal requirements to avoid adverse impacts on the socio-environment and human health. Efficient infra-structure has been developed. Construction materials have been procured from approved dealer. process is employed because of the following reasons:

- Construction material has been procured from approved dealers.
- For the protection of workers PPEs (dust masks, gloves & shoes) has been provided during construction and it will be provided during operational phase too.
- The proposed emergency system is semi-automatic which is being control through computerized systems and it relates to smoke alarms.
- Through the selected system high quality of products will be produced to fulfil market needs.
- The generated wastewater will be treated through septic tank.
- The Proponent intends to reduce the environmental and social issues up to practically possible safe limit. The Client had adopted SOPs for Emergency Reponses Plan, Fire Fighting Plan and Disaster Management Plan.
- Planning principles and design considerations have been reviewed and incorporated into the site planning process to the extent possible. The concepts considered in the design of the proposed project are:
- No additional land acquisition will be required.
- Substantial reduction of environmental degradation in project area.

- Augmentation in adequacy of sanitation conditions at the user end enhancing the efficiency of existing infrastructure.

Mitigation

No additional mitigation measure will be required as state of art technology is being adopted for the Processing unit.

6.2.3 *Seismic Hazard*

Faisalabad is situated in Seismic Zone-2 A which corresponds to peak horizontal ground acceleration of 0.08 to 0.16g (where 'g' is the acceleration due to gravity). The impacts associated with this zone are low-moderate.

Mitigation

The proposed structure of the M/S Afrock Power (Private) Limited. Solar, Lithium-ion battery & Electric Vehicles Unit will be designed and constructed to withstand moderate to large earthquakes. For seismic hazard analysis, updated structural and seismic evaluations will be consulted.

6.2.4 *Safety of infrastructure:*

As we already mentioned the project area is an isolated area, consequently, the building structures have been designed in accordance with the requirement of seismic factor as well as after due consideration given to other structural design parameters.

Mitigation

No mitigation is required.

6.2.5 *Transportation:*

There is only one entrance and one exit point provided at the proposed site and the same shall be used in future. Hence, traffic patterns of the area will not be disturbed. Also, there is not much traffic in the vicinity. This project is in industrial area.

Mitigation

No mitigation is required.

6.2.6 *Groundwater Consumption*

The Manufacturing of Solar, Lithium-ion battery & Electric Vehicles Unit will put Lead on the groundwater. Water consumption (during different operations) may lower the underground water table in the long run. However, the ground water hydrology reveals that enough recharge is available in this area.

Mitigation

The Proponent will ensure effective project management, efficient use of resources and incorporation of design and infrastructure measures for water conservation and efficient use of existing wastewater treatment plant keeping in view the reuse of treated water.

Water will be handled with great care. Pipes and containers will be used for further usage of water. Water will be saved at maximum possibility during construction.

6.2.7 *Wastewater drainage:*

The development of infrastructure like road network, security wall or any other buffer zone, etc. shall not restrict the natural drainage ways and even alterations in drainage pattern of the project design and construction features shall be implemented after the approval from the EPA and TMA.

Mitigation

Municipal wastewater drainage will be properly handled. After primary treatment in the sedimentation tank, the wastewater will be disposed of in industrial Estate Waste Water Drain.

6.2.8 *Emergency Response*

Disasters such as earthquakes, flooding and other manmade disasters such as fires may occur, which must be considered for minimizing their impacts. This will be a moderate negative impact.

Mitigation

The Building Regulations of Faisalabad Development Authority (FDA) or any related authority will be strictly adhered to. Complete equipment control system,

fire escape stairs and secured access system supplemented with close circuit surveillance equipment/alarms will be included in the design of the plant. Adequate internal and external water distribution system will be designed, with standby system for sufficient water from tube well, which could also supply adequate quantity for firefighting during emergency. The structure stability certificate will be obtained.

6.2.9 *Fire Fighting System & Storage*

Inefficient firefighting system and insufficient storage of fire water may cause severe damage to the plant's building. This will be a moderate negative impact.

Mitigation

Storage for firefighting will be provided in water storage reservoir. The firefighting pump will maintain constant pressure in the system. Fire hose cabinets will also be provided at different locations inside the plant. A separate fire alarm system will also be installed in the shape of smoke detectors/ionization detectors at M/S Afrock Power (Private) Limited. Solar, Lithium-ion battery & Electric Vehicles Unit .

Special provisions for fire safety in the plant's building will also be considered during the design phase. These will be:

The number of emergencies exits from the Plant.

- Location of the fire exits.
- Signs required at exits.
- System required detecting fire.
- Alarms required warning people of fire.
- Fire Hydrant to extinguish fires.
- Materials to be used in the construction of the building to slow fire growth.
- Construction to limit fire spread from one area to another.

6.3 ANTICIPATED ENVIRONMENTAL IMPACTS DURING CONSTRUCTION PHASE

Project construction phase was of 01 year whose activities will surely show effects on land environment, water, air, noise level, soil quality, socio-economictrend of area, etc. These impacts had been controlled effectively by adopting best management practices.

By the implementation of said project, a positive impact on the socio-economic culture for the people has been observed. The chance for local employment, fabrication, brick

masonry, painting and machinery erection works had been increased.

The construction phase of aforesaid project will include activities associated with the site leveling, construction of civil structures, architectural works and building services. The construction phase would bring in immediate but short- term changes on various components of environment near the project site. This section explains how aforesaid project will affect different environmental aspects and its mitigation measures to manage the impact. The impacts during construction phase will be temporary and localized. Even though, the measures proposed to minimize such impacts.

6.3.1 Soil

Due to the construction activities, soil erosion and contamination may occur. Soil erosion may occur on plant site or at contractors' camps because of uncontrolled run-off from equipment washing yards, excavation of earth/cutting operations and clearing of vegetation at plant's site, whereas contamination of soil may be caused by oil and chemical spills at plant site, equipment washing yards. This impact is low, temporary, local, reversible and minor negative in nature.

Mitigation

Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for dumpsites, and covered.

6.3.2 Air Pollution

The construction activities produce fugitive and point emissions from different sources. In case of the proposed Project, the sources of air emissions would be excavation operation and exhausts of construction machinery & equipment and Vehicless carrying construction material. The air emissions may cause health impacts such as dryness and roughness of the throat; eye, nose, throat irritations and coughing etc. to the workers and staff of contractor. These emissions may also affect the bio-physical environment. These impacts would be temporary, local and minor negative in nature.

Mitigation

The impacts of air pollution shall be mitigated by water sprinkling, provision of dust masks to workers, and the use of well-maintained machinery and equipment. Also, the Vehicless carrying construction materials and the construction material storage areas

will be covered with tarpaulin.

6.3.2.1 *Dust Emission*

The construction contractor of the proposed Project will ensure regular spraying of water on all temporary service and access roads to minimize the dust generation. These measures will be implemented by the Contractor and Supervisory staff and will ensure that they are carried out as part of its contract supervision function.

6.3.3 *Noise Pollution*

The noise may be produced due to the operation of construction machinery and equipment. Exposure to continuous higher noise levels may induce the following health impacts on the workers such as increase in blood pressure, hypertension etc. However, the impacts of noise pollution would be temporary and minor negative in nature in case of the proposed Project.

Mitigation

The mitigation measures include providing ear plugs to workers and use of well-maintained machinery and equipment with reduced noise level ensured by suitable in-built muffling devices.

6.3.4 *Noise Modeling*

Construction equipment sound levels are the sound levels emitted by equipment under actual field operating conditions. Construction equipment's operate under two primary modes – mobile and stationary. Mobile equipment such as dozers, scrapers etc., operate in a cycle in which full power is followed by reduced power. Stationary equipment can be subdivided in two groups: one group such as compressor and generator which operate at constant power while the jack hammers, auger drill, falls in to impact machinery with instantaneous sound levels. Data for the equipment's was obtained by direct measurements and current technical publications. The following steps were taken to develop the noise model to predict the hourly equivalent noise levels at the site:

- Identification of main construction operation or phases.
- Equipment used to complete each construction phase.

- Determination of the peak noise levels and minimum noise level for a work cycle of equipment's.
- Determination of hourly equipment equivalent noise level at the receptor by
- considering the distance between the receptor and equipment and the usage factor.
- Determination of cumulative hourly equivalent noise level at the site from different construction operations.

Table 6-1: Noise level results of different equipment's/machinery

Sr. No.	Machinery Description	Noise Level dB (A)
1	Crane	85.6
2	Batching Plant	57.2
3	Generator	88.6
4	Electric Saw	89.2
5	Tractor	78.2
6	Roller machine	91.5
7	Leader	77.5
8	Grinder	100.2
9	Generator = Motor	81.4
10	Hammer	91.3
11	Workshop	79.5

6.3.5 *Solid Waste*

The solid waste may be generated due to different construction activities, and it will mainly include surplus excavated and construction material. The indiscriminate disposal of solid waste may cause dust emissions due to wind blowing thereby affecting the health of the workers working or passing in the immediate vicinity of solid waste heaps. The impacts of solid waste would be temporary and minor negative in nature.

Mitigation

The solid waste shall be reused in construction work where possible and/ or disposed of to officially designated dumping site outside the plant area.

6.3.6 *Health and Safety of Workers*

The health and safety issues are associated with the operation of construction machinery and equipment, which may cause minor and severe injuries to workers.

Mitigation

SHE should be followed strictly during the construction by the workforce and some general measures such as use of well-maintained machinery and equipment and training of the workers in the construction safety shall be taken. Provision of protective for laborers handling hazardous materials, e.g., safety helmet, adequate footwear, protective goggles, gloves etc. A contingency plan in case of major accidents may also be elaborated.

6.3.7 Ground Water

Construction waste, if left unattended will result in forming leachate that will percolate through the soil strata and will reach underground water table and hence, will end up contaminating it. Also, the water for construction and consumption may come in conflict with local water demand. There is a probability that various materials like fuel, lubricant oil and other oily products, which are used during the construction phase may contaminate groundwater, if they are not handled properly.

Mitigation

Mitigation measures will include protection of groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality; the solid waste will be disposed of in designated landfill sites to sustain the water quality for domestic requirements and water required for construction may be obtained in such a way that the water availability and supply to nearby communities remain unaffected.

6.3.8 Traffic Management

Due to the proposed construction activities, traffic management may pose some disturbance in the project area of influence. This may result in traffic jams and cause inconvenience to the people travelling on the road near the Project Area due to movement of Vehicless carrying construction materials. This impact is temporary, local, reversible and minor negative in nature.

Mitigation

Mitigation measures will include proper traffic management plan will be needed to avoid traffic jams/public inconvenience; movement of Vehicless carrying construction materials will be restricted during the daytime to reduce traffic Lead and inconvenience to the residents; the executing agency is required to maintain liaison between the traffic police, residents/ travelers and the contractor to facilitate traffic

movement during construction stage.

6.3.9 *Wastewater*

During the construction stage, the sanitary wastewater will be generated at the workers' camp(s). If this wastewater is allowed to stagnate in water ponds on the site, it can create unhygienic conditions and some of the wastewater may also percolate the soil, thereby, polluting the groundwater. This may pose a minor negative impact.

Mitigation

The contractor will provide pit latrines, septic tanks for labour camps to treat the sanitary wastewater before its discharge into industrial City wastewater drain/ sewer.

6.3.10 *Flora*

Construction of the proposed Project does not involve cutting of trees and plants. This will be a minor negative impact.

Mitigation

After construction instead of introducing new ornamental plants, local tree and plants species will be planted for landscaping. In addition to providing a better view to the area, the proposed vegetation's will help minimize the excess noise, vehicular emissions, and dust pollution.

6.3.11 *Fauna*

Due to the construction activities of the proposed Project, the free movement of fauna would be disturbed. Also, due to the leakages/spills from the construction equipment/machinery the local ponds/water storages from where the animals/birds drink water may get contaminated. This impact is temporary and minor negative in nature.

Mitigation

- Proper landscaping of the plant
- New and good condition machinery with minimum noise will be used in construction.
- Contractor will ensure that the no hunting, trapping of animal will be carried out during construction.
- The camps will be properly fenced and gated to check the entry of wild animals

in search of eatable goods. Similarly waste of the camps will be properly disposed of to prevent the chances of eating by wild animals, which may prove hazardous to them.

- Special measures will be adopted to minimize impacts on wild birds such as avoiding noise generating activities during the critical period of breeding.

6.3.12 *Impacts of Heavy Vehicless on the Existing Road Network*

The plying of heavy Vehicless on the existing road network may result in air pollution (if unpaved roads), noise pollution due to tire-road friction especially near sensitive receptors (residential areas, school, mosque, health facility etc.), and damage to roads and traffic congestion. However, the impacts would be temporary and moderate negative in nature.

Mitigation

- Any Vehicles with an open Lead carrying area used for transport of potentially dust producing materials shall have properly fitted side and tailboards. Materials having potential to produce dust shall not be Leaded to a level higher than the side and tail boards and shall be covered with clean tarpaulin in good condition.
- The Contractor shall not use any Vehicless either on or off road with grossly excessive noise pollution. In case of built-up areas, noise mufflers shall be installed and maintained in good condition on all motorized equipment under the control of the Contractor.
- The traffic on the existing road shall be managed cooperation with the local traffic police department to avoid traffic accidents and congestions causing unnecessary delays.

6.3.13 *Social/Cultural Disturbances*

Problems for the residents of the area/nearby communities may occur due to increased construction/commercial activity. People might think that their family life and traditional rituals are at jeopardy.

Mitigation

Mitigation measures will include Adequate training of especially for the transitive workforce of the plant (involved both in the construction process and in the commissioning) to regard the rituals of the area so that the locals do not feel insecure and local people will be involved by employing them during the construction process.

6.3.14 Poverty Alleviation

Installation of the proposed unit will generate the employment opportunities for the population living in the surrounding areas. This will be a potential Positive impact about 50 to 80 people will be involved in

the construction of the plant and this will create the business opportunities for the locals and improve the livelihood of the community.

Mitigation

Impacts to employment and economics during construction are beneficial and hence no mitigation measures are discussed here.

6.3.15 *Disturbance to the Residents*

The construction activities and vehicular movement may cause public inconvenience and disturbance to the residents during the execution of the proposed project in performing their routine activities. The general mobility of the locals in and around the project area will be affected especially near the project active sites. This is a temporary and moderate adverse impact.

Mitigation

- During the construction phase, mobility of workers in the nearby areas should be strictly restricted by the contractor to avoid any inconvenience to the local communities.
- The contractor should select specific timings for construction work to cause least disturbance to the local population considering their peak movement hours.
- Contractor will take care of the concerns of the local community and the sensitivity towards the local customs.
- The contractor and traffic police will implement the approved traffic management plan; and
- Local vendors will be provided with regular business by purchase camp site goods and getting services from them.

6.3.16 *Construction Camps/Camp Sites*

Improper construction camp location and mismanagement of construction camp activities can lead to various social and environmental impacts which may include noise, health and safety, traffic problems, soil degradation, loss of vegetation and assets on the selected land, solid waste, and water pollution. Furthermore, cultural differences, behavior of construction workers, potential disregard for local cultural norms can lead to increased tension between local

communities and workers residing in the construction camps. Sufficient land is available for construction camps at the proposed site. This impact is temporary and minor negative in nature.

Mitigation

- Working hours of noisy activities will be limited to normal daytime working hours when near identified sensitive receptors.
- Waste Management Plan should be implemented to include procedures for the classification, storage and disposal of all construction wastes and the training of employees who handle hazardous materials; and
- Construction camps will be established away from populated areas.

6.4 ANTICIPATED ENVIRONMENTAL IMPACTS DURING OPERATIONAL PHASE

This section delineates the potential impacts during operation phase of the project and the mitigation measures to counteract these impacts. The summary of the impacts and possible mitigation measures are as follows:

6.4.1 Ecology

Currently, the site is open plot and located in approved and designated industrial area i.e. FIEDMC. After the completion of said project different native and ornamental plants species has been planted in designated green spaces and along boundary of project site. The overall aesthetic beauty of the area has been enhanced and it will have a significant impact on the overall ecology, aesthetic and landscape of the area.

Mitigation

This impact is positive, long-term and significant. Hence, it doesn't require any mitigation measure.

6.4.2 Water Environment

Wastewater will be generated at almost from and domestic use in a facility. During Operation wastewater will be generated as well Which will be treated in Effluent treatment Plant, and then released in the FIEDMC sewerage system . Domestic wastewater will be treated as well before final disposal.

Mitigation

Following mitigations should be adopted to manage generated wastewater:

- The wastewater will be treated through ETP Plant prior to disposing off in sewerage system of designated and approved Industrial estate. i.e., FIEDMC
- Water conservation activities will be adopted for the preservation of water.
- All faults will be monitored and fixed.
- Freshwater conservation techniques should be adopted to ensure sustainable development such as wastewater recycling plant.
- Monitoring of effluents shall be carried out as per requirement of Self-Monitoring and Reporting Tools (SMART) to ensure compliance with the PEQS.
- It will be ensured that no solid waste will be entered in the wastewater.

6.4.3 Noise Pollution

Noise is considered as an interference to and imposition upon comfort, health and the quality of life. Given the conditions like exposure limit and time, noise may have both physiological as well as psychological effects on human health. Physiological effects include dizziness, nausea, unusual blood pressure variation, physical fatigue, loss of hearing, etc. While reduced mental capability and irritations may attribute to psychological effects.

The operations inside plant require attention of the workers all the time; therefore, each worker is expected to be exposed to high noise for at least 8 hours during every 24 hours. This condition may lead to physical and mental fatigue, which consequently may lower their manual and mental dexterity.

Mitigation

The following are two ways to mitigate or to attenuate the effect of noise caused by different machines/ sections. Either of the following techniques suited to the location or machines can be adopted:

- Apply conventional methods of noise control such as enclosures, noise absorption materials and silencers; and

- Providing personal protection equipment to the workforce.

Noise will be controlled by providing enclosures around high noise level machines and by providing ear plugs/earmuffs to the workers. Enclosures usually give an attenuation of 10 – 30 dBA and are the most satisfactory solution.

6.4.4 Air Quality

Air emissions will be generated from production of steam from coal-based boiler will be used. This would be the source of air emissions that would deteriorate the project area air quality. Moreover, dust will be generated due to the frequent movement of Vehicless carrying the raw-material and finished goods. During operational phase, suspended particulate matter and gaseous emissions will be the main pollutant. Gaseous emissions from generators will be controlled as waste heat recovery boiler will be installed to capture waste heat generated from the generators.

Due to increased vehicular movement increase in NOx, SOX, VOC and CO concentrations will be observed at the project site. As most of the construction equipment will be mobile, the emissions are likely to be fugitive and not concentrated on a single source or place. As the impacts will be localized in nature, the areas outside the said project boundary are not likely to face any significant adverse impacts with respect to ambient air quality.

Mitigation

Following mitigation measures will be adopted:

- For dust suppression regular sprinkling of water will be carried out.
- Vehicless used for transportation of raw material as well as finished product and the utility Vehicless will be regularly serviced and maintained to keep the environmental impact on account of their exhaust emissions to its minimum level.
- Native tree would be planted along the boundary of project area to keep environment healthy. For removal one tree, 3-5 trees will be planted.
- Setting up of a system to monitor air quality of the plant in accordance with the NEQS and Self Marketing & Reporting (SMART) Program.

- An air quality monitoring and improvement plan will be developed to keep the air pollution levels too minimum.
- Indoor air quality will be monitored on regular basis for parameters like CO, CO2, NO2, VOC's, etc. and appropriate mitigation measures will be implemented.
- Fresh air will be regulated to maintain the acceptable indoor CO2 level in the space and achieve saving in energy on partial occupancy.
- Vehicless with excessive smoke emissions will not be allowed to enter the proposed plant.
- Plantation of trees inside and outside the boundary of the plant to minimize the effect of air pollution.
- Use of low sulphur fuel in the plant; and
- Use of scrubbers or other modern equipment's to minimize the emissions from the stacks.

6.4.5 *Solid Waste Management*

Approx 45.86 M Gallon / Year of solid waste will be generated from the process.. The same will be collected and stored at a designated site and disposed-off properly through a suitable contractor.

Mitigation

Following mitigations should be adopted to manage generated solid waste:

- A Proper Site will be designated for the collection of Solid waste.
- Residential area is located at safe distance from project site.
- A thick greenbelt will be developed all around the Site which will be acting as noise.
- The use of concrete and masonry walls & barriers keeping in view the benefits of stiffness weight & cavity construction & the need to provide well sealed sound attenuating doors & windows.
- The use of complete or partial enclosures, as and if required.
- The recyclable and reusable waste will be sold to the EPA certified contractor which will include paper, plastic, and non-ferrous material.
- Waste bins will be placed in the facility at the strategic position for the collection of solid waste.
- The installed bins will be covered to reduce the chances of the disease vector

production.

- Record of generated waste during the project activity should be maintained on the regular basis. Quantity of the waste disposed, recycled or reuse will be logged on a waste tracking register.
- Regular training will be given to the workers dealing with the waste management it will include identification, segregation, and management of waste.
- The ash generated from the boiler will be disposed of through EPA certified contractor on regular basis. It can be used for the filling of low- lying areas.

6.4.6 *Handling & Storage of Chemicals*

A site will be designated for the Storage of Chemicals , Following Chemicals will bes stored in the Project Site **Soda Ash, Flakes, Cortex-p, HCL.** .

Mitigation

- Control source of release if possible to do so safely. Contain spill, isolate hazard area, and deny entry to unauthorized personnel.
- Prevent from entering sewage or drainage systems and bodies of water. Dike area around spill and pump uncontaminated acid back to process if possible.
- Place spilled material in suitable (corrosion resistant) labeled containers for final disposal.
- Treat or dispose of waste spilled material and/or contaminated absorbent material in accordance with all local, regional and national regulations.
- Use of PPE
- Store in a dry, cool, well-ventilated area away from incompatible substances. Keep in tightly closed containers which are
- Appropriately labeled. Do not allow contact with water. Do not store near alkaline substances.

6.4.7 *Health & Safety of Workers*

Improper handling of raw-material may cause various health issues such as inhaling, injection, work place incident, physical hazards, chemical hazards, etc. It can cause allergy reaction and many other issues. To ensure the safety of workers these impacts need to be managed effectively.

Mitigation

- Regular inspection and maintenance of the plant will be carried out to eliminate the risk and associated hazards of any unfortunate incident.
- Workers will be trained on the regular basis regarding personal safety, disaster management physical and chemical hazards.
- Operators operating the plant should be fully trained and equipped.
- Training regarding HSE should be given on the regular basis.
- Workers will be given PPEs such as helmets, mask, earplugs/muffs, safety boots, etc.
- It should be strictly enforced to wear PPEs while working.
- Incidents should be reported directly to the concerned authority.
- The effective use of hearing-protection devices shall be ensured.

- Protective measures and emergency rescue procedures should be followed strictly.
- Only authorized persons shall be allowed in the processing area
- UnLeading of the raw-material and Leads of the final products should be controlled, supervised, slow and smooth.

6.4.8 Flora

No negative impacts are envisaged on the flora of the area during the operational phase. However, due to landscaping and plantation, the impact on flora would be positive at operational phase of the Project.

6.4.9 Drinking Water Contamination

Water pollution can originate at the internal water network. If the pipes and the overhead water storage tanks are not cleaned properly, they may lead to bacteriological contamination of the potable/drinking water and thus will lead to infectious diseases/health problems to the employees of the plant. This is a moderate negative impact.

Mitigation

- The Management of M/S Afrock Power (Private) Limited. will provide the safe drinking water meeting the requirement of NEQS and WHO to the employees.
- Water Quality Monitoring will also be conducted on quarterly basis and the quality will be maintained according to WHO Guidelines for drinking water.

6.4.10 Security Risks

Many workers will be hired including skilled and un-skilled laborers. The increase in the number of the individuals residing in the area, may lead to an increase in crime and violence in surrounding areas. The nature of the impact is low as the locals will be preferred for hiring.

Mitigation

- Proper security will be provided to the workers working in the premises of proposed project.
- Before hiring any worker and his criminal record may be checked.
- CNIC of all the workers will be kept by the proponent.

- Strict law will be enforced to control the crime at site.
- Security to the workers should be provided**.**

6.4.11 Emergency Response

Emergency response preparedness committee will be formulated consisted of heads of all the departments. Emergency Response Leader will be the head of the team assisted by safety team and safety supervisors. Emergency Response Leader along with his team will ensure that in the case of emergency, team is prepared for fire-fighting and the first aid kits will be provided which may include blankets, hot water bottles, stretchers, benches, sterilized dressing, snake bite kit, cotton and iodine (2% alcohol).

Incidents and accidents may take place unexpectedly during project operations no matter how effective, strong and efficient the mitigation measures for all adverse impacts; especially the safety issues may be adopted. These may include accident and natural disasters.

Mitigation

- Site in-charge should be responsible to ensure that fire-fighting plan has been implemented with true spirit.
- Safety team will be responsible to monitor the activities and to act on the approved firefighting plan in the case of fire.
- Designated area fire marshals will be responsible to monitor their respective areas and act on firefighting plan in case of fire.
- Workers should be given adequate training of handling machinery.

- Emergency call service must be made available.
- The drills to check the response of the workers against any emergency will be carried out on the regular basis.
- Safety and hazards signs will be displayed with the facility to avoid any unfortunate incident.

6.4.12 Socioeconomic Impact

It is envisaged that the adverse impacts associated with the operation of said project includes local community will be disturbed due to increase in the traffic Lead (i.e., Vehicless carrying raw material and final products), wastewater management, solid waste management & disposal, soil pollution, etc. The intensity of the aforesaid project will be quite low. The commencement of the aforesaid project will have a beneficial impact on the surrounding community such as increase in employment opportunity, increase in the wages of the local area employees, increase in revenue generation, provision of social welfare funds of the employees and appreciation of land value.

Mitigation

No mitigation measures will be required.

6.4.13 Employment Opportunity

Employment opportunities generated by the project include construction labor at the site in the initial stages of setting up of the proposed facility, skilled and unskilled labor a staff during the Production phase. Additional employment opportunities are envisaged, such as provision of daily raw materials. Reliance on local markets for provision of construction materials and other supplies will be a significant effect.

6.4.14 Environmental Enhancement Measures

The said project will be result in following benefits:

- Direct and indirect employment opportunities,
- Gains in the local and national economy,
- Industrial development in region
- Business spin-offs in the factory area,

Tree plantation along boundary of project will act as environmental enhancement measure. Trees including Shatoot, Jaman, Moor Pankh, Fish

Paam, Trysenia, etc. will be grown on all open spaces and along boundary of project.

The environmental budget allocated for tree plantation, installation of wastewater treatment plant and management and disposal of solid waste is approximately PKR 20.5 million approx.

- **Potential Environmental Enhancement Measures**

The proposed project has several positive impacts, which include:

- No residential and commercial structures will be affected.
- The project will help in economy growth of Pakistan.
- The land use will be done in an away that it will not create any threat to the privacy of adjoining buildings.

7 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

7.1 GENERAL

The objective of the Environmental Management and Monitoring Plan (EMMP) is to address all the major environmental issues and provide a framework for the implementation of the proposed mitigation measures during the construction and operational phases of the project. The proper implementation of the EMP will ensure that all the adverse environmental impacts identified in the EIA (Environmental Impact Assessment) report are adequately mitigated, either totally prevented or minimized to an acceptable level and required actions to achieve those objectives are successfully adopted by the concerned institutions or regulatory agencies.

The implementation of EMP should be carefully coordinated with the design and construction program of the project to ensure that relevant mitigation measures are implemented at the appropriate stage and that adequate resources are properly allocated to achieve the desired results. This EMMP has been prepared to satisfy the requirements of the Punjab Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Review Procedures, 2000.

For effective environmental management, the management of the project should assign the necessary responsibilities to its Health, Safety and Environment team, which should be responsible for environmental monitoring of the project.

7.2 OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides a delivery mechanism to address potential impacts of the project activities, to enhance project benefits and to introduce standards of good practice to be adopted for all project works.

The EMP has been prepared with the objectives of:

- Defining roles and responsibilities of the project proponent for the implementation of EMMP and identifying areas where these roles and responsibilities can be shared with other parties involved in the execution and monitoring of the project.
- Outlining mitigation measures required for avoiding or minimizing potential impacts assessed in the Initial Environmental Examination (IEE) report.
- Developing a monitoring mechanism and identifying requisite monitoring

parameters to confirm effectiveness of the mitigation measures recommended in the Initial Environmental Examination (IEE) report.

- Defining the requirements for communication, documentation, training and monitoring, management, and implementation of the mitigation measures.

Role of Contractor in EMP

The Contractor will be responsible for the implementation of the proposed Project under the supervision of the M/S Afrock Power (Private) Limited.. The Contractor will be bound to follow the provisions of the contract documents especially about environmental protection and apply good construction techniques and methodology without damaging the environment. Obligation of the contractor, to safeguard, mitigate adverse impacts and rehabilitate the environment should be addressed through environmental provisions in the contract document and through adequate implementation at site.

7.3 SPECIFIC IMPLEMENTATION RESPONSIBILITIES

This section describes the implementation and supervision responsibilities for the different phases of the Project.

7.3.1 Design Phase/ Pre-Construction Phase

Project Manager and his staff are responsible for ensuring that the proposed Project design and specifications adequately reflect the EMP. The responsibilities of Project Manager and his support staff would be as follows:

- To get EIA approved by EPA Punjab.
- Setting up systems for environmental management; and
- Incorporating environmental mitigation measures in the design/ tender document.

7.3.2 Construction Phase

The Contractor(s) will be responsible for compliance of environmental mitigation measures for the proposed Project, while SEO will monitor the compliance.

7.3.3 Operation Phase

Factory Manager, in coordination with SEO and respective departmental heads, will be responsible for the following:

- Coordinating with the operations staff working to monitor environmental compliance during the Plant's operation.
- Reporting on the progress of environmental compliance to EPA Punjab.
- Assessing the long-term environmental impacts of the Plant's operation; and
- Report to Managing Director about the progress of work.

7.4 STAFF AND TRAINING

7.4.1 Environmental Committee and its Responsibilities

M/S Afrock Power (Private) Limited. will form up an Environmental Committee (EC), which will be responsible for the environmental management and supervisory affairs during the construction phase of the proposed Project.

The responsibilities are as follows:

- To ensure implementation of all the proposed mitigation measures during and after the proposed Project.
- To organize routine monitoring of construction Vehicles emissions, air quality, noise, and vibration, etc. during construction phase. In case, the noise and emission levels exceed the acceptable levels; a ban must be enforced.
- To develop operational guidelines and implementation schedule.
- Receiving complaints from residents and institutions and assisting the local environmental authority including liaison with EPA.
- To ensure that the proposed Project is implemented in an environmentally friendly manner, causing least harm to the existing environment including flora and fauna, sites of religious and cultural significance etc.

7.4.2 Technical Training Programs

To raise the level of professional and managerial staff, they need to upgrade their knowledge in the related areas. The Environmental Committee should play a key role in this respect and arrange the trainings.

Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the Contractor(s) workforce to implement effective environmental protection measures. A domestic

training program is proposed to train the Contractor(s) staff who will be involved in the construction phase and the professional staff from the M/S Afrock Power (Private) Limited. involved at the operational stage of the Treatment Plant.

7.5 KEY ENVIRONMENTAL ISSUES

Following are the key issues, which are envisaged for the proposed Project at the design, construction, and operational stages:

- Inadequate design of the proposed Project
- Air pollution
- Noise pollution
- Disposal of solid waste & Sludge
- Disposal of wastewater
- Health and safety of workers

7.6 SCHEDULE FOR IMPLEMENTATION OF ENVIRONMENTAL BUDGET

Schedule of implementation of environmental budget is shown in Table 7.1 below:

Table 7-1: Schedule for implementation of Environmental Budget

Environmental Component	Quantity	Amount Pak Rs.	Details/Basis
Landscaping/Plantation	500-1000	01 million	Cost includes plantation and maintenance up to three years
Waste Water Treatment Plant	L.S	02 million	Lump Sum
Solid waste management:	L.S	02 million	Lump Sum
Health & Safety Measures	L.S.	01 million	Lump sum
Miscellaneous Cost	L.S.	12,000	Lump sum
Air Quality Monitoring	2	30,000	2 samples @ 15000/sample
Water Quality Monitoring	2	20,000	2 samples @ 10000/sample
Noise Level Monitoring	2	10,000	2 samples @ 5000/sample
Soil Tests	2	10,000	2 samples @ 5000/sample
Training		10,000	Lump sum
External Monitoring		50,000	
Total Environmental and Social Management Cost		**6.5 million approximately**	

7.7 EMP TEAM ALONG WITH ROLES AND RESPONSIBILITIES

As the project is at proposed stage so currently hiring is not done at this stage names cannot be provided. After completion of construction relevant hirings will be done. Following functionaries will be involved in the implementation of EMP:

1. Mr. Idrees Ahmad as the project proponent and owner. He is mainly responsible for implementation of EMP.
2. Project contractor(s) as executors of the EMP during installation phase of the project.

3. Transportation& Maintenance; the health, safety, and environment team of the proposed project as an executor of the EMP during the transportation phase of the project.

Sr.#	Managers	Responsibilities
1.	**Contract Manager**	• Implementation of EMP • Environmental issues identification during pre-construction phase. • Communication EMP to all employees.
2.	**Contractor**	• Ensure that the control measures identified during environmental surveys are implemented as they are relevant to their work/visit. • Ensure that the project management team is notified of any non-conformance of control measures or environmental incident where the environment has been put at risk.
3.	**Site Manager**	• Ensure site material and safe handling of hazardous waste • Controlled access arrangement to avoid hazards • Emergency egress arrangements to avoid any unfortunate incident. • First aid facilities/services should be readily available on-site.
4.	**Site HSE Advisor**	• Ensure good standards of workmanship • Engaged health and safety to devise site waste management plan to be followed and implemented. • Daily checks & weekly checks. • Regular consultation with workers.
5.	**Site Environment Advisor**	• According to legislation and consent develop EMP. • Ensure application of EMP.

		• Carry out regular site inspection.
6.	**Public Contact Officer**	• First point of contact for members of the public. • Arrange and manage public forums. • Maintain relation with stakeholders. • Door to door surveys as appropriate. • Coordination with work.

7.8 RESPONSIBILITIES OF PROPONENT

Management of the M/S Afrock Power (Private) Limited. will be responsible for the environmental management and supervisory affairs during the installation and operational phase of the proposed project. Some environment personnel designated by the management of M/S Afrock Power (Private) Limited. will look after the environment related issues during the operational phase. The responsibilities of environmental personnel are as follows:

1. Monitoring progress of the project as per planned schedule of activities
2. Exercising oversight over the implementation of environmental mitigation measures by the contractor
3. Documenting the experience in the implementation of the environmental process
4. Preparing training materials and implementing programs
5. Maintaining interfaces with the other lined departments/ stakeholders
6. Reporting the status of EMP implementation to the management

7.9 ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) is developed to eliminate and/ or mitigate the impacts envisaged at the design, construction, rehabilitation, and the operational stages and provide specific guidelines for long-term monitoring by identifying the roles and responsibilities of the Proponent, Design Consultant, and Contractor(s). Tables 7.2, 7.3 and 7.4 present the environmental aspects, issues, mitigation measures, implementation responsibility and the costs incurred at all the stages.

Table 7-2: Environmental Management Plan (Design Phase)

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
1	Waste Water/Effluent Discharge	During the production process effluents will be produced from the proposed Plant.	• Sewage treatment plant should be designed considering the future population and waste generation rate. • All structural, layout and engineering designing should be in strict accordance with the applicable by-laws and engineering parameters. • Project design should be sound enough to sustain against peak flows and necessary additional arrangements should be included in design for the same purpose.	Design Consultant
2	Seismic Hazard	Damage to the plant building	• The proposed structure of the M/S Afrock Power (Private) Limited. Solar, Lithium-ion battery & Electric Vehicles Unit will be designed and constructed to withstand moderate to large earthquakes. • For seismic hazard analysis, updated structural and seismic evaluations will be consulted.	Design Consultant

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
3	Groundwater Consumption	Heavy Lead on the groundwater. Prolonged and high-water consumption (during different operations) may lower the underground water table in the long run.	• The Proponent will ensure effective project management, efficient use of resources and incorporation of design and infrastructure measures for water conservation and proper maintenance of existing wastewater treatment plant keeping in view the reuse of treated water.	Design Consultant
4	Emergency Response	Disasters such as earthquakes, flooding and other manmade disasters such as fires may occur	The Building Regulations of Faisalabad Development authority (FDA) and M3 Industrial State, Phase-II (if any) will be strictly adhered to. • Complete equipment control system, fire escape stairs and secured access system supplemented with close circuit surveillance equipment/alarms will be included in the design of the plant. • Adequate internal and external water distribution system will be designed, with standby system for sufficient water from tube well, which could also supply adequate quantity for firefighting during emergency.	Design Consultant

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
5	Fire Fighting System & Storage	Inefficient firefighting system and insufficient storage of fire water may cause severe damage to the plant's building.	• Storage for firefighting will be provided in water storage reservoir • The firefighting pump will maintain constant pressure in the system. • Fire hose cabinets will also be provided at different locations inside the plant; and • A separate fire alarm system will also be installed in the shape of smoke detectors/ionization detectors at M/S Afrock Power (Private) Limited. Solar, Lithium-ion battery & Electric Vehicles Unit .	Design Consultant
6	Flora	No tree will be uprooted. However, trees will be planted.	• Proper landscaping and plantation. This plantation will improve the aesthetic value and ecological habitat of the project area. • Disallow introduction of exotic species with known environmental setbacks (Eucalyptus, etc.). • A landscape will be properly designed with provision of new trees/ plantations around the plant boundary, roadside, office buildings and stretches of open land. The vegetation for the attenuation of air pollution would be most needed in the areas where ground level concentrations of the pollutants are expected to rise.	Design Consultant

Table 7-3: Environmental Management Plan (Construction Phase)

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
1	Air Quality	• Dust, SO2, NOx & CO emissions from trucks, cause health issues to workers. • Health impacts (dryness, roughness of throat, coughing etc.) on the workers associated with fugitive and point emissions because of different activities such as excavation operation,	• Spray by water trucks to minimize the dust. • Maintenance of construction machinery should be made mandatory to reduce emissions. • Haul-trucks carrying earth, sand, aggregate and other materials will be kept covered with tarpaulin to reduce dust pollution. • Provision of dust masks to workers. • Use of well-maintained machinery and equipment.	Proponent/contractor
2	Soil	Due to the construction activities, soil erosion and contamination may occur	• All spoils will be disposed of as desired, and the site will be restored back to its original conditions before handing over. • Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for dumpsites, and covered.	Proponent/contractor
3	Noise	Health impacts (increase in blood pressure, hypertension etc.) due to the operation of construction machinery and equipment	• Engines of Vehicless visiting project site should be properly tuned-up. • The green zone of plants will also help decrease sound levels.	Proponent/contractor

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
			• Machinery used during construction will produce noise • Use of PPE's must be ensured • Providing ear plugs/earmuffs to workers; and • Use of well-maintained machinery and equipment with reduced noise levels ensured by suitable in-built muffling devices. • No use of heavy noisy equipment during prayer timings	
4	Occupational, Health & Safety	There will always be the possibility regarding hazard to health and safety of workers to occur during construction stage.	• First aid facilities should be readily available for the workers at the site. • The contractor will ensure the availability of transport and driver to handle any misshape which may occur. • Relevant safety devices like belts, gloves and testers should be strictly used by the Labour force at the work site. • Implement training programs that support the achievement of the staff and personnel's competency in relation to HSE. • HSE Plan has been attached as **Annexure-V**.	Proponent/contractor

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
5	Disposal of Construction Debris	Each phase of the development shall produce solid waste, disposal of which, if not managed properly could have negative impacts on the site and surrounding area.	• A site waste management plan should be made the responsibility of the contractor. • The wastes should be properly segregated and separated to encourage recycling of some useful waste materials. • Train or educate the workers on the importance and means of waste management and handling. • Bins should be places at different location after few distance and educated workers to throw waste in them. • Construction waste can be reused in other construction activities so it must be reuse instead of wastage.	Proponent/contractor
6	Traffic Management	This may result in traffic jams and cause inconvenience to the people travelling, due to movement of Vehicless carrying construction materials.	• Movement of Vehicless carrying construction materials should be restricted during the daytime to reduce traffic Lead and inconvenience to the residents. • Liaison between the Traffic Police, Executing Agency and the Contractor to facilitate traffic movement during construction stage.	Proponent/contractor

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
7	Groundwater Quality	Groundwater may get contaminated due to the disposal of construction waste generated during the project activity. Also, the water for construction and consumption may come in conflict with local water demand.	• Avoid accidental spills through good work practice. • Avoid wastage of water and leakage of pipes. • Adopt water conservation measures • Wastewater will be treated to comply with NEQS before final disposal. • Training of work force in the storage and handling of materials and chemicals that can potentially cause soil contamination. • Solid waste generated during construction will be safely disposed of.	Proponent/contractor
8	Flora & Fauna	No negative impact on the ecological environment will take place on account of cutting of any trees in the project area and clearing of vegetation from the site.	• Trees and ornamental plants shall be planted along the project boundary which increase the aesthetic value of the site and will combat pollution. • Landscaping is deemed to be a powerful mitigation activity with a positive impact.	Proponent/contractor
9	Socioeconomic Environment	Several categories of employees will be required during the construction phase. This would have a positive impact on the local economy and on regional unemployment.	• Awareness and educational programs introduced by the project management or area can reduce the fear among the people regarding non-local people. • Locals must be preferred for job opportunities	Proponent/contractor

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
10	Impacts of Heavy Vehicless on the Existing Road Network	The plying of heavy Vehicless on the existing road network (Industrial City Road) may result in air pollution (if unpaved roads), noise pollution due to tire-road friction especially near sensitive receptors (residential areas, school, mosque, health facility etc.), and damage to roads and traffic congestion.	• Any Vehicles with an open Lead carrying area used for transport of potentially dust producing materials shall have properly fitted side and tailboards. Materials having potential to produce dust shall not be Leaded to a level higher than the side and tail boards and shall be covered with clean tarpaulin in good condition. • The Contractor shall not use any Vehicless either on or off road with grossly excessive noise pollution. In case of built- up areas, noise mufflers shall be installed and maintained in good condition on all motorized equipment under the control of the Contractor. • The traffic on the existing road shall be managed cooperation with the local traffic police department to avoid traffic accidents and congestions causing unnecessary delays;	Proponent/contractor

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
11	Social/Cultural Disturbances	Problems for the residents of the area due to increased construction activity. Also, social conflicts of the laborers with the locals.	• Adequate training of the work force of the plant (involved both in the construction process and in the commissioning) to regard the rituals of the area so that the locals do not feel insecure and local people will be involved by employing them during construction process. • Maintaining a complaint register for grievance and developing grievance redress mechanism (GRM)	Proponent/contractor

Table 7-4: Environmental Management Plan (Operational Phase)

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
1	Air Quality	• Air quality may deteriorate due to process. • The quantity of air pollutants may increase due to the operation of Generators.	• Setting up of a system to monitor air quality of the plant in accordance with the applicable standards/limits. • Indoor air quality will be monitored on regular basis for parameters like CO, CO2, NO2, VOC's, etc. and appropriate mitigation measures will be implemented. • Fresh air will be regulated to maintain the acceptable indoor CO2 level in the space and achieve saving in energy on partial occupancy. • Vehicless with excessive smoke emissions will not be allowed to enter the proposed Plant. • Maintenance of Vehicless will be done on regular basis to avoid excessive air pollution. • Plantation of trees inside and outside the boundary of the plant to minimize the effect of air pollution. • Use of low sulfur fuel in the generators; and • Use of scrubbers or other modern equipment's to minimize the emissions from the stacks.	Proponent

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
2	Noise Quality	Noise due to machinery	• Plantation along with roads will make buffer zone to avoid noise • Padding of machinery for noise reduction will be installed • Proper servicing and maintenance of machinery • PPE's use and implementation must be ensured. • Use of conventional methods such as enclosures, noise absorbing materials or silencers; and • Use of personal protection equipment • Provision of noise barriers towards receptors.	Proponent
3	Solid Waste	The solid waste may negatively impact the site, the workers, the visitors and the healthcare facility surrounding in different ways including aesthetically, occupationally as well as from health, safety and environment point of view.	• Solid waste will be collected, which will be managed by M/S Afrock Power (Private) Limited. waste management. Collected waste will be sold to EPA certified contractors. • Recyclables will be reused. • Hazardous waste will be marked according to Hazardous substance rule 2003 with bone and skull mark on the bin and place of handling	Proponent

4	Occupational, Health & Safety	• There will always be the possibility regarding hazards to health and safety of workers to occur during the operational phase of the project. • Inhalation of acid • Injury during handling of chemicals	• All the workers involved in transport of the materials will be suggested to wear boots, gloves, safety cap, masks to avoid injury and inhalation • All the Vehicless should be properly tuned up and regular maintenance and periodic monitoring must be done. Strict rules should be made by the project administration to control speeds of Vehicless. • Only relevant person will be allowed to handle chemicals to avoid any accident/incident • Chemicals will be placed in appropriate, leak-proof secondary containers to protect against breakage and spillage • Environmental protection and spill prevention plan will also be implemented at site and make sure that oil, and chemicals, etc. are properly stored, transported, protected and handled to avoid spillages and safety risks to the site personnel or property. • First aid kit will be available on-site • HSE/Compliance manager will be hired to supervise accordingly • All safety signs will be displayed in local language • Relevant PPE's will be provided to workers and their implementation will be ensured.	Proponent

Sr. No.	Aspect	Project Impact	Mitigation Measures	Responsibility
5	Emergency Response	Disasters such as earthquakes and fires may occur	• An Emergency Response Plan for earthquakes and manmade disasters will be developed by the M/S Afrock Power (Private) Limited. Management. • Emergency Response Plan will be implemented in close consultation with the Fire Fighting Department, bomb disposal squad and paramedics. In addition, training of the staff/employees regarding the emergency procedures/plans will be regularly conducted.	Proponent
6	Wastewater Quality	The sewage effluents shall be discharged after primary treatment into the main sewerage tank. Waste water from domestic use which may deteriorate the quality of groundwater.	• The system for the primary treatment of the sewage effluent should be appropriately installed and maintained. • Process wastewater generated will be treated through ETP and then discharge into FIEDMC Sewerage system. • Domestic wastewater generated will be discharged after treatment as well.	Proponent
7	Local Socio-economic Conditions	Impact on the local communities due to extraction of water from groundwater aquifer in large quantity for operational purposes	• Initiate efficient use of water by focusing on re-use of water for irrigation in the plant as well as to farmers having land in the surrounding of plant. • If additional manpower is required in future, residents should be preferred; and • Improving educational and health facilities.	Proponent

7.10 ENVIRONMENTAL MONITORING

This section provides environmental monitoring plan that identifies the roles and responsibilities of project staff involved in environmental monitoring and list the parameters that will be used in the monitoring process.

7.10.1 Objectives

The main objectives of the pre-construction and construction phase monitoring plans will be to:

- Monitor the actual impact of the works on the project site physical, biological, and socio-economic receptors. This will indicate the adequacy of the EIA.
- Recommend mitigation measures for any unexpected impact or where the impact level exceeds the anticipated impact.
- Ensure compliance with legal obligations including safety on construction site; and
- Monitor the rehabilitation of borrow areas and the restoration of construction campsites as described in the EMP; and
- Ensure the safe disposal of excess construction materials.

The main objectives of monitoring during the operational phase will be to:

- Appraise the adequacy of the EIA with respect to the project's predicted long-term impacts of operation of the Plant on physical, biological, and socio-economic environment.
- Evaluate the effectiveness of the mitigation measures proposed in the EMP and recommend improvements, when necessary.

7.10.2 Monitoring Parameters

i. Construction Phase

a) Air Quality

Air quality monitoring will be carried out as per EPA requirement/Quarterly during the construction phase at the representative locations.

The following parameters will be monitored:

- CO
- NO_X
- SO_X
- PM_{10}

b) *Groundwater Quality*

Groundwater quality monitoring will be done on Regularly/Daily basis during the construction phase at the representative locations.

c) *Noise Levels*

The noise levels monitoring will be carried out on daily basis at representative locations in the project area.

d) *Occupational, Health & Safety*

This will be carried out on daily basis at representative locations in the project area.

e) *Disposal of Construction Debris*

This will be carried out on daily basis at representative locations in the project area.

f) *Flora & Fauna*

This will be carried out on daily basis.

g) *Socioeconomic Environment*

This will be carried out during hiring of employees.

ii) Operational Phase

a) Air Quality

Air quality monitoring will be done as per EPA requirement during the operational phase at the representative locations. The following parameters will be monitored:

- CO
- NO_X
- SO_2
- PM_{10}

b) *Groundwater Quality*

Groundwater quality monitoring will be done on Regularly/Daily basis during the

construction phase at the representative locations.

c) Noise Levels

The noise levels monitoring will be carried out on daily basis at representative locations in the project area.

d) Occupational, Health & Safety

This will be carried out on daily basis at representative locations in the project area.

e) Solid Waste

This will be carried out on daily basis at representative locations in the project area.

f) Wastewater Quality

This will be carried out on daily basis.

7.11 TRAINING SCHEDULE

Proponent provides periodic Environmental and HSE trainings to workers working in their existing plants. The management of Proponent feels HSE is important for moral, legal, and financial reasons. The management of proponent has developed strict SOPs for Health and Safety of workers. These SOPs includes SOPs for Personal protective equipment's, Risk Assessment, permit to work, SOP for work at height, Fire Safety and Prevention, Confined Space entry, handling of acid and chemicals etc. A comprehensive annual training calendar has also been developed for training on topics of HSE for management as well as labors. Important training under the spectrum needs to include:

- Training on firefighting and safety management.
- Training on environmental safeguards and compliance.
- Staff training on environmental monitoring and reporting.
- Training on occupational health and safety measures.
- Training on handling of chemicals

The details of this training program are presented in **Table 7.5**

Table 7-5: Environmental Training Schedule

STAFF	TRAINER	CONTENTS	SCHEDULE
Selected management staff from the project proponent.	IMC	• Environmental sensitivity of project area • Key findings of the EIA mitigation measure • EMP • Social and cultural values of area Leadership	Prior to the start to the project activities
All employees	IMC	• Environmental sensitivity of project area • Mitigation measures contingency plan Community issues	Prior to the start of the project activities
Drivers	IMC	• Road safety • Defensive driving	Before and during the project activities.

8 PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Public consultation refers to the process by which the concerns of various stakeholders and local community who have a plausible stake in the environmental management & associated impacts of the project or activity are ascertained with a view to considering all the material concerns in the project or activity design as appropriate. According to the Review of IEE and EIA Review Regulations, 2000 public consultation is mandatory for any socio- environmental study for the commencement of any project.

8.1 GENERAL

Impact assessment survey and public consultation sessions held with different stakeholder groups that may be impacted by the proposed project commencement were carried out. The consultation process was carried out in accordance with the guidelines laid by EPA, Punjab. The objectives of this process were to:

- Share information with stakeholders on proposed project establishment.
- Access the impacts on the physical, biological and socio-economic environment.
- Understand stakeholder concerns regarding various aspects of the project commencement.
- Note valuable suggestions of local stakeholders to improve the proposed project design.
- Understand the perceptions, assessment of social impacts and concerns of the affected people/communities of the project area.
- Find out the awareness level and situation of acceptability to identify any issues for the implementation of the proposed project.
- Invite people to express their views about the positive/negative impacts on their lifestyles and environment.
- Disclose information about contact offices/officers for any complaints/queries.

It is envisaged, there will be no social impact being foreseen due to the commencement of aforesaid project at aforesaid location, the nearest community is located at safe distance from the project area. This EIA Report includes all the

comments, which were considered during the social survey and preparing the definitive development concept for the installation and operation of proposed project.

8.2 OBJECTIVES OF CONSULTATION

Public consultation plays a vital role in studying the impacts of the proposed project on stakeholders in successful implementation and execution of project. It provides an opportunity to exchange knowledge with the beneficiaries and affected parties. Referring particularly to a project related to environmental assessment, involvement of the public is more essential, as it leads to better and more acceptable decision-making. The overall objective of consultation with stakeholders is to help verify the environmental and social issues, besides technical ones, that have been presumed to arise and to identify those which are not known or are specific to project. In fact, discourse with many who have thoroughly observed the site conditions in the pre-development phase, goes a long way in updating the knowledge and understanding.

8.2.1 *Consultation process*

Information disclosure, public consultation and discussion regarding the various aspects of project with the people of area are necessary. This process is intensified during the EIA Studies and separate rounds of public consultations were held with local community and various government departments as listed below. Surveys were carried out to investigate physical, biological and socio- economic resources falling within the immediate AOI of the project. Primary data collection included:

- Data collection regarding the socio-economic condition of study area.
- Pre-testing of socioeconomic survey tools in the field.
- To consult the locals for collection of information on biological environment.

Various meetings with the stakeholders were held the following objectives:

- Share information with stakeholders regarding said project and expected impacts on community in project vicinity.
- Understand stakeholders' concerns regarding various aspects of the project, including the existing condition of the upgrading requirements, and the likely impact of construction and operation activities.
- Provide an opportunity to the public to influence the project design in a positive manner.

- Obtain local and traditional knowledge, before decision making.
- Increase public confidence about the proponent, reviewers and decision makers.
- Reduce conflict through the early identification of controversial issues and work through them to find acceptable solutions.
- Dissemination of information through discussions, education and liaison.
- Documentation of information narrated by the stakeholders and mitigation measures proposed by the stakeholders.
- Incorporation of public concerns and their address in the EIA and eliciting their comments and feedback.
- Create a sense of ownership of the proposal in the mind of the stakeholders.

8.3 PROPONENT'S ENVIRONMENTAL MANAGEMENT TEAM

Consultation regarding Establishment of proposed project was done with Proponent's Environmental Management Team and anticipated impacts were discussed. Concerns of locals, Environmental Practitioners & experts and Government departments were discussed and asked to consider them while construction of above-said project. Locals will be preferred for employment after providing proper training. Mitigations measures mentioned in EMP will be truly implemented.

8.3.1 The responsible authority

Overall responsibility for implementation of EMP will be that of project proponent. He will appoint a HSE/Project Manager of relevant qualification. HSE/Project Manager will act as Environmental Manager and will manage all HSE condition at the PEQS. HSE Plan has been attached as **Annexure-V.**

8.3.2 Other department and agencies

Following officers of government departments were consulted by the socio-environmental team of the consultants and concerned details about the project were noted down through personal interviews, group meetings, etc., in their offices, for instance, see Table below.

Sr#	CNIC/Designation	Concerns/Remarks
1	Deputy Director (Field), EPA	Following comments area summarized to control the pollution: • Hazardous waste should be managed in environmentally friendly manner. • Wastewater should be treated effectively & approval should be acquired from concerned agency before disposing off in nearby drain. • HSE* at the site should be managed effectively. • Safety signs must be displayed • No impact is being foreseen due to the selected location. • Locals should be given job opportunity.
2	Environmental Inspector	
Social Welfare Department		
3	Deputy Director Officer	Following comments are suggested by the Deputy Director on the behalf of Social Welfare Department: • Final goods should be affordable for the locals. • The proposed product should be economical. • Job opportunities should be given to the locals. • Wages should be given according to the work assign to them. • Life insurance of the workers should be given as well as all the facilities should be given as per labour laws.
Irrigation Department		

4	Superintendent Engineer	Following comments were suggested: • Untreated wastewater should not be disposed of in the nearby drains without proper treatment. • Beneficial as job opportunities will be available to the residents.
Forest Department		
5	Divisional Forest Officer Faisalabad	Following recommendation were suggested by the forest department: • Planation and landscape activities should be carried out on broader scale. • Indigenous species such as Arjarn, Barna, Neem, Suharjna, Amaltas and Jaman should be planted. • Proper drainage system must be available at site.
**** HSE= Health, Safety and Environment***		

8.3.3 Environmental Practitioners and experts

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

Table 8-1: Environmental Experts and their Concerns

Sr. No	Name	Designation	Comments/Suggestions
1.	Engr. Abdullah	Environmental Engineer	Following comments are summarized to control the air pollution generation during operational phase • It should be ensured that the pollution abatement technique must be installed if needed • Operation should be carried out under controlled conditions

2.	Ms. Hafsa Imran	Environmentalist	• Installation of proposed unit will have positive impact on economy, but its construction should be done in Environmentally Friendly way • During construction and operation emissions must be controlled properly • Basic facilities should be provided to local community
3.	Ms. Sadia Batool	Environmentalist	Following mitigation measures should be adopted: • Tree plantation in designated green zones should be carried out • Proper disposal of the waste • HSE management measures should be adopted and implemented effectively.
4.	Mr. Adeeb	Environmentalist	• Locals should be preferred for employment. • Value addition of area • In case of outsider's residence must be provided • Proper mitigation measures must be adopted while construction and operation of this project
5.	Mr. Yahya	Environmentalist	• She said that in case of removal of vegetation trees must be planted after construction at designated green areas • Water conservation strategies must be adopted • Solid waste must be collected and dispose of properly • Wastewater should not mix with surface water channels it must be properly dispose of after meeting PEQS. • Avoid groundwater contamination

8.3.4 *Consultation with Affected and wider community*

In addition, to the use of direct methods to evince the response of the various stakeholders in targeted population residing in study area was ascertained by conducting a sample survey, through specially formatted questionnaires. Questions posed to the public were related to creation of possible impacts, adverse impacts and beneficial impacts, including employment opportunities, income generation activities, change in living standards and provision of the basic amenity.

Personal views of the respondents on the establishment of unit, possible disturbance to the residents near the AOI and infringement of their privacy were also recorded. The various rounds of public meetings and consultations were arranged in project and study area. The objectives of consultation with the affected persons are given in the table below:

- Disclose the proponent plan for the construction/operation of said facility.
- To share information on the design and specifications of project works.
- To analyze the expected impact on the socio-economic environment.
- To understand their concerns regarding various aspects of project commencement.

8.3.5 *Views, Concerns and Suggestions of Various Stakeholders*

The major socio-economic concerns and problems of the affected persons of various communities have been given in tabulated form below along with their main concerns and remarks. Community showed a lot of concerns; a few are being mentioned here:

- Removal of shrubs and trees should be avoided to the extent possible in the case of clearance green zones should be established within the facility.
- Indigenous tress around the facility should be planted to control air pollution and as the compensation of removed trees.
- The project will become the source of income for local to earn their livelihood easily and honorably, so locals should be preferred.
- The area will inhabit and will be used for the beneficial purposes.
- For the solid waste management and waste disposal, proper disposal techniques should be adopted.

- Water spraying/sprinkling should be done on the regular basis for dust suppression.
- Employment opportunities will be generated, and locals should be hired on the priority basis.
- The air pollution is one of the major impacts from which Punjab is being affected at the large scale. So, ambient air quality should be monitored regularly, and air pollution expected to generate from the operation should be mitigated beforehand.
- Good relations with the local communities will be promoted by encouraging Contractor to provide opportunities for skilled and unskilled employment to the locals as well as on-job training.
- Noise generated activities should be carried out during day hours.

Public consultation was done within 4-5 km of project site. The views and the concerns of the local communities, direct and indirect stakeholders have been complied and are presented in Table 8.2 below:

Table 8-2: Stakeholders and their Concerns

Sr. No.	Main Concerns	Suggestions
1	People were concerned that the rising number of industries will degrade the environment.	• Every industry must ensure their working without any hazardous emissions. • Air pollution should be controlled effectively.
2	Construction activities might cause disturbances to the travelers using nearby routes.	• Construction should be completed in short duration. And special measures should be taken to cause minimum or no disturbance. • Safety signs must be displayed at appropriate locations.
3	Health concern due to industrial pollution that might be caused by industries.	• Proper laws must be enforced by the Government. • Health of the workers should be ensured. • Chemicals should be stored and handled properly only authorized persons should be allowed near the chemical storage area.

4	Noise pollution is caused from the industries.	• Special measures should be taken to reduce and control noise pollution. • Construction activity should be carried out during day hours. • Noisy activities should be confined.
5	With the rising number of industries, resources will be used.	• Job creation, eradication of poverty, • This will also improve National Economy.
6	Industries produce large amount of waste and disposed of without treatment.	• Every industry should be forced to treat waste before discharging it. • Wastewater should be treated prior to final disposal in nearby drain. • Solid waste should be managed effectively by adopting the standard practices of the area.
7	Locals will be ignored during the project	Locals should be given priority in employment opportunities.
8	Number of industries are increasing at a quick rate.	Tree plantation should be done, and greenery should be increased for the better environment.
9	Proposed project will not be beneficial to the Communities that are present near the project area.	• The proposed project should increase its welfare activities so that economic and social condition of the communities can improve. • Workers should be hired from local community.

10	Major concern was environment for the respondents.	• An effective EMMP should be designed and enforced with true spirit. • Planation should be carried out at extensive scale. • Indigenous tress around the facility should be planted to control air pollution. • Safeeda can be planted in the project area as the area in known to be affected by the logging and salinity. • Removal of shrubs and bushes should be avoided to the extent possible.
11	Construction of unit for production of Lead Batteries will be beneficial for us.	People said that we will get Products from industry rather than go to city for purchase.
12	Establishment of unit for production of Lead Batteries will be beneficial for the surroundings	Peoples said they will get original Products from industry rather than locally manufactured fake Products from Suppliers.

8.4 SUMMARY FINDINGS

Socio-economic baseline conditions and Socio-economic status of the people of the project area are described hereunder.

- The people whose interviews were recorded as a part of the public consultations were local inhabitants.
- In the project area, different sources of income are present, and the locals rely on more than one source.
- Several concerns of the people related to environment are correct. All these will be well taken care of in the design, construction, and operation of the project. Complete EMP is a part of this EIA that takes care of all the people's concern

9 CONCLUSION

9.1 GENERAL

Conclusively, the establishment of M/S Afrock Power (Private) Limited. Solar, Lithium-ion battery & Electric Vehicles Unit at Faisalabad will be beneficial for economic growth and to improve the life style of the locals. The proposed action will have potential positive impacts on the physical and socioeconomic environment by saving the consumption of fuel and provision of jobs and business opportunities to local and transitive workforce both at construction and operation phase. The overall objective of this EIA is to carry out a detailed environmental assessment of the project area; to assess impacts caused by the different activities of the proposed project and to address measures to mitigate adverse environmental impacts arising from the execution of the proposed project.

The conclusions mentioned below are based on the findings of detailed environmental assessment, which has been carried out as per requirement of Punjab-EPA.

9.2 MAIN ISSUES AND CONCERNS

During the field surveys, significant efforts were made to identify the main environmental, ecological and social issues related to the implementation of the proposed project. Residents and stakeholders were also contacted for obtaining salient information of the project. Following temporary issues may occur during construction of proposed project:

- Noise and air pollution due to the operation of construction machinery during construction phase of the project may occur.
- Health and safety problems of the workers may also arise during the construction and operation phases of the project.

All the adverse impacts of the proposed project have properly been mitigated and a comprehensive EMP has been formulated. The implementation of EMP will help to eliminate the impacts of the project.

9.3 RECOMMENDATIONS

- The construction activities shall be phased to confine the disruption of traffic. Traffic diversion/re-routing plans, if found necessary, shall be made with the help of traffic police for smooth flow of traffic. The Vehicless carrying the construction materials will not be allowed to enter the town during rush hours which could be possible at night hours.
- Noise measurements shall be carried out at locations and schedule specified to ensure the effectiveness of mitigation measures; and
- Health and safety problems of the workers shall be ensured during the construction and operation phases of the project.

As a conclusion of the study, the proposed project will not cause potentially significant environmental and social adverse impacts on the local environment after implementation of the mitigation measures. Results of the EIA Study have shown that overall, the project is environmentally feasible. Most of the environmental impacts are low adverse in nature. However, these impacts can be mitigated by the implementation of Environmental Management Plan. Overall, the impacts related to construction phase could be minimized by the implementation of the proper mitigation measures. The proposed project will have a positive and healthy improvement in socio-economic environment of the proposed area

TERMS OF REFERENCE (TOR) OF

EIA OF M/S Afrock Power (Private) Limited.

1. Title

EIA of M/S Afrock Power (Private) Limited.

2. Project Proponent

Teela Khan

S/O Mudir

Chief Executive

Home Address: Regi Lalma, Muhalla Naikabad, Peshawar

Plant Address: Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad

CNIC: 17301-6556497-3

3. Project Overview

Teela Khan S/O Mudir, as the Chief Executive/ proponent, has planned to setup a facility under the company name "M/S Afrock Power (Private) Limited." for the Manufacturing of Solar, Lithium-ion battery & Electric Vehicles Unit . Total area of the project comprises of **13.02 acres** . The final Product will be The Product will be Mudir

4. IEE/EIA Legal Requirement

IEE/EIA is mandatory according to the Punjab Environmental Protection Amended Act (PEPA- 2012). Section 12 (1) of the PEPA-2012 which states that:

"No proponent of a Project shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination or, where the Project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained approval from the Federal Agency in respect thereof."

According to Pakistan Environmental protection Agency (Review of IEE and EIA) Regulations 2000,the proposed project falls under Category B(12) of Schedule II, which requires EIA before commencement of construction.

5. Scope of Work

The Scope of Work as envisaged by the consultant to carry out EIA for the captioned project is elaborated as under:

a. Reconnaissance survey of the proposed site of the Project.

b. Collection of available data, drawings and all relevant information about the proposed Project.

c. Review of applicable existing Environmental Legislation and Standards

d. Review of the available data, drawings and reports to ascertain its adequacy and need for collection of additional data (if any).

e. Establishment of baseline environmental conditions.

f. Evaluation of potentially positive and negative impacts due to the proposed Project.

g. Propose mitigation measures to eliminate or reduce the negative impacts to an acceptable level due to proposed plant construction/operation.

h. Preparation of Environmental Management Plan (EMP)

i. Prepare Environmental Impact Assessment (EIA) Report

6. Components of EIA Report

- Chapter 1: Introduction
- Chapter 2: Statutory Requirements & Standards
- Chapter 3: Description of the Project
- Chapter 4: Description of the Environment

- Chapter 5: Environmental Impacts and Mitigation Measures
- Chapter 6: Environmental Management Plan
- Chapter 7: Stakeholder's Participation
- Chapter 8: Conclusions

7. Compliance of Guidelines

The consultancy firm shall be responsible to prepare EIA report in compliance of following guidelines;

j. Guidelines for preparing and reviewing environmental reports

k. Guidelines for policy and procedures for the filing, review and approval of EIA

l. Guidelines for sensitive and critical areas

m. Punjab Environmental Quality Standards (PEQS).

8. Deliverables

Draft EIA Report and Final EIA Report

9. Time Schedule – Four (04) months

Signature by: Muhammad Nawaz

Environmental Consultant

Evergreen Environmental Solutions

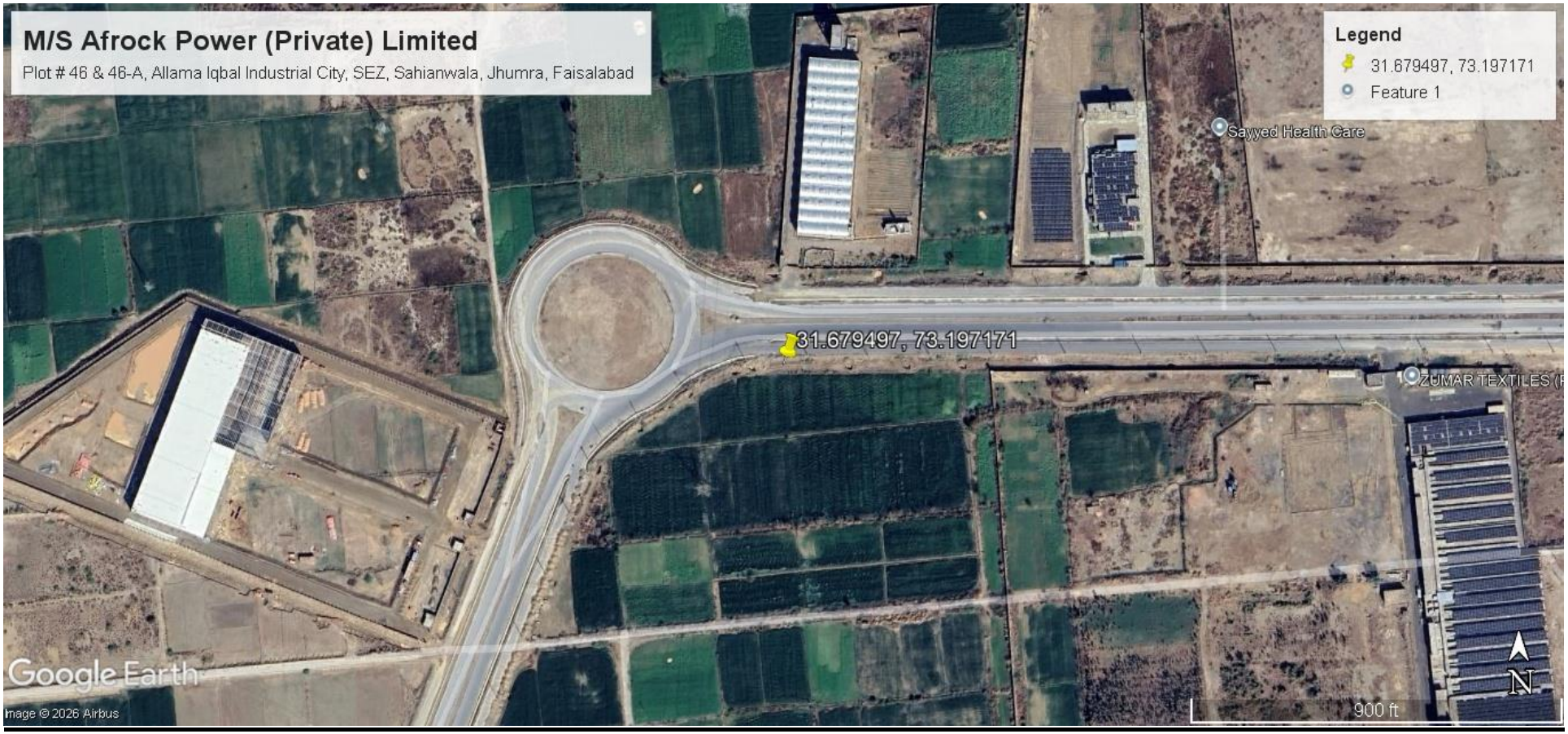
Signature by:

Teela Khan

Proponent

M/S Afrock Power (Private) Limited.

Annexure II


M/S Afrock Power (Private) Limited
Plot # 46 & 46-A, Allama Iqbal Industrial City, SEZ, Sahianwala, Jhumra, Faisalabad
Legend
31.679497, 73.197171
Feature 1
Sayyed Health Care
31.679497, 73.197171
ZUMAR TEXTILES
Google Earth
Image © 2026 Airbus
900 ft
N

Annexure IV

List of Respondents			
Sr. No.	**Name**	**Father Name**	**Area**
1	Muhammad Ali	MIAN TUFAIL	Jhumra
2	RIZWAN ALI	M YOUNAS	Jhumra
3	LIAQAT ALI BAIG	M SHARIF	Jhumra
4	SH M ABDULLAH	SH M IDREES	Faisalabad
5	IMRAN PARVAIZ	M PARVAIZ	Jhumra
6	ASIF IQBAL	SH M IQBAL	Faisalabad
7	SAJID LATIF	M LATIF	Faisalabad
8	RIZWAN ALI	NASEER AHMED	Faisalabad
9	SALMAN SHAHBAZ	SHABAZ SAEED	Faisalabad
10	MANZOOR IJAZ	M IJAZ	Faisalabad

HEALTH, SAFETY & ENVIRONMENT PLAN

1. *Underground Obstruction*

Underground services that have the potential to affect the construction include:

- Underground electricity cables
- Gas mains
- Communication cables
- Water mains
- Sewer mains
- Council drains
- Traffic signal cables

Search would be undertaken to check for major services at least 30 m both upstream and downstream of the proposed works.

2. *TRENCHING & EXCAVATION SAFETY*

Excavation and trenching are among the most hazardous construction operations.

Dangers of Trenching and Excavation

Cave-ins pose the greatest risk and are much more likely than other excavation related accidents to result in worker fatalities. Other potential hazards include falls, falling Leads, hazardous atmosphere and incident involving mobile equipment.

Key issues are:

a) Collapse of Excavations

- **Temporary support**-Before digging any trench pit, tunnel or other excavations, decide what temporary support will be required and plan the precautions to be taken. Make sure the equipment and precautions needed (trench, sheets, props, baulks etc.) are available on site before work starts.

- **Battering the excavation sides**-Battering the excavation sides to a safe angle of repose make also save the excavation safer .In granular soils , the angle of slope should be less than the natural angle of repose of the material being excavated. In wet ground, a considerably flatter slope will be required.

b) Falling or Dislodging Material

- **Loose materials**-may fall from spoil heaps into the excavation. Edge protection should include toe boards or other means, such as projecting trench sheets or box sides to protect against falling materials. Head protection should be worn.

- **Undermining other structures**-Check that excavations do not undermine scaffold footings. Buried services or the foundations of nearby buildings or walls. Decide if extra support for the structure is needed before you start. Surveys of the foundations and the advice of the structural engineer may be required.

- **Effect of plant and Vehicless**-Do not park plant and Vehicless close to the sides of excavations. The extra Leadings can make the sides of excavations more likely to collapse.

c) Falling into Excavations

- **Present people from falling**- Edges of excavations should be protected with substantial barriers where people are liable to fall into them achieve this, use: Guard rails and toe boards inserted into the ground immediately next to the supported excavation side, or fabricated guard rails assemblies that connect to the sides of the trench box the support system itself, e.g. using trench box extensions or trench sheets longer than the trench depth.

3. Protect Yourself

Do not enter an unprotected trench! Trenches 5 feet (1.5 meters) deep or greater require a protective system unless the excavation is made entirely in the stable rock. Trenches (6.1 meters) deep or greater require that the protective system be de-signed by a registered professional engineer or be bases on tabulated data prepared and/or approved by a registered professional engineer.

4. Protective Systems

There are different types of protective systems. Sloping involves cutting back the trench wall at an angle inclined away from the excavation. Shoring requires installing aluminum hydraulic or other supports to prevent soil movements and cave-ins. Shielding protects workers by using trenches or other types of supports to prevent soil cave-ins.

Designing a protective system can be complex because you must consider many factors: soil classification, depth of cut, water content of soil, changes due to weather or climate, surcharge Leads (e.g., spoil, other materials to be used in the trench) and other operations in the vicinity.

a) General Trenching and Excavation Rules

- Keep heavy equipment away from trench edges.
- Keep surcharge Leads at least 2 feet (0.6 meters) from trench edges.
- Know where underground utilities are located.
- Test for low oxygen, hazardous fumes and toxic gasses.
- Inspect trenches at the start of each shift.
- Inspect trenches following a rainstorm.
- Do not work under raised Leads.

5. *Excavated Materials*

All excavated material must be set back at least 2 feet from the excavation area to prevent possible cave-ins. When the proper setback cannot be provided, materials should be hauled away. Excavation equipment should not be operated or stored where it can create a potential cave-in problem.

6. *Construction of signposts, barricades and fencing*

Barricades that are impenetrable shall be used to separate pedestrians from hazards on all sides of excavations that may be exposed to pedestrians. Use material and methods suitable to site conditions. Signs and fencing material shall not protrude into the clear pathways.

- A-frames used for defining path of travel (not barricading trenches) shall be placed end to end without spacing, shall be connected and maintained to ensure stability to help a person who is blind negotiate the safe path using a cane.
- Caution tape shall not be used by itself to delineate the path of travel or create a barricade.
- Signposts, scaffolding and fencing supports shall be entirely outside the pedestrian path of travel, minimum 4 feet wide and 80" high without obstruction.
- Construction barriers shall be maintained in a sound, neat and clean conditions.

7. *Stockpiles*

A stockpile must be planned, constructed, used and maintained so that no person working at the workplace is endangered by any instability of the stockpiled material.

The height of an unstable face of a stock pile must not exceed the maximum safe reach of equipment being used to remove material from stockpile.

8. *Walkways*

A worker must not walk upon the surfaces of structural members that have shear connectors, dowels or other protrusions unless suitable walkways and runways are provided to eliminate the tripping hazard.

9. *Water Accumulation*

Water must not be allowed to accumulate in excavation if it might affect the stability of the excavation or might endanger workers. Erosion of slopes by surface water must be prevented if workers maybe endangered.

PAKISTAN ENVIRONMENTAL PROTECTION AGENCY (REVIEW OF IEE AND EIA) REGULATIONS, 2000

S.R.O. 339 (1)/2001. - In exercise of the powers referred by section 33 of the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997), Pakistan Environmental Protection Agency, with the approval of the Federal Government is pleased to make the following Rules, namely : -

1. *Short title and commencement*

(1) These regulations may be called the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2000.

(2) They shall come into force at once.

2. *Definitions*

(1) In these regulations, unless there is anything repugnant in the subject or context –

(a) "Act" means the Pakistan Environmental Protection Act, 1997 (XXXIV of 1997);

(b) "Director-General" means the Director-General of the Federal Agency;

(c) "EIA" means an environmental impact assessment as defined in section 2(xi);

(d) "IEE" means an initial environmental examination as defined in section 2(xxiv); and

(e) "section" means a section of the Act.

(2) All other words and expressions used in these regulations but not defined shall have the same meanings as are assigned to them in the Act.

3. *Projects requiring an IEE*

A proponent of a project falling in any category listed in Schedule I shall file an IEE with the Federal Agency, and the provisions of section 12 shall apply to such project.

4. *Projects requiring an EIA*

A proponent of a project falling in any category listed in Schedule II shall file an EIA with the Federal Agency, and the provisions of section 12 shall apply to such project.

5. *Projects not requiring an IEE or EIA*

(1) A proponent of a project not falling in any category listed in Schedules I and II shall not be required to file an IEE or EIA:

Provided that the proponent shall file –

(a) an EIA, if the project is likely to cause an adverse environmental effect;

(b) for projects not listed in Schedules I and II in respect of which the Federal Agency has issued guidelines for construction and operation, an application for approval accompanied by an undertaking and an affidavit that the aforesaid guidelines shall be fully complied with.

(2) Notwithstanding anything contained in sub-regulation (1), the Federal Agency may direct the proponent of a project, whether or not listed in Schedule I or II, to file an IEE or EIA, for reasons to be recorded in such direction:

Provided that no such direction shall be issued without the recommendation in writing of the Environmental Assessment Advisory Committee constituted under Regulation 23.

(3) The provisions of section 12 shall apply to a project in respect of which an IEE or EIA is filed under sub-regulation (1) or (2).

6. *Preparation of IEE and EIA*

(1) The Federal Agency may issue guidelines for preparation of an IEE or an EIA, including guidelines of general applicability, and sectoral guidelines indicating specific assessment requirements for planning, construction and operation of projects relating to particular sector.

(2) Where guidelines have been issued under sub-regulation (1), an IEE or EIA shall be prepared, to the extent practicable, in accordance therewith and the proponent shall justify in the IEE or EIA any departure therefrom.

7. *Review Fees*

The proponent shall pay, at the time of submission of an IEE or EIA, a non- refundable Review Fee to the Federal Agency, as per rates shown in Schedule III.

8. *Filing of IEE and EIA*

(1) Ten paper copies and two electronic copies of an IEE or EIA shall be filed with the Federal Agency.

(2) Every IEE and EIA shall be accompanied by –

(a) an application, in the form prescribed in Schedule IV; and

(b) copy of receipt showing payment of the Review Fee.

9. *Preliminary scrutiny*

(1) Within 10 working days of filing of the IEE or EIA, the Federal Agency shall –

(a) confirm that the IEE or EIA is complete for purposes of initiation of the review process; or

(b) require the proponent to submit such additional information as may be specified; or

(c) return the IEE or EIA to the proponent for revision, clearly listing the points requiring further study and discussion.

(2) Nothing in sub-regulation (1) shall prohibit the Federal Agency from requiring the proponent to submit additional information at any stage during the review process.

10. *Public participation*

(1) In the case of an EIA, the Federal Agency shall, simultaneously with issue of confirmation of completeness under clause (a) of sub-regulation (1) of Regulation 9, cause to be published in any English or Urdu national newspaper and in a local newspaper of general circulation in the area affected by the project, a public notice mentioning the type of project, its exact location, the name and address of the proponent and the places at which the EIA of the project can, subject to the restrictions in sub-section
(3) of section 12, be accessed.

(2) The notice issued under sub-regulation (1) shall fix a date, time and place for public hearing of any comments on the project or its EIA.

(3) The date fixed under sub-regulation (2) shall not be earlier than 30 days from the date of publication of the notice.

(4) The Federal Agency shall also ensure the circulation of the EIA to the concerned Government Agencies and solicit their comments thereon.

(5) All comments received by the Federal Agency from the public or any Government Agency shall be collated, tabulated and duly considered by it before decision on the EIA.

(6) The Federal Agency may issue guidelines indicating the basic techniques and measures to be adopted to ensure effective public consultation, involvement and participation in EIA assessment.

11. *Review*

(1) The Federal Agency shall make every effort to carry out its review of the IEE within 45 days, and of the EIA within 90 days, of issue of confirmation of completeness under Regulation 9.

(2) In reviewing the IEE or EIA, the Federal Agency shall consult such Committee of Experts as may be constituted for the purpose by the Director-General, and may also solicit views of the sectoral Advisory Committee, if any, constituted by the Federal Government under sub- section (6) of section 5.

(3) The Director-General may, where he considers it necessary, constitute a committee to inspect the site of the project and submit its report on such matters as may be specified.

(4) The review of the IEE or EIA by the Federal Agency shall be based on quantitative and qualitative assessment of the documents and data furnished by the proponent, comments from the public and Government Agencies received under Regulation 10, and views of the committees mentioned in sub-regulations (2) and (3) above.

12. *Decision*

On completion of the review, the decision of the Federal Agency shall be communicated to the proponent in the form prescribed in Schedule V in the case of an IEE, and in the form prescribed in Schedule VI in the case of an EIA.

13. *Conditions of approval*

(1) Every approval of an IEE or EIA shall, in addition to such conditions as may be imposed by the Federal Agency, be subject to the condition that the project shall be designed and constructed, and mitigatory and other measures adopted, strictly in accordance with the IEE/EIA, unless any variation thereto have been specified in the approval by the Federal Agency.

(2) Where the Federal Agency accords its approval subject to certain conditions, the proponent shall –

(a) before commencing construction of the project, acknowledge acceptance of the stipulated conditions by executing an undertaking in the form prescribed in Schedule VII;

(b) before commencing operation of the project, obtain from the Federal Agency written confirmation that the conditions of approval, and the requirements in the IEE/EIA relating to design and construction, adoption of mitigatory and other measures and other relevant matters, have been duly complied with.

14. *Confirmation of compliance*

(1) The request for confirmation of compliance under clause (b) of sub- regulation (2) of Regulation 13 shall be accompanied by an Environmental Management Plan indicating the measures and procedures proposed to be taken to manage or mitigate the environmental impacts for the life of the project, including provisions for monitoring, reporting and auditing.

(2) Where a request for confirmation of compliance is received from a proponent, the Federal Agency may carry out such inspection of the site and plant and machinery and seek such additional information from the proponent as it may deem fit:

Provided that every effort shall be made by the Federal Agency to provide the requisite confirmation or otherwise within 15 days of receipt of the request, with complete information, from the proponent.

(3) The Federal Agency may, while issuing the requisite confirmation of compliance, impose such other conditions as the Environmental Management Plan, and the operation, maintenance and monitoring of the project as it may deem fit, and such conditions shall be deemed to be included in the conditions to which approval of the project is subject.

15. *Deemed approval*

The four-month period for communication of decision stipulated in sub-section (4) of section 12 shall commence from the date of filing of an IEE or EIA in respect of which confirmation of completeness is issued by the Federal Agency under clause (a) of sub-regulation (1) of Regulation 9.

16. *Extension in review period*

Where the Federal Government in a particular case extends the four-month period for communication of approval prescribed in sub-section (5) of section 12, it shall, in consultation with the Federal Agency, indicate the various steps of the review process to be taken during the extended period, and the estimated time required for each step.

17. *Validity period of approval*

(1) The approval accorded by a Federal Agency under section 12 read with Regulation 12 shall be valid, for commencement of construction, for a period of three years from the date of issue.

(2) If construction is commenced during the initial three year validity period, the validity of the approval shall stand extended for a further period of three years from the date of issue.

(3) After issue of confirmation of compliance, the approval shall be valid for a period of three years from the date thereof.

(4) The proponent may apply to the Federal Agency for extension in the validity periods mentioned in sub-regulations (1), (2) and (3), which may be granted by the Federal Agency in its discretion for such period not exceeding three years at a time, if the conditions of the approval do not require significant change:

Provided that the Federal Agency may require the proponent to submit a fresh IEE or EIA, if in its opinion changes in location, design, construction and operation of the project so warrant.

18. *Entry and inspection*

(1) For purposes of verification of any matter relating to the review or to the conditions of approval of an IEE or EIA prior to, during or after commencement of construction or operation of a project, duly authorized staff of the Federal Agency shall be entitled to enter and inspect the project site, factory building and plant and equipment installed therein.

(2) The proponent shall ensure full cooperation of the project staff at site to facilitate the inspection, and shall provide such information as may be required by the Federal Agency for this purpose and pursuant thereto.

19. *Monitoring*

(1) After issue of approval, the proponent shall submit a report to the Federal Agency on completion of construction of the project.

(2) After issue of confirmation of compliance, the proponent shall submit an annual report summarizing operational performance of the project, with reference to the conditions of approval and maintenance and mitigatory measures adopted by the project.

(3) To enable the Federal Agency to effectively monitor compliance with the conditions of approval, the proponent shall furnish such additional information as the Federal Agency may require.

20. *Cancellation of approval*

(1) Notwithstanding anything contained in these Regulations, if, at any time, on the basis of information or report received or inspection carried out, the Federal Agency is of the opinion that the conditions of an approval have not been complied with, or that the information supplied by a proponent in the approved IEE or EIA is incorrect, it

shall issue notice to the proponent to show cause, within two weeks of receipt thereof, why the approval should not be cancelled.

(2) If no reply is received or if the reply is considered unsatisfactory, the Federal Agency may, after giving the proponent an opportunity of being heard:

(i) require the proponent to take such measures and to comply with such conditions within such period as it may specify, failing which the approval shall stand cancelled; or

(ii) cancel the approval.

(3) On cancellation of the approval, the proponent shall cease construction or operation of the project forthwith.

(4) Action taken under this Regulation shall be without prejudice to any other action that may be taken against the proponent under the Act or rules or regulations or any other law for the time being in force.

21. *Registers of IEE and EIA projects*

Separate Registers to be maintained by the Federal Agency for IEE and EIA projects under sub-section (7) of section 12 shall be in the form prescribed in Schedule VIII.

22. *Environmentally sensitive areas*

(1) The Federal Agency may, by notification in the official Gazette, designate an area to be an environmentally sensitive area.

(2) Notwithstanding anything contained in Regulations 3, 4 and 5, the proponent of a project situated in an environmentally sensitive area shall be required to file an EIA with the Federal Agency.

(3) The Federal Agency may from time to time issue guidelines to assist proponents and other persons involved in the environmental assessment process to plan and prepare projects located in environmentally sensitive areas.

(4) Where guidelines have been issued under sub-regulation (3), the projects shall be planned and prepared, to the extent practicable, in accordance therewith and any departure therefrom justified in the EIA pertaining to the project.

23. *Environmental Assessment Advisory Committee*

For purposes of rendering advice on all aspects of environmental assessment, including guidelines, procedures and categorization of projects, the Director-General shall constitute an Environmental Assessment Advisory Committee comprising –

(a) Director EIA, Federal Agency … Chairman

(b)	One representative each of the Provincial Agencies	…	Members
(c)	One representative each of the Federal Planning Commission and the Provincial Planning and Development Departments	…	Members
(d)	Representatives of industry and non-Governmental organizations, and legal and other experts	…	Members

24. *Other approvals*

Issue of an approval under section 12 read with Regulation 12 shall not absolve the proponent of the duty to obtain any other approval or consent that may be required under any law for the time being in force.

SCHEDULE I
(*See* Regulation 3)

List of projects requiring an IEE

A. Agriculture, Livestock and Fisheries

1. Poultry, livestock, stud and fish farms with total cost more than Rs.10 million
2. Projects involving repacking, formulation or warehousing of agricultural products

B. Energy

1. Hydroelectric power generation less than 50 MW
2. Thermal power generation less than 200 KW
3. Transmission lines less than 11 KV, and large distribution projects
4. Oil and gas transmission systems
5. Oil and gas extraction projects including exploration, production, gathering systems, separation and storage
6. Waste-to-energy generation projects

C. Manufacturing and processing

1. Ceramics and glass units with total cost more than Rs.50 million
2. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost less than Rs.100 million
3. Man-made fibers and resin projects with total cost less than Rs.100 million
4. Manufacturing of apparel, including dyeing and printing, with total cost more than Rs.25 million
5. Wood products with total cost more than Rs.25 million

D. Mining and mineral processing

1. Commercial extraction of sand, gravel, limestone, clay, sulphur and other minerals not included in Schedule II with total cost less than Rs.100 million
2. Crushing, grinding and separation processes

3. Smelting plants with total cost less than Rs.50 million

E. *Transport*

1. Federal or Provincial highways (except maintenance, rebuilding or reconstruction of existing metalled roads) with total cost less than Rs.50 million

2. Ports and harbor development for ships less than 500 gross tons

F. *Water management, dams, irrigation and flood protection*

1. Dams and reservoirs with storage volume less than 50 million cubic meters of surface area less than 8 square kilometers

2. Irrigation and drainage projects serving less than 15,000 hectares

3. Small-scale irrigation systems with total cost less than Rs.50 million

G. *Water supply and treatment*

Water supply schemes and treatment plants with total cost less than Rs.25 million

H. *Waste disposal*

Waste disposal facility for domestic or industrial wastes, with annual capacity less than 10,000 cubic meters

I. *Urban development and tourism*

1. Housing schemes

2. Public facilities with significant off-site impacts (e.g. hospital wastes)

3. Urban development projects

J. *Other projects*

Any other project for which filing of an IEE is required by the Federal Agency under sub-regulation (2) of Regulation 5

SCHEDULE II

(*See* Regulation 4)

List of projects requiring an EIA

A. *Energy*

1. Hydroelectric power generation over 50 MW
2. Thermal power generation over 200 MW
3. Transmission lines (11 KV and above) and grid stations
4. Nuclear power plans
5. Petroleum refineries

B. *Manufacturing and processing*

1. Cement plants
2. Chemicals projects
3. Fertilizer plants
4. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost of Rs.100 million and above
5. Industrial estates (including export processing zones)
6. Man-made fibers and resin projects with total cost of Rs.100 M and above
7. Pesticides (manufacture or formulation)
8. Petrochemicals complex
9. Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, textiles (except apparel),printing and publishing, paints and dyes, oils and fats and vegetable ghee projects, with total cost more than Rs.10 million
10. Tanning and leather finishing projects

C. *Mining and mineral processing*

1. Mining and processing of coal, gold, copper, sulphur and precious stones
2. Mining and processing of major non-ferrous metals, iron and steel rolling
3. Smelting plants with total cost of Rs.50 million and above

D. *Transport*

1. Airports
2. Federal or Provincial highways or major roads (except maintenance, rebuilding or reconstruction of existing roads) with total cost of Rs.50 million and above
3. Ports and harbor development for ships of 500 gross tons and above
4. Railway works

E. *Water management, dams, irrigation and flood protection*

1. Dams and reservoirs with storage volume of 50 million cubic meters and above or surface area of 8 square kilometers and above
2. Irrigation and drainage projects serving 15,000 hectares and above

F. *Water supply and treatment*

Water supply schemes and treatment plants with total cost of Rs.25 million and above

G. *Waste Disposal*

1. Waste disposal and/or storage of hazardous or toxic wastes (including landfill sites, incineration of hospital toxic waste)
2. Waste disposal facilities for domestic or industrial wastes, with annual capacity more than 10,000 cubic meters

H. *Urban development and tourism*

1. Land use studies and urban plans (large cities)
2. Large-scale tourism development projects with total cost more than Rs.50 million

I. *Environmentally Sensitive Areas*

All projects situated in environmentally sensitive areas

J. *Other projects*

1. Any other project for which filing of an EIA is required by the Federal Agency under sub-regulation (2) of Regulation 5.
2. Any other project likely to cause an adverse environmental effect

Annexure VII

SCHEDULE III
(See Regulation 7)

IEE/EIA Review Fees

Total Project Cost	**IEE**	**EIA**
Upto Rs.5,000,000	NIL	NIL
Rs.5,000,001 to 10,000,000	Rs.10,000	Rs.15,000
Greater than Rs.10,000,000	Rs.15,000	Rs.30,000

Annexure VII

SCHEDULE VIII

(*See* Regulation 21)

Form of Registers for IEE and EIA projects

S. No.	Description	Relevant Provisions 1
	2	3
1.	Tracking number	
2.	Category type (as per Schedules I and II)	
3.	Name of proponent	
4.	Name and designation of contact person	
5.	Name of consultant	
6.	Description of project	
7.	Location of project	
8.	Project capital cost	
9.	Date of receipt of IEE/EIA	
10.	Date of confirmation of completeness	
11.	Approval granted (Yes/No)	
12.	Date of approval granted or refused	
13.	Conditions of approval/reasons for refusal	
14.	Date of Undertaking	
15.	Date of extension of approval validity	
16.	Period of extension	
17.	Date of commencement of construction	
18.	Date of issue of confirmation of compliance	
19.	Date of commencement of operations	
20.	Dates of filing of monitoring reports	
21.	Date of cancellation, if applicable	