

**Establishment of Roidec (Pvt) Ltd
Located At**

**Plot No 225 E Sundar Industrial Estate,
Lahore**

INITIAL ENVIRONMENTAL EXAMINATION-2026

Proponent:

Tariq Riaz & Muhammad Waseem Zulqarnain

**SUBMITTED TO:
EPA**

LIST OF ABBREVIATIONS

CO ₂	Carbon dioxide
dB(A)	A weighted decibel scale
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
EPO	Environmental Protection Ordinance
IEE	Initial Environmental Examination
Ltd.	Limited
LTI	Loss Time Injury
LWI	Loss Work Injury
m ³	Cubic meter
m ³ /h	Cubic meter per hour
MW	Megawatt
M/S	Messrs
NEQS	National Environmental Quality Standards
No.	Number

NOC	No Objection Certificate
NO _x	Oxides of Nitrogen
PEPC	Pakistan Environmental Protection Council
PEPA, 1997	Pakistan Environmental Protection Act, 1997
PEPA, 2012	Punjab Environmental Protection (Amendment) Act, 2012
PEPO	Pakistan Environmental Protection Ordinance
PKR	Pakistani Rupees
PM	Particulate Matter
PPEs	Personal Protective Equipment
Pvt.	Private
SMART	Self-Monitoring and Reporting
SOPs	Standard Operating Procedures
SO _x	Oxides of Sulfur
WAPDA	Water and Power Development Authority

EXECUTIVE SUMMARY

INTRODUCTION

The chemical industry is set to play a pivotal role in driving industrial growth by supplying critical materials to diverse sectors such as sports goods, paints, packaging, construction, and manufacturing. By transforming raw materials into valuable products through carefully controlled physical and chemical processes, the industry will support the development of numerous downstream applications. Adhesives manufacturing, a segment of the light chemical industry, primarily involves formulation, blending, and dispersion processes rather than complex chemical reactions.

However, the chemical industry also poses potential environmental challenges, including air emissions, wastewater generation, solid waste production, and occupational health risks. To address these issues, comprehensive environmental planning, effective pollution control systems, and robust monitoring programs will be essential. A strategic shift toward water-based products and biodegradable materials can significantly mitigate pollution and enhance sustainability.

Roidec Private Limited is planning to establish an adhesive manufacturing unit at 225 Sundar Industrial Estate, Lahore. The proposed project will produce water-based lamination adhesives (Green Bond) and solvent-based adhesives (CAD-5), which will be supplied to manufacturers of export-quality soccer balls. The primary customers for these adhesives will be football manufacturers and exporters based in Sialkot, Pakistan.

An Environmental Impact Assessment (EIA) has been prepared to identify, evaluate, and address potential environmental impacts associated with the project's construction and operational phases. The EIA will also recommend appropriate mitigation measures to minimize adverse effects and maximize positive environmental and socio-economic benefits, ensuring compliance with relevant environmental regulations.

The main objectives of this EIA are to establish baseline environmental conditions, identify potential impacts and suggest suitable mitigation measures for the execution of the said project. This study has been accomplished in line with the provisions – guidelines and directives of Punjab Environmental Protection Agency. This executive summary presents an overview of the main findings of the EIA Report for the aforesaid project i-e Roidec Pvt Ltd.

PROJECT OUTLINE (Details are given in Chapter 2)

Salient features of project:

Proponent Name/ Authorized Person:	Tariq Riaz & Muhammad Waseem Zulqarnain
Project Title:	Establishment of Roidec (Pvt) Ltd
Project Location:	Plot No 225 E Sundar Industrial Estate, Lahore
Total Area	26,993.47 sq. ft. (\approx 4.96 kanals).
Source of Water	Groundwater
Cost of Project	PKR 45 million approx.
Source of Power:	WAPDA & In house power generation
Wastewater:	Wastewater from the process will be treated through waste water treatment plant
Solid Waste Management:	To handle the waste, waste management contract with EPA certified company has been done.
Tree Plantation	At designated areas
Raw Material	Polyvinyl Water-based dispersions Water-based Plasticizers Biodegradable resins Synthetic rubbers Non-prohibited solvents such as ethyl acetate Minor performance-enhancing additives.
Finished Product	Water-based lamination adhesives (Green Bond) and regular solvent-based adhesives (CAD-5),
Capacity of the Unit	1,000 kg per day
Main Principle of Unit	Physical mixing and chemical formulation
Components of Projects	Raw Material Storage Area (Solvents, Additives, Resins) Process and Mixing Halls Finished Product Storage Area

	Chemicals Storage Area Offices Parking Area
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MAJOR IMPACTS AND RECOMMENDED MITIGATION MEASURES:

Beneficial/Positive Impacts:

- Provision of employment and stimulation of local economy.
- During the construction phase, the project will generate significant positive economic and socio-cultural impacts. Local residents will benefit from a range of job opportunities, both skilled and unskilled leading to higher household incomes and improved living standards. As workers gain on-the-job training, their skill sets will expand, making them more employable in the future.
- The increased demand for construction materials, food, transport, and other services will stimulate nearby businesses, while the development of roads and utilities will leave a lasting infrastructure legacy for the community.
- Moreover, the interaction between the workforce and local people will encourage cultural exchange and social integration, fostering a stronger sense of cohesion. A portion of the project’s revenue may also be reinvested in community services such as schools or health clinics, further enhancing local development. Overall, the construction activities will create a multiplier effect, boosting economic activity and uplifting the region’s social fabric.

Negative Impacts:

Impacts	Mitigation measures
Construction phase	
Dust emissions	Most of the dust generating activities during construction will last for a brief period. Thereafter, vehicular movement will generate most of the dusts. Dusts will be suppressed using water bowser to spray exposed land surfaces and particularly areas likely to be disturbed by trucks and other vehicles during the construction of the factory premises. Vehicular speed

	<p>limits of 20 km/h will be ensured in order to minimize dust generation. Further mitigation measures will be:</p> <ul style="list-style-type: none"> • Covering haulage vehicles transporting aggregate, soil and cement • Covering onsite stockpiles of aggregate, cement, soil, etc. • Providing workers with the necessary Personal Protective Equipment (PPE) e.g. dust masks and ensure that they are worn • Operating well maintained vehicles and equipment
Wastewater	<p>During the operational phase, significant quantities of wastewater will be generated mainly from equipment washing, floor cleaning, formulation vessel cleaning, and accidental spills.</p> <p>This wastewater may contain adhesive residues, polymers, resins, plasticizers, solvents, and suspended solids. If discharged untreated, this wastewater may increase Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), and Total Suspended Solids (TSS) in receiving drains, leading to water pollution.</p> <p>Chemical-laden wastewater may also cause toxicity to aquatic life and contaminate soil if seepage occurs. The presence of solvents and synthetic compounds may reduce dissolved oxygen levels and disturb natural biological processes.</p> <p>Measures:</p> <ul style="list-style-type: none"> • A dedicated wastewater collection and treatment system will be installed. • Wastewater will be passed through settling, filtration, and neutralization units before discharge. • Treated wastewater will meet Punjab EPA discharge standards. • No direct discharge of untreated effluent into drains or soil will be allowed.

	<ul style="list-style-type: none"> Regular wastewater quality monitoring will be conducted
Impacts of accidental spillages	<ul style="list-style-type: none"> The integrity of storage facilities will be ensured Drip pans will be made available where necessary
Safety	<ul style="list-style-type: none"> Safety signage will be put in relevant places within the construction site Reckless driving by construction workers will be prohibited and monitored. Workers will be given PPEs such as; helmets, mask, ear-plugs/muffs, safety boots, safety goggles, safety jackets, harnesses etc. and its use was strictly enforced Workers will be trained on regular basis regarding personal safety Incidents will be reported directly to the concerned authority
Solid waste management	<ul style="list-style-type: none"> Recycling or reuse of waste wherever possible. Application of a good strategy to collect, remove and safely dispose of waste on daily basis to ensure a clean environment in the factory site Integrated waste management system will be adopted for the proper management of the waste at site At the end of the construction phase, left-over waste will be removed as per practices of area All the idle machinery and equipment will be immediately removed from the site Scrap and the debris will be removed from the site at the end of the construction stage after appropriate segregation of the material
Operation Phase	
Air Emissions, Particulate emissions	<p>Solvent-based adhesive production will release volatile organic compounds (VOCs) such as ethyl acetate during mixing and handling.</p> <p>These vapors may cause odor issues, indoor air pollution, and respiratory discomfort for workers. Prolonged exposure may also contribute to</p>

	<p>atmospheric pollution and formation of ground-level ozone.</p> <p>Mitigation Measures:</p> <ul style="list-style-type: none"> • Proper exhaust ventilation systems will be installed in production areas. • Fume hoods and localized extraction systems will be used near mixing units. • Water-based adhesives will be promoted to reduce solvent use. • Workers will be provided with masks and proper PPE.
<p>Noise Emissions</p>	<ul style="list-style-type: none"> • Effective noise suppression design and plan will be made for all noise producing equipment i.e. high noise generating machines will be kept in isolation from other machines to minimize the overall cumulative noise. • Noise barriers should be implanted • The repairing and the small source of noise will be removed if it will possible. • PPEs are provided to workers • Proper tree plantation has been done • Noise monitoring will be carried out periodically.
<p>To minimize loss work injury/hazards/incidents/a accidents</p>	<ul style="list-style-type: none"> • Proper training will be provided for the proper usage of machineries and personal protective equipment (PPE) will be provided. It will be ensured that the individual who has received the correct training is operating a particular machine. • Site supervisor or health and safety should be present on site • Risk Assessment will be done on daily basis • Emergency response plans will be remained active. • Monitoring cameras and sensors will be implanted at the work site • Regulation of the health and safety polices will be done on regular basis • Regular housekeeping practices will be ensured by keeping the floor dry and during washing; proper protective equipment are being used. Restricted entry should be ensured during washing.

	<ul style="list-style-type: none"> • Training of staff in the handling of lifting materials. • Timely maintenance and repair of electrical equipment will be conducted. • Implementation of work rotations, provision of regular work breaks. • At workplace, first aid facilities will be maintained at readily accessible places.
Solid waste management	<ul style="list-style-type: none"> • There will be separated bins for segregation of different type of waste • Proper waste collection system will be ensured. For this purpose, waste bins are placed inside the boundary. • The recyclable waste will be sent to waste contractors. • The sludge of from the ETP plant will salad out to waste companies. • The site in charge will ensure the separation of waste at production line. • Proper person will be haired for the collection and removal of waste from the site. • Records of generated waste should be maintained. • All non-hazardous waste that can be recycled or reused will be handed over to the contractors. • Training will be provided to personnel for identification, segregation and management of waste. • All containers of waste will be labeled properly. • All the container should be caped clean, making sure no Oster will produce in it. • The proper waste management system will be applied. • Small bins and large containers will be provided on every waste producing site at defined place causing no risk to worker and machinery. • In-house audits of the waste management will be undertaken on regular basis.

ENVIRONMENTAL MANAGEMENT & MONITORING PLANS:

An Environmental Management Plan (EMP) will be implemented to control air emissions, wastewater, solid waste, and occupational health risks. Regular monitoring of air quality, wastewater quality, and noise levels will be conducted. Environmental training will be provided to workers, and compliance with environmental regulations will be ensured through record keeping and periodic inspections. Plan has been included in **Chapter-7** of this EIA Report

CONCLUSION & RECOMMENDATION

The proposed project of Roidec Private Limited will be environmentally manageable if recommended mitigation measures are properly implemented. The use of water-based adhesives and controlled formulation processes will significantly reduce environmental risks.

It is recommended that the project be allowed to proceed subject to strict implementation of the Environmental Management Plan, regular environmental monitoring, and compliance with applicable environmental laws and standards.

Recommendations:

Following Recommendations are suggested:

- All the workers should be given with proper PPE's during operation phase
- All the concerns of stakeholders should be catered before construction
- EMP should be properly implemented
- The construction and installation should be completed in guidelines of accorded Environmental Approval.

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CHAPTER 1: INTRODUCTION

1.1 GENERAL

The chemical industry will play an important role in industrial development by supplying essential materials to many sectors such as sports goods, paints, packaging, construction, and manufacturing. Chemical industries will convert raw materials into useful products through controlled physical and chemical processes. Adhesives manufacturing is a part of the light chemical industry where formulation, blending, and dispersion processes are mainly involved instead of heavy chemical reactions.

However, chemical industries will also have potential environmental impacts such as air emissions, wastewater generation, solid waste production, and occupational health risks. Therefore, proper environmental planning, pollution control systems, and monitoring programs will be necessary. The shift towards water-based products and biodegradable materials will significantly reduce environmental pollution and improve sustainability.

Roidec Private Limited will establish an adhesive manufacturing unit at 225 Sundar Industrial Estate, Lahore. The proposed project will manufacture water-based lamination adhesives (Green Bond) and solvent-based adhesives (CAD-5), which will be used in export-quality soccer ball manufacturing. The project will mainly supply adhesives to football manufacturers and exporters located in Sialkot, Pakistan.

This Environmental Impact Assessment (EIA) has been prepared to identify and evaluate potential environmental impacts associated with the construction and operation of the project. The EIA will also recommend suitable mitigation measures to minimize negative impacts and enhance positive environmental and socio-economic benefits in accordance with environmental regulations.

The purpose of this study is to identify the environmental baseline i.e. physical, biological and socio-economic/cultural conditions and assess all possible impacts arising during the construction and operation phase of the project with the aim to find out appropriate measures for their mitigation, to either eliminate those impacts or to bring them to acceptable level and formulate Environmental Management Plan (EMP) for implementation of the project in environment-friendly manner.

The report provides relevant information, as required under the officially approved format, to facilitate the decision makers i.e. EPA Punjab for the issuance of Environmental Approval.

1.2 THE PROPONENT

Name of Proponents	Tariq Riaz Muhammad Waseem Zulqarnain
CNIC	35202-1441669-5 35202-7762407-9
Address	Cinema Road, Arshad Colony, Raiwind, Tehsil & District Lahore House No E-50/C Model Town, Lahore

1.3 THE PROJECT

1.3.1 Nature of Project

The proposed project will involve setting up a chemical formulation facility for adhesive production. The manufacturing process will be based on mixing, blending, and formulation of polymers, resins, plasticizers, solvents, and additives under controlled conditions. No heavy chemical synthesis will be involved, which will reduce the risk of hazardous emissions.

The nature of the project will be chemical manufacturing, specifically adhesive formulation and blending. The project will involve handling of chemicals such as water-based dispersions, synthetic rubbers, biodegradable resins, and non-prohibited solvents like ethyl acetate.

1.3.2 Size of Project

The size of extension is as follows:

Capacity of the Unit	1000 kg per day
Main Principle of Unit	Physical mixing and chemical formulation

Components of Projects	Raw Material Storage Area (Solvents, Additives, Resins)
	Process and Mixing Halls
	Finished Product Storage Area

1.3.3 Location of Project

The project will be located at Plot No. 225, Sundar Industrial Estate, Lahore. Sundar Industrial Estate is a planned industrial zone designed specifically for manufacturing and processing industries.

1.3.4 Total area

The total plot area of the project will be 26,993.47 square feet (approximately 4.96 kanals).

The land use will be as follows:

- Open Area: 20,961.87 sq. ft.
- Total Covered Area: 6,904.6 sq. ft.

The large open area will help in ventilation, internal movement, parking, and landscaping, which will reduce environmental and visual impacts.

1.3.5 Cost of the Project

Cost of project will be Approx. PKR 45 million.

1.3.6 Total Area of the Project:

The built-up area and layout of the project will be as follows:

- Total Plot Area: 26,993.47 sq. ft.
- Open Area: 20,961.87 sq. ft. (for parking, green spaces, and circulation)
- Covered Area of Ground Floor Hall & Office: 5,681.60 sq. ft.
- Room Covered Area: 678 sq. ft.
- Guard Room Covered Area: 272 sq. ft.

- Mumty Covered Area: 273 sq. ft.
- Total Covered Area: 6,904.6 sq. ft.

1.4 PURPOSE OF REPORT

The development of any Project leads to positive and adverse changes in environmental and change in social settings of the Project Area. The intensity and level of change, however, depends upon the nature of the Project and the baseline environmental conditions of the area. The development and commencement of said project will cause minor to moderate adverse environmental and social impacts on the surrounding area. Thus, an environmental and social study is mandatory to establish the baseline conditions, evaluate the possible adverse impacts if any, and devise the mitigation measures.

Section 12 of Pakistan Environmental Protection Act, 1997 (PEPA, 1997) states ***“No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an Initial Environmental Examination (IEE) and, where the project is likely to cause an adverse environmental effect, an Environmental Impact Assessment (EIA), and has obtained approval from the Provincial Agency in respect thereof.”*** Later on, Punjab Environmental Protection Agency (Review of IEE and EIA) Regulations, 2022 provided the guidelines for categorizing the Projects. The main objectives of this EIA study were:

- To determine and document the state of the environment of the project area to establish a baseline in order to assess the suitability of the said project in that area.
- To identify pre-construction, construction and operation activities and to assess their impacts on environment.
- Provide assistance to the proponent for planning, designing and implementing the project in a way that would strengthen environment, improve ecological resilience, eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in cost effective manner.
- To present Mitigation and Monitoring Plan to smoothly implement the suggested mitigation measures and supervise their efficiency and effectiveness.
- To provide opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.

- Prepare an EIA Report for submittal to the Environmental Protection Agency, Punjab for according Environmental Approval.

1.5 Structure of Report

This EIA reviews information on existing environmental attributes of the Study Area. Geological, hydrological and ecological features, air quality, noise, water quality, soils, social and economic aspects and cultural resources are included. The report predicts the probable impacts on the environment due to the said project. This EIA also proposes various environmental management measures. Details of all background environmental quality, environmental impact/pollutant generating activities, pollution sources, predicted environmental quality and related aspects have been provided in this report. The structure of the assessment report will be as follow;

- Description of the Project
- Alternatives
- Scoping & Screening
- Description of Environmental and Social Conditions
- Assessment of Environmental Impacts and Mitigation Measures
- Mitigation Measures for Identified Impacts
- Public Consultation
- Environmental Management and Monitoring Plan (EMMP)
- Recommendations and Conclusions

CHAPTER 2

SCREENING AND SCOPING

2.1 General

This section of the study concentrates on details of the project and its salient features; such as location, site layout, objectives, selection of alternatives, cost and magnitude of operation and various phases. Inputs and discharges relevant to different phases of the project, such as electricity & materials, etc. have also been examined as a response to possible environmental concerns.

2.2 Type and Category of Project

As per Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2000, The project falls under Section – C (4) of the schedule I of IEE / EIA Regulations, 2000 (amended 2022)

2.3 Objectives of Project

Following are the main objectives of said textile industry:

- To manufacture high-quality water-based and solvent-based adhesives
- To support export-oriented soccer ball manufacturing.
- To promote environmentally responsible chemical production
- To generate employment opportunities
- To comply with environmental and safety regulations

2.4 Alternatives

The analysis of the alternatives is a part of the EIA process to select the best among all possible project options. The alternatives of a project are defined as the options that can help to meet the objectives of a project by different means including alternative project sites, Environmental alternative etc. The key criteria when identifying alternatives is that they should be feasible and reasonable.

Selection of preferred alternative is based on scores of factors including cost, schedule of delivery, environmental and social impact and the cost for their redressal. The drivers that affect potential alternative options and scenarios include: availability of project sites, current

technologies; design changes that need to be introduced, operational situation, capital & recurrent costs, environmental & social issues, their potential impacts, and costs of mitigation.

The details of the site alternatives and project alternatives are discussed below

2.4.1 Site Alternatives

No other site alternative was available to be considered as feasible option for the installation of the plant as proposed project site is owned by the Roidec (Pvt) Ltd. The proposed site was selected because of the following reasons;

- The selected site is located in the proximity of other relevant industries
- Operation of the aforesaid unit in the respective zone will provide job opportunities to local people and will improve their socio-economic status of the study area.
- Availability of developed infrastructure
- Industrial zoning compliance
- Distance from dense residential areas
- Existing industrial surroundings reducing cumulative land-use conflicts.

No important religious, archaeological, recreational site or ecologically/declared protected area and human settlement exists within close proximity of the selected site. In view of these facts, it can be concluded that the selected site is best suited for the project, and will not pose any adverse impact or threat on any component of the environment.

2.4.2 Project Alternative

2.4.2.1 Contribution to GDP and Development

The chemical manufacturing sector plays an important role in Pakistan's industrial growth by supplying essential input materials to various downstream industries such as sports goods, textiles, footwear, packaging, construction, and paints. Adhesive manufacturing is a value-added segment of the chemical industry, as it supports export-oriented manufacturing units and enhances product quality and durability.

Roidec Private Limited will contribute to national economic development by producing water-based and solvent-based adhesives required for export-quality soccer balls. The project will indirectly support Pakistan's sports goods export sector, particularly in Sialkot, which is

internationally recognized for football manufacturing. By ensuring local availability of high-quality adhesives, the project will reduce dependence on imported chemicals and strengthen the domestic supply chain. This industrial activity will positively contribute to GDP growth, industrial output, and export competitiveness of Pakistan.

The establishment and operation of this project will also support industrial development of Sundar Industrial Estate and surrounding areas by promoting chemical manufacturing activities, infrastructure utilization, and allied service.

2.4.3 Labor

Availability of labor is a key factor supporting industrial development in Pakistan. The chemical and manufacturing sectors benefit from an ample supply of semi-skilled and skilled labor, particularly in industrial estates. Adhesive manufacturing requires technical operators, quality control staff, machine operators, supervisors, and support staff.

Roidec Private Limited will emphasize hiring local labor as much as possible during both construction and operational phases. This will increase employment opportunities and improve the socio-economic conditions of the surrounding area. Direct employment will be generated for plant operators, technicians, administrative staff, and safety personnel, while indirect employment will be created through transport, supply, maintenance, and service providers.

Considering the economic contribution, employment generation, and industrial importance of the project, no feasible project alternative can be envisaged.

2.4.4 Environmental alternatives

2.4.4.1 Wastewater Treatment

Wastewater generated from the proposed adhesive manufacturing unit will mainly originate from process equipment washing, formulation tank cleaning, floor washing, maintenance activities, and domestic use. Unlike municipal wastewater, industrial wastewater from adhesive manufacturing may contain polymeric residues, resins, plasticizers, solvents, suspended solids, and elevated organic load, which require proper treatment before disposal.

Generally, industrial wastewater consists of more than 99% water, while the remaining fraction contains dissolved and suspended contaminants such as oils, chemicals, detergents, organic matter, and trace hazardous substances. If discharged untreated, such effluent may cause water pollution, soil contamination, and ecological imbalance.

To address this issue, Roidec Private Limited will install a dedicated Effluent Treatment Plant (ETP) specifically designed for chemical industry wastewater. The treatment process will include:

- Primary treatment for removal of suspended solids and gross contaminants
- Secondary (biological) treatment to reduce organic load (BOD and COD) through microbial degradation
- Tertiary/chemical treatment where required to neutralize toxic compounds and residual chemicals

Biological treatment will be preferred as it is environmentally sustainable and reduces chemical sludge generation. Chemical treatment will only be used where necessary for neutralization or removal of specific contaminants.

2.4.5 Economic Alternative

The establishment of Roidec Private Limited involves a significant capital investment of PKR 45 million, which will utilize financial, energy, and natural resources. Electricity demand for mixing units, ventilation systems, lighting, and utilities will be substantial.

To minimize pressure on the national power supply system, Roidec Private Limited will plan to use energy-efficient machinery and equipment. Efficient motors, optimized production scheduling, and proper maintenance will reduce energy consumption. Where feasible, in-house power management solutions will be adopted to ensure reliable operations without overburdening the national grid.

Considering the economic benefits, industrial importance, export support, and employment generation associated with the project, no economically viable alternative to the proposed project is considered feasible.

CHAPTER 3:**DESCRIPTION OF PROJECT**

This section of the study concentrates on details of the project and its salient features; such as its location, objective, site layout, cost and magnitude of operation at various phases and process employed for the subject process.

3.1 Objectives of Project

The main objective of the project will be to produce reliable and high-performance adhesives for the sports goods industry while adopting environmentally friendly practices. The project will aim to reduce environmental pollution through the use of water-based formulations, proper waste management, and emission control systems. The project will also contribute to industrial growth and employment generation.

3.2 Particulars of Project Site

Details of location of project are provided in table below:

Table 1: Particulars of Project Site

Particulars	Details
Latitude	31.282123° N
Longitude	74.169493° E
Location	Plot No 225 E Sundar Industrial Estate Lahore
District	Lahore
Nature of area	Industrial

3.3 Location and Layout of Project**3.3.1 Location of the Project**

Project site is located at Plot No 225 E Sundar Industrial Estate Lahore. Roidec Pvt Ltd is situated within **Sundar Industrial Estate**, Lahore, which is a well-planned and officially

developed industrial zone. The site lies in an industrially designated area, minimizing land-use conflicts and making it suitable for industrial operations. Google map is given below:



Figure 3-1 Location Map of Project Site

3.4 Nature of Area

Said area is industrial in nature.

3.5 Land Ownership

The land is owned by Roidec Associates (Pvt) Ltd . Property documents have been attached as **Annexure II.**

3.6 Land Use on Site

The land use on the site will be industrial in nature. There is no settlement, grassland or preserved area in the proximity of the project area that could be damaged or dismantled.

3.7 Road Access

The project site has **adequate road access** through the internal road network of Sundar Industrial Estate. The nearest major road is located approximately **2.04 km** from the site, which connects the estate to the main arterial roads leading toward Lahore city and surrounding industrial zones. The internal roads are wide, paved, and suitable for the movement of heavy vehicles, raw material transport, and finished goods.

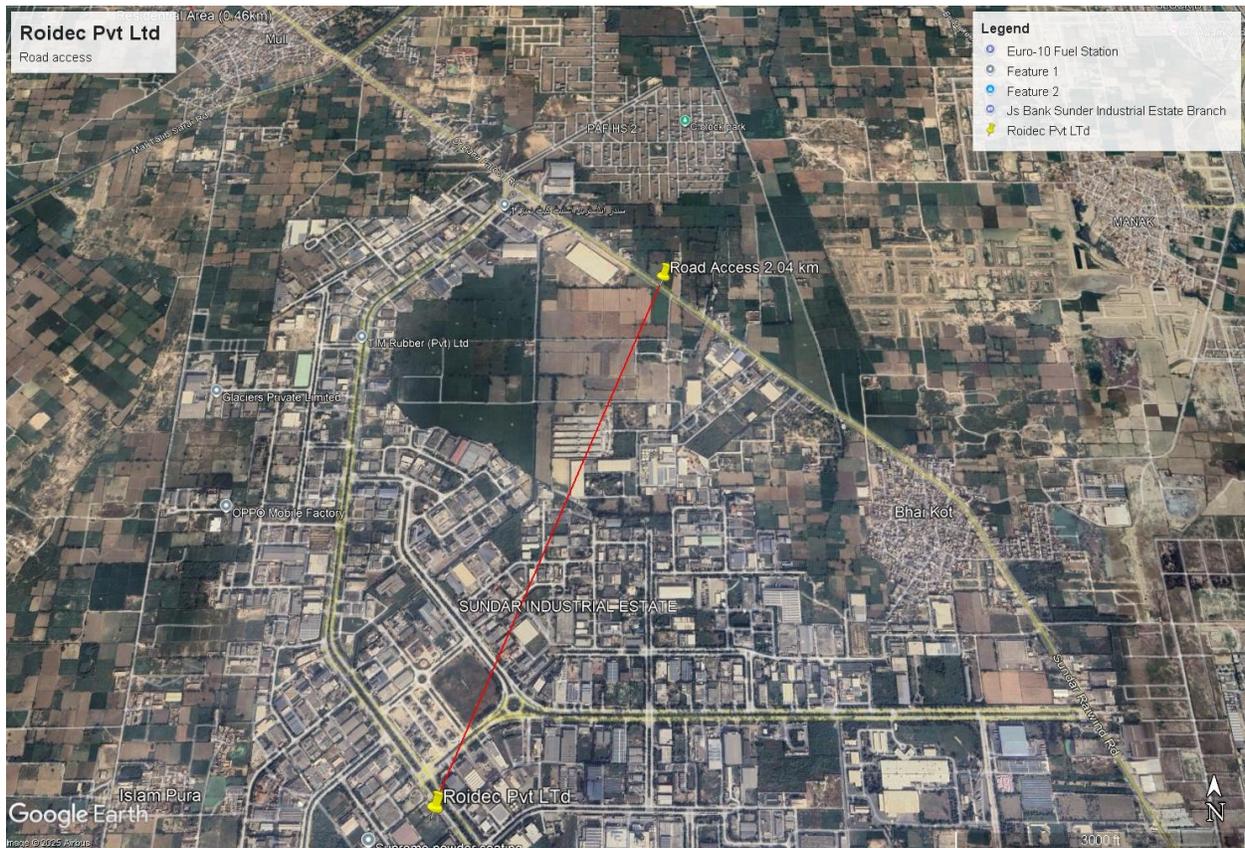


Figure 3-2 Road Access

3.8 Vegetative Features on Site

The area around the project area is industrial. There found no vegetative features nearby the project site.

3.9 Schedule of Implementation

The schedule of implementation for the commencement of the civil work involved for the installation construction and operational maintenance is approximately 12 months and the detail timeline of the construction period is given in Table below:

Table 2: Timeline for Project Development

Sr. #	Activities	3 Months											
		4W	4W	4W									
1	Detailed Designing	█	█										
2	Mobilization of Contractors			█									
3	Lean Development Period				█	█	█						
4	Peak installation Period							█	█	█	█	█	
5	Commissioning												*
<i>W=48 Weeks</i>													

3.10 Description of the project:

The proposed project will involve the production of adhesives through controlled formulation processes. Raw materials such as polyvinyl water-based dispersions, synthetic rubbers, biodegradable resins, plasticizers, solvents, and additives will be used.

The manufacturing operations will be carried out in enclosed mixing units to ensure product quality and environmental protection. Wastewater and air emissions generated during the process will be managed through proper treatment and control systems.

3.10.1 Products:

The project will be designed to manufacture water-based lamination adhesives (Green Bond) and regular solvent-based adhesives (CAD-5), primarily for the production of export-quality soccer balls, catering to football manufacturers and exporters in Sialkot, Pakistan.

3.10.2 Main Principle of Unit

The main principle of the project will be based on physical mixing and chemical formulation rather than complex chemical reactions. Controlled agitation, temperature regulation, and precise material ratios will be used to achieve desired adhesive properties.

The project will emphasize cleaner production by promoting water-based products and minimizing the use of hazardous chemicals, which will reduce environmental and health risks.

3.10.3 Manufacturing process:

The adhesive manufacturing process will start with the preparation and measurement of raw materials. These materials will be mixed in specific proportions using mechanical mixers under controlled conditions. Separate production lines will be used for water-based and solvent-based adhesives.

After mixing, the product will be tested for quality parameters and then transferred to storage or packaging. Wastewater from cleaning and formulation will be collected and treated, while solvent vapors will be controlled through ventilation systems.

3.10.4 Raw Material Storage and Handling

Raw materials will be stored in designated areas with proper labeling and safety measures. Spill prevention systems will be provided to avoid soil and water contamination.

3.10.5 Mixing and Formulation

Measured quantities of polymers, resins, plasticizers, and solvents will be added into mixing vessels. Mechanical mixing will ensure uniform dispersion and consistency.

3.10.6 Quality Control

Samples will be tested for viscosity, bonding strength, and drying properties. Only approved batches will proceed to packaging.

3.10.7 Packaging and storage

Finished adhesives will be packed in suitable containers and stored in a ventilated storage area

Storage Areas

Warehouse for storage of raw material, finished products, chemicals will also be established. The purpose of the construction is to provide adequate space for storage of materials. Proper ventilation, emergency exits and storage/ stacking SOP's will be followed.

3.11 Relocation and Rehabilitation Plan

There exists no human settlement within premises of the selected project site to be displaced as a result of the proposed project. Moreover, no structure of any significance stands at the site is proposed to be relocated. The project area is owned by the proponent. So, no restoration and rehabilitation are required.

3.12 List of Raw Materials

List of Raw Materials is provided below:

- Polyvinyl water-based dispersions
- water-based plasticizers
- Biodegradable resins
- Synthetic rubbers
- Non-prohibited solvents such as ethyl acetate, and minor performance-enhancing additives.

3.13 Amenities

The following social amenities are present at site and the management of the waste (construction waste, solid waste and effluents) is explained in sub-sections below:

3.13.1 Electricity Consumption

Wapda and In house power generation,.

3.1.1. Ground Water Resource

During constructional and operational phase ground water will be consumed.

3.13.2 Management Plans

Following management plans will be employed to reduce the impact of the proposed activity:

3.13.3 Air Emissions

Air emissions will be generated while continuous operation of generator, steam from dying etc, boilers. may deteriorate the quality of air in the open area. No other emissions will be generated from process related activities.

To deal with the pollution generated from these activities, regular monitoring and testing of generators will be carried out to ensure compliance. The workers dealing with the process activities will be provided with masks, safety shoes and all other necessary PPEs. To reduce the public nuisance native trees will be planted on the boundary to reduce the nuisance and to reclaim the disturbed soil effectively.

3.13.4 Wastewater Management and Disposal

In the proposed project the wastewater will be generated from dyeing section, municipal and domestic activities. This wastewater will be transfer to the waste water treatment plant where the water will be treated and the results of the final discharge water will be maintained according to the PEQS and then discharge to Nala near by the industry.

It is proposed that tree plantation will be carried out around the premises of project area. The generated wastewater will be consumed for on-site horticultural activities.

3.13.5 Waste Management

The solid waste will be generated during the cooking in the worker's mess and during processing. The solid waste which will produce during process activities which will be sold out to EPA certified contractor. Regular training will be given to the workers dealing with the waste management it will include identification, segregation and management of waste. Other waste producing from the admin block, canteen, warehouse or from skybridges will goes to the municipal waste committee

3.13.6 Emergency Preparedness

Emergency response preparedness committee will be formulated consisted of heads of all departments and nominated members. Project Manager will be the head of the team who will chair the Committee. In the case of emergency, he will immediately inform the concerned authorities. HSE Manager will be responsible for on-site HSE management.

First aid facilities will be available at facility which will include; blankets, hot water bottles, sterilized dressing, snake bite kit, cotton and iodine (2% alcohol).

3.13.7 Safety Trainings

Skilled, semi-skilled and un-skilled staff will be provided with proper training about the work and safety practices that need to adopt during the process activities.

3.13.8 Use of Drugs and Narcotics

Drugs and narcotics are strictly prohibited during working hours in working area. Smoking will be only allowed during rest timings at properly isolated places.

3.13.9 Personal Protective Equipment

Following Personal Protective Equipment (PPEs) will be provided to the workers:

- Safety Helmet
- Safety Shoes
- Dust Mask
- Safety Gloves
- Safety goggles
- Ear plugs/ muffles

CHAPTER 4: DESCRIPTION OF THE ENVIRONMENT

4.1 General

An environmental baseline study is intended to establish a database against which potential project impacts can be predicted and managed later. The EIA of the proposed Project covers a comprehensive description of the project area, including environmental attributes which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the construction and operation of the project. The existing environmental conditions around the proposed project have been considered with respect to physical, biological and socio-economic aspects. Site visits were conducted to survey the field area and to collect environmental data on physical, biological and socioeconomic parameters. Further, consultations were held with the general public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project

4.2 Methodology

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

4.2.1 Data Collection

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

4.2.2 Social Survey

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

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

4.2.3 Sampling Design

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

4.2.4 Questionnaires

In order to test the validity and reliability of the proposed questionnaires, they were reviewed to assess whether questions needed to be clarified, changed or re-sequenced and then a final editing of questionnaires was conducted prior to their application in the project area.

4.3 Data Editing and Analysis

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

4.3.1 Review of Legal and Administrative Framework

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

4.3.2 Baseline Conditions

Baseline conditions refer to the existing physical, environmental and socio-economic status of the project area. On the basis of baseline information, the project interventions are assessed and mitigation measures are proposed. The baseline information also helps to indicate the specific issues to be monitored during construction and operational phases. The baseline data (physical, biological and socio-economic parameters) related to the project area is described below. Information provided is based on primary and secondary data collected by site visits, desk studies and consultation with locals respectively. This section gives the overview of the topology, geology, seismology and meteorological conditions of whole city whereas, it gives detailed information about the surface water, ground water and air quality of the project area. The detail of each parameter is discussed in sub-sections below:

4.4 Physical Resources

The physical resources consist of existing land form and land use at the project site including geology, hydrology, meteorology and climatology. The pre-project condition (i.e., baseline) of these components of the physical environment is described in detail. To identify the potential impacts on the physical, biological and socio-economic environment that is likely to arise from the project activities.

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

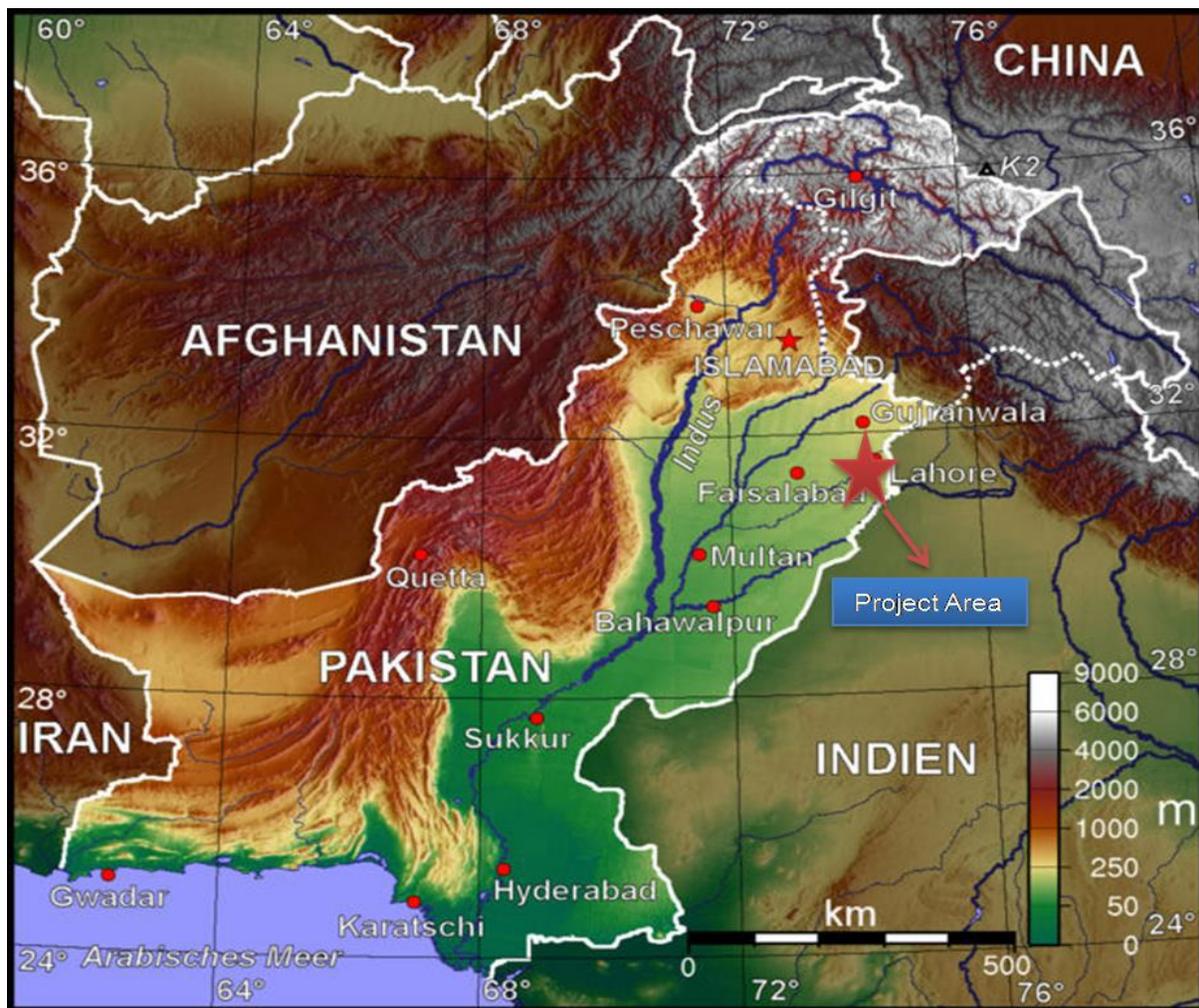


Figure 4.1 Figure showing project location

Reference: Environmental Impact Assessment of construction of alternate route to circular road from New Azadi Chowk to Masti Gate by Fizza Batool.

Hydrology and ground water

The Study Area forms the upper part of Punjab plain, which is a part of the Indo- Gangetic depression. This depression is of a synclinal nature. Synclinal depression is a fore deep downward of the Himalayan foreland of variable depth, converted into flat plains by simple process of alluvial deposition. It is part of the large inter alluvial upper Bari Doab, which is bounded by the Ravi River in northwest and the Sutlej River to the southeast. The Bari Doab along with other Doabs like Rechna, and Chaj form the vast alluvial plain of the upper Indus Plain in Punjab.

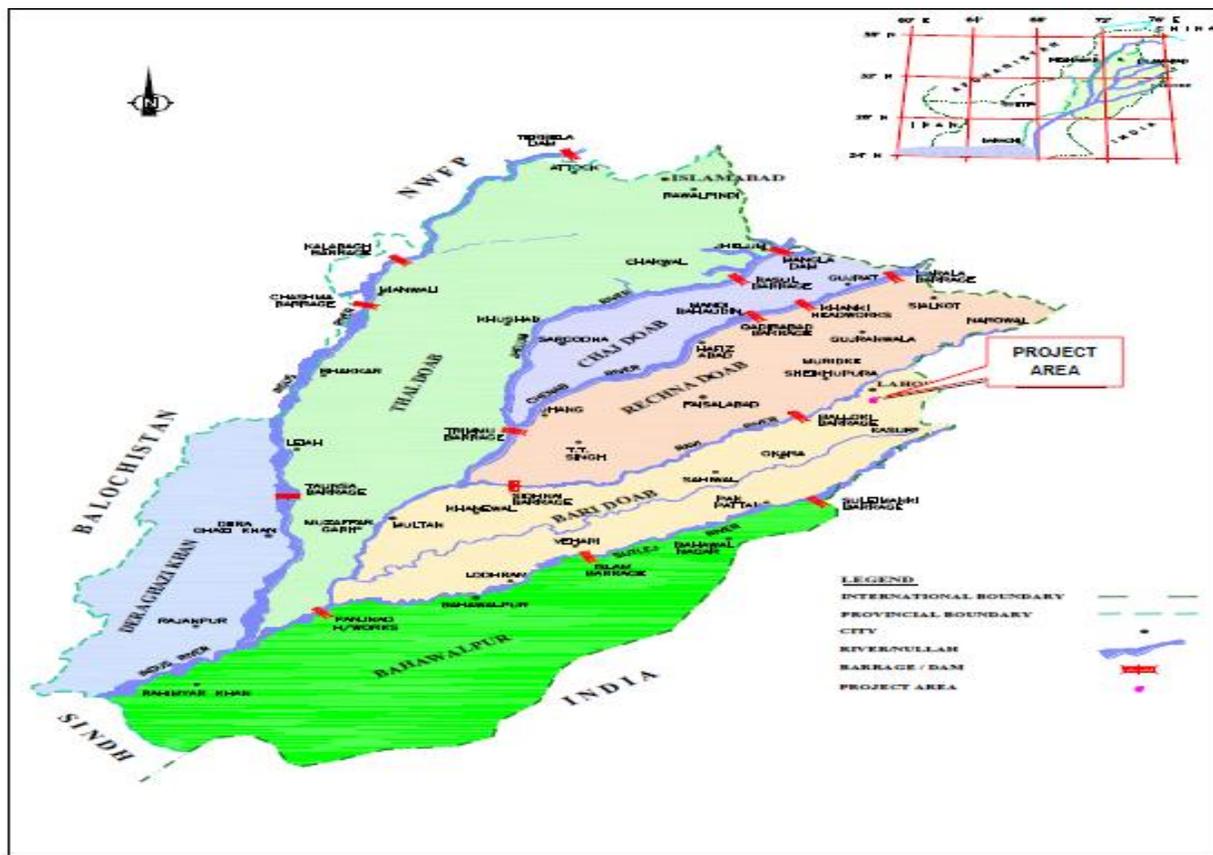


Figure 4.2 Hydrology of area

4.4.1 Climate & metrology

Seasonal climatic conditions must be considered for the design and execution of Project. The climate including air, temperature, precipitation, humidity and evaporation is an influencing factor, affecting the construction of plant and other engineering structures. However, to determine the overall effect of the climatic stresses, daily and seasonal temperature changes, site altitude, direct solar radiation, and precipitation must be considered. The Project Area has extreme climate: it has hot summer and cold winters. The summer starts from April and lasts till September. May, June, and July are the hottest months. The mean maximum and minimum temperature ranges from 40.4 °C and 27.3 °C respectively for these months.

The winter seasons lasts from November to March. December, January and February are the coldest months. The mean maximum and mean minimum temperature ranges from 19.8°C to 5.9°C in January. Temperatures in the Project Area vary from 5.9 °C to 40.4 °C.

The project area receives rains in all the seasons but monsoon rain is pronounced and constitutes a definite rainy season between the month of July and September. The average rainfall is about 629 millimeters per year.

Average Monthly Temperature, Precipitation and Relative Humidity (2004-

Month	Mean Temperature		Precipitation (mm)	Relative Humidity AT 0500 HRS (%)	Relative Humidity AT 2000 HRS (%)
	Maximum	Minimum			
January	19.8	5.9	28.92	80.4	51.9
February	22.0	8.9	37.14	79.0	52.4
March	27.1	14.0	34.3	68.6	42.2
April	33.9	19.6	44.32	50.2	25.3
May	38.6	23.7	24.38	45.7	27.2
June	40.4	27.3	91.62	59.1	40.9
July	36.1	26.8	150.52	76.7	60
August	35.0	26.4	161.42	78.8	65.9
September	35.0	24.4	67.28	74.4	56.4
October	32.9	18.2	11.74	70.6	44.2
November	27.4	11.6	4.44	77.1	48.8
December	21.6	6.8	9.94	82.9	53.73
Annual	30.8	17.8	666	70.34	47.4

2008) Source: Meteorology Department Lahore

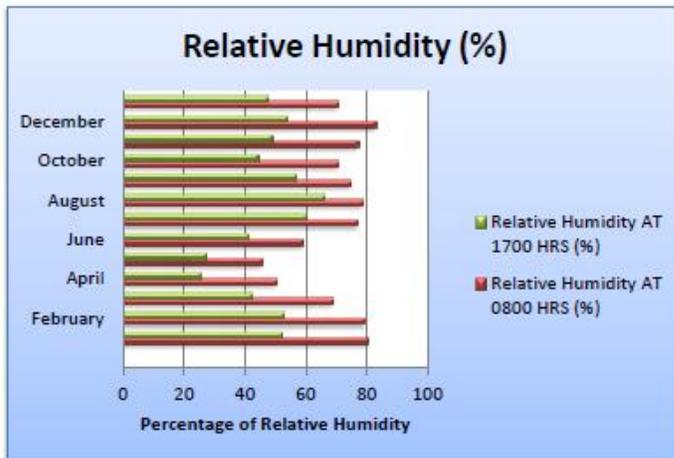


Figure 4.3 Relative Humidity in the Study Area (2005-2008)

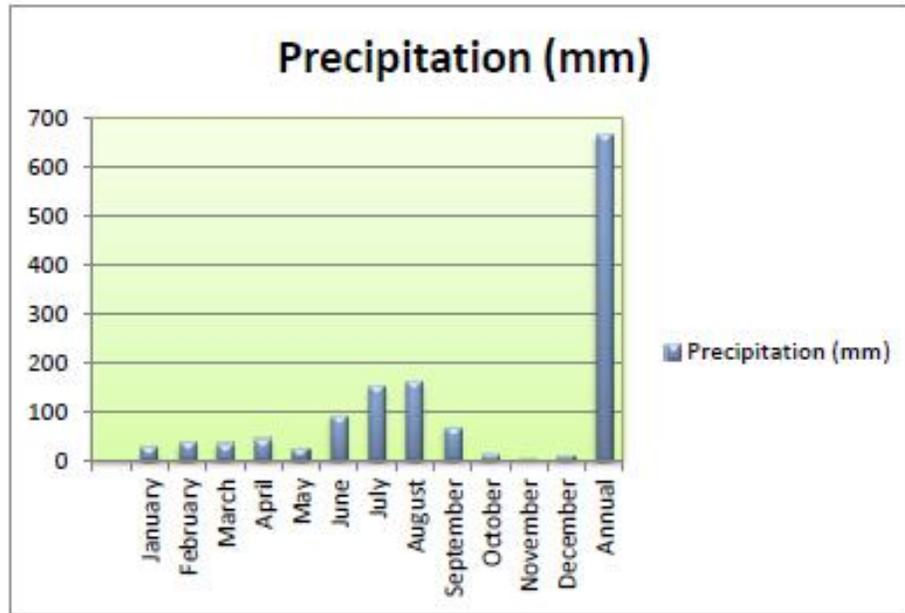


Figure 4.4 Average Rainfall in the Project Area (2004-2008)

Wind Speed and Direction 2008

Wind Speed m/sec	N	NE	E	SE	S	SW	W	NW	All Dir.
0									4906
1	2	2	9	4			3	3	23
2	74	108	120	162	51	87	199	132	836
3	72	235	70	258	26	174	163	320	1318
4	34	49	39	101	5	41	112	75	456
5	51	103	25	151	13	73	64	221	701
6	18	10	18	22	3	4	14	23	112
7	20	41	3	42	5	19	16	52	195
8	7	2	2	3			3	8	25
9	10	9	2	15		1	13	11	49
10	12	5		6		1	31	5	32
11	1							3	5
12	1	1				1	1	4	7
13		2		1			1	3	7
14							1	1	2
15	2					1		1	5
16									
17								1	1
18	1					1	1	2	5
19									
20 or above	1					1			2

Source: Meteorology Department Lahore

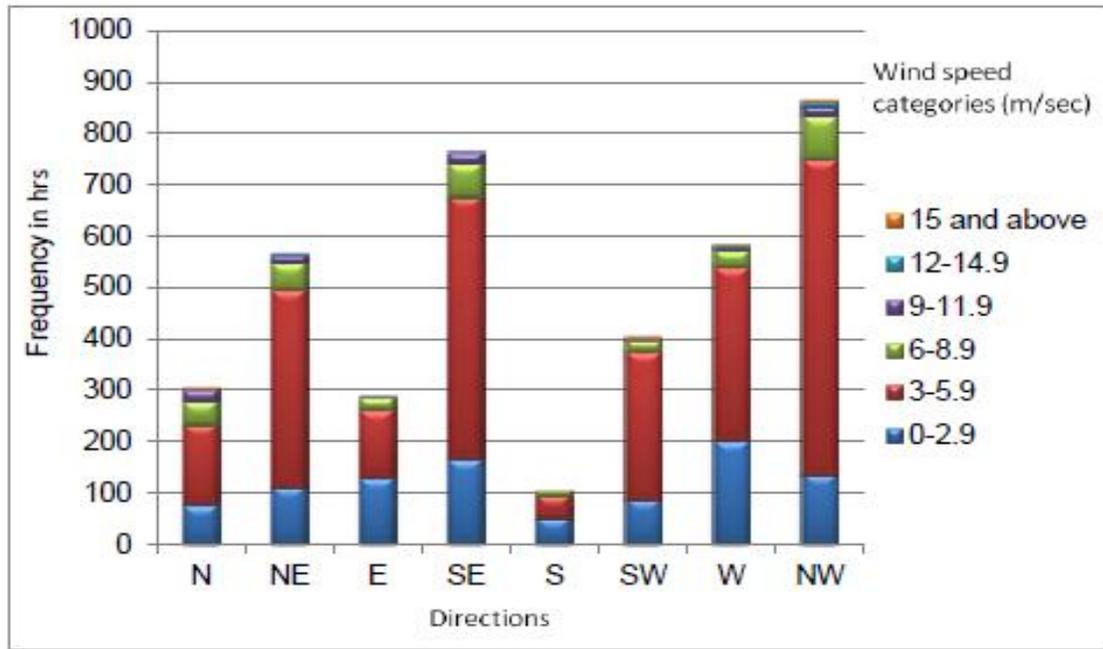


Figure 4.5 Wind Speed and wind direction in the city of Lahore 2008

Reference: EIA of Construction of Lahore Orange Line Metro Train Project (Ali Town –Dera Gujran)

4.4.2 Noise Level

Noise level in different areas of Lahore is as follows:

Sr. #	Location	Max. Noise Level (dB)
1	University of Lahore	82.9
2	Mansoor	87.0
3	Chouburji	81.6
4	GPO Chowk	73.4
5	Daroghawala Chowk	76.3
6	Jamia Masjid Anwar e Madina	83
7	Himayat e Islam .College	80.6
8	Australia Masjid	81.3
9	Ali Hospital	84.5
10.	UET Gate No. 3	70.3
NEQS Limit		80

4.4.3 Ambient Air Quality

Atmospheric pollution, particularly in urban areas like Lahore, has a strong impact on daily life. Motor vehicles are a major source of air pollution. Factories and cottage industry inside the

Lahore City are also contributing to air pollution. Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂), Carbon dioxide (CO₂), Carbon monoxide (CO), Ozone (O₃) and particulate matter (PM₁₀) are considered pollution indicators. Air quality of Lahore at different points is as follows:

Sr. No.	Location	Monitoring Duration	Parameters			
			NO _x µg/m ³	SO ₂ µg/m ³	CO mg/m ³	PM ₁₀ µg/m ³
1.	UOL	24 hr	<0.01	<0.01	2.1	284.17
2.	Mansoorah		<0.01	<0.01	3.24	269.83
3.	GPO		5.15	18.03	1.93	110.3
4.	Daroghawala		6.04	18.32	2.07	120.37
5.	Chouburji		26.33	25.26	2.81	202.65
6.	Jamia Masjid Anwar e Madina		<0.01	<0.01	1.16	176.04
7.	Himayat e Islam .College		<0.01	<0.01	1.80	150.04
8.	Australia Masjid		<0.01	<0.01	1.79	148.75
9.	Ali Hospital		19.75	25.26	2.26	155.42
10.	UET Gate No. 3		11.01	19.20	1.51	131.5
NEQS Limit			120 for 24 hrs	120 for 24 hrs	5 for 8 hrs	150 for 24 hrs

4.5 BIOLOGICAL ENVIRONMENT

4.5.1 Flora

Several types of floral species are present in Lahore as well as project area, however, some of the principal trees, are given below in Table

No.	Common Names	Botanical Names
1	Arjun	<i>Terminalia arjuna</i>
2	Dhak	<i>Butea frondosa</i>
3	Mahwa	<i>Bassia latifolia</i>
4	Bahara	<i>Terminalia bellerica</i>
5	Amaltas	<i>Cassia fistula</i>
6	Gul-e-nishter	<i>Erythrina subrosa</i>
7	Barringtonia	<i>Barringtonia acutangula</i>
8	Nim	<i>Melia indica</i>
9	Gab	<i>Diospyros embryopteris</i>
10	Berna	<i>Crateva religiosa</i>
11	Khark	<i>Celtis australis</i>
12	Putajan	<i>Putranjiva roxburghii</i>
13	Fiddle wood/Kashmir Lagotis	<i>Eithryxylum ruberratum</i>
14	Gul-e-mast	<i>Dalmania indica</i>
15	Gul-e-mohr	<i>Poinciana regia</i>
16	Alstonia	<i>Alstonia scholaris</i>
17	Ashoke	<i>Saraca indica</i>
18	Sheesham	<i>Dalbergia sissoo</i>
19	Alata	<i>Stercolia colorata</i>
20	Kenair	<i>Nerium grandiflora</i>
21	Weeping Willow	<i>Salix babylonica</i>
22	Keekar	<i>Parkinsonia aculeata</i>
23	Nilem	<i>Jacaranda mimosifolia</i>
24	Kachnar	<i>Bauhinia purpurea</i>
25	Molsary	<i>Mimosop elengi</i>
26	Bel	<i>Aegle marmelos</i>
27	Siris	<i>Albizia lebbek</i>
28	Tun	<i>Cedrela toona</i>
29	Jamin	<i>Eugenia jambolana</i>
30	Moor pankh	<i>Thuja orientalis</i>
31	Silkoak	<i>Grevillea robusta</i>

4.5.2 Fauna

Mammals

Common mammals found in the area are dogs, cats, house rats and bats.

Reptiles

Snakes such as cobra, kraits etc. were once common in the tract, but now cases of snake bites are very rare, as these reptiles have been either killed by expanding urbanization or they have moved away. Lizards such as Spiny tailed lizard (*Uromastix hardwickii*) and fringed toed lizard (*Acanthodactylus cantoris*) are also reported by the residents of the area.

Amphibians

Amphibians frequently seen in and around the project area, especially during rainy season, include common Frog (*Rana tigrina*) and Indus valley toad.

Birds

House sparrow (*Passer domesticus*), House crow (*Corvus splendens*) and Mynah (*Acredotheres tristis*) are the most common sight in the area.

There are no endangered species of flora and fauna in the Study Area.

4.6 SOCIOECONOMIC ENVIRONMENT

Socio economic environment is represented by the human and economic development and quality of life values. For the study of socio-economic environment of the project area, field surveys were conducted and interviews were held with the general public and neighbors. The baseline conditions of the city are as follow:

4.6.1 Demography

The total population of Lahore District was 6,318,745 as enumerated in March 1998 with an intercensal percentage increase of 78.3 since March 1981 when it was 3,544,942 souls. The average annual growth rate of population in the district during intercensal period 1981-1998 was 3.5 percent. The total area of the district is 1772 square kilometers, which gives population density of 3,566 persons per square kilometer as against 2000 persons observed in 1981 indicating a fast growth rate of the district. Table 4.9 gives population, its intercensal increase and average annual growth rate since 1951 of Lahore district.

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

Source: DCR of Lahore District, 1998

Reference: *EIA of Construction of Structural Road from Expo Center to Ring Road (Parallel to Canal Bank Road)*

4.6.2 Industries

After Karachi, Lahore is the biggest industrial area in Pakistan. There has been a steady expansion of industries in and around Lahore since independence. There are many large industrial units in the district. These units manufacture cotton, woolen and silk cloths, carpets and rugs, textile products, lather and rubber foot wears, wearing apparel, pharmaceutical goods, soap, iron and steel products, heating, plumbing and lighting equipment, hardware, miscellaneous fabricated products, agriculture machinery, engines and turbines, textile machinery, printing machinery, metal working machinery, pumps and compressors, household machinery, water generators, motor generators, transformers, electric fans, communication equipments, cycles and rickshaws. There are also a good number of printing and publishing units and body building workshops. Besides, there are units of canning and preservation of food, edible oils, beverages, metal and wood furniture, rubber products, chemicals, glass products, repair of railway equipment, toys, stationary etc.

4.6.3 Educational facilities

In the project area some educational institutions are found which include Allied School, Kips School, Dar-e-Arqam School and Punjab School. Overall in Lahore, educational facilities are mainly being provided by the Government of Punjab, the city government and the private sector and voluntary organizations. To a limited extent the high school education is also being managed by the Federal Government through the operation of few institutes located in the cantonment area. Of the total educated persons 12.6 % are below primary, 23.2 % had passed primary, 22.5 % middle, 18.2 % Matriculation, 9.3 % Intermediate, 7.2 % Graduates, 2.6 % Post graduates while 0.6 % were certificate holders. Total number of Government schools in Lahore District is 409 out of which, 223 are boy schools and 186 are girls schools while total number of students studying in these schools are 121,417 out of which, 46,625 are boys while 74,792 are girls. Similarly, total numbers of Municipal Corporation based schools in Lahore are 103 out of which, 44 are boy schools and 59 are girl schools. In these 44 boy schools total number of students is 4,575 and the total number of girl students is 9,606. Similarly, there are number of colleges and universities are dealing with all fields of Science and arts. The numeric details of these institutes are given in Table

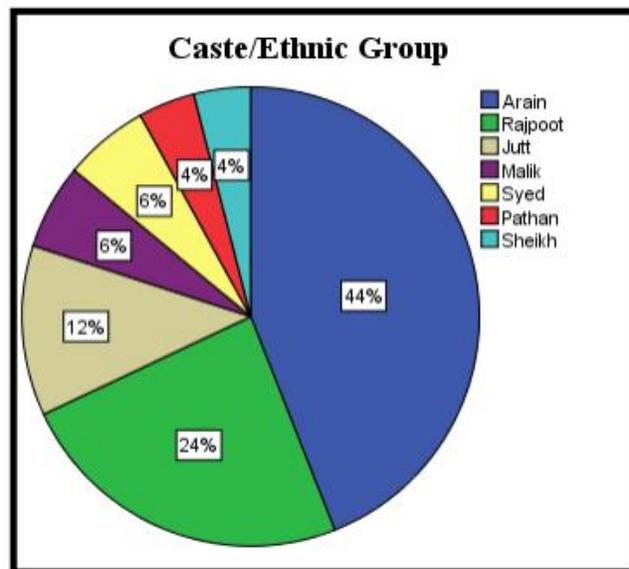
Sr. No.	Type of Institutions	Number	Number of population served
1	Higher Secondary Schools and Intermediate Colleges	36	182990
2	Degree Colleges	38	173359
3	Universities	52	48025

Source: DCR of Lahore District, 1998

4.6.4 Quality of life values

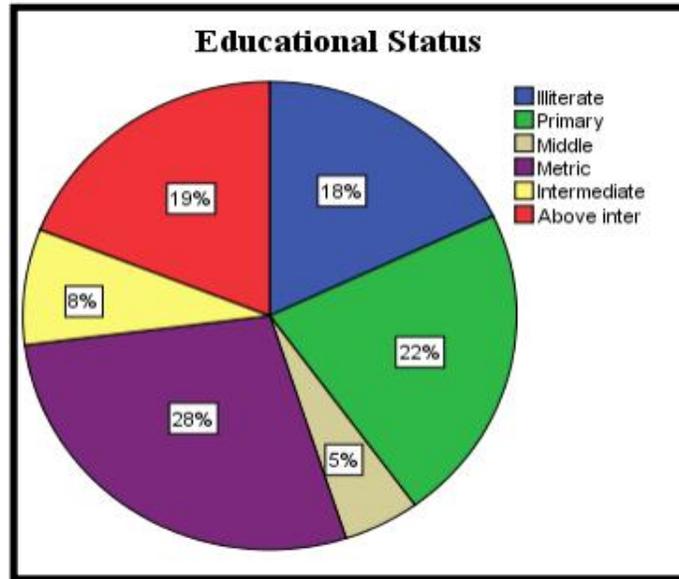
4.6.4.1 Caste / Ethnic Group

According to baseline survey, it was found that the largest part of the respondents i.e. 44% were Arain. While 24% were Rajputs, 12% were Jutt and 06% were Syed and Malik each. While 04% were Pathan and Sheikh each.



4.6.4.2 Educational Status of the Respondents

Educational attainment for sampled population of project area is not very low because out of 100 respondents, only 18% were illiterate. Primary school respondents were 22%. While 06% went to middle schools, 28% were up to metric level, 08% had passed the intermediate and 19% of the total respondents had got education above intermediate.



4.7 LAB REPORTS OF ENVIRONMENTAL ANALYSIS

Testing of different parameters was done by EPA certified laboratory to check the quality of different environmental parameters. The copy of the lab reports of these parameters (ambient air analysis, water quality analysis and noise) is given in annexure.

CHAPTER 5: STAKEHOLDER CONSULTATION

5.1 GENERAL

Public consultation refers to the process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. According to the IEE and EIA Review Regulations, public consultation is mandatory for any socio-environmental study.

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

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

This report includes all the comments, which were taken into account in preparing the definitive development concept for the establishment of said project. Public consultation performance is attached as Annexure of this EIA Report.

5.2 OBJECTIVES OF CONSULTATION

Public consultation plays a vital role in studying the impacts said project on stakeholders in its successful implementation and execution. It provides an opportunity to exchange knowledge with all stakeholders. Referring particularly to a project related to environmental assessment, involvement of public is all the more essential, as it leads to better and more acceptable decision-making. The overall objective of the consultation with the 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 the project. In fact, discourse with many

who have thoroughly observed the site conditions in the pre-developmental phase, goes a long way in updating the knowledge and understanding.

5.3 IDENTIFICATION OF STAKEHOLDERS

All the people who are directly or indirectly affected or concerned with the project are the stakeholder. Besides the living population of the surrounding areas, some other stakeholders were identified and contacted. They are the key players including; shops owners, vendors, public offices, school, university, hospitals,. Not only published material (Both brief and comprehensive literature were obtained on request) but also noted their views and the concerns. Following stakeholders are identified for this project:

Project stakeholders include the settled families, either property owners or the tenants, businessmen (land owners, traders, shopkeepers, vandors, transporters, restuarent owners etc.), employees of the commerical entities. PAPs are of two types, for instance:

5.3.1 Direct

In this case, the PAPs are those who will be benefited directly by project. No disturbance on the local community is being foreseen due to the installation of the said plant.

5.3.2 Indirect

Indirect impact will occur on those who are living or doing business within project area of influence. Indirect respondents include;

- ✓ Government agencies responsible to deal with the project related activities
- ✓ Government Agencies directly, indirectly or widely involved in the execution and monitoring of the said project
- ✓ Workers of political, cultural, religious or social scientific bodies, directly or indirectly related

5.4 PUBLIC DISCLOSURE

Public disclosure is the outcome of all such activities where public is involved at least in the information sharing process. This is an integral part of that process so before the proponent applies for NOC to the EPA, this disclosure will be distributed properly among all stakeholder.

It is the responsibility of the proponent and the consultants to display public disclosure document at prominent places where community has easy access.

5.5 CONSULTATION PROCESS

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

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

Various meeting with the stakeholders were held the following objectives:

- Share information with stakeholders on the said project and expected impacts on community in the vicinity of the project
- 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

5.5.1 Consultation Methodology

The methodology adopted for consultations is summarized below.

5.5.1.1 Consultation Material

The main document for distribution to stakeholders during the consultations was Social Impact Assessment Interview. The filled Survey forms of stakeholders are annexed

5.5.1.2 Consultation Mechanism

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

By reaching out to a wider segment of the population and using various communication tools such as participatory needs assessment, community consultation meetings, focus group discussions, in-depth interviews, and participatory rural appraisal EIA involved the community in active decision-making. This process will continue even after this EIA has been submitted, as well as during future EIA in which similar tools will be used to create consensus among stakeholders on specific environmental and social issues.

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

5.5.2 Primary Stakeholders Consultation

The community consultations were conducted with the community members outside their settlements to encourage and facilitate their participation.

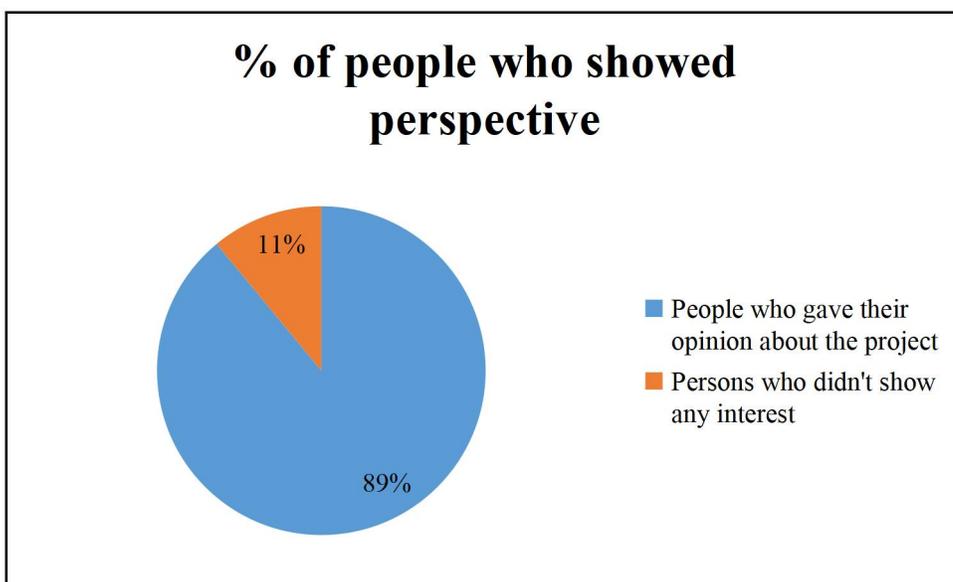
5.5.2.1 STAKEHOLDER CONCERNS AND RECOMMENDATIONS

The finding of the community consultation has been addressed in various sections of EIA. Mitigation plan has been incorporated into EMP. The summary of consultation with various stakeholders is given below

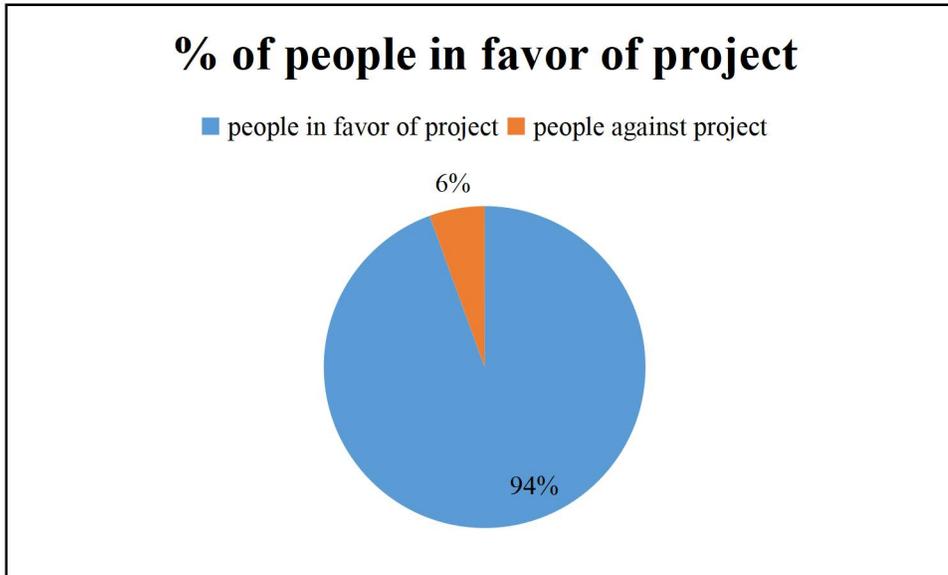
Out of total respondents of, 77% knew about the project whereas 23% were not aware of the project planning and implementation. All people were then briefed about the project.



89% commented their views about the project and 11% didn't respond.



Out of 89%, majority of the people (about 94%) favored the construction of the project keeping in view its importance and 6% people showed pessimistic views in general but mitigation measures and solutions to their concerns were provided.



Majority of people were in favor of project. They said that project will result not only in direct jobs opportunities for locals but also will enhance subsidiary business, trade, education, and agriculture and community development. The people were of the view that industry might also elevate education standards, struggle for career enhancement besides improvement in standard and quality of living in area. People were also of the view that industry may also be instrumental in connecting the local people with major cities and will result in increase in GDP.

Very few near to 6 % only shows concerns over power house emissions, noise, wastewater and health impacts. Majority of the concerns were changed in the favor of installation after communicating the participants proper solutions and mitigation measures

5.6 STAKEHOLDERS CONSULTED

Names of consulted stakeholders are given in table below:

Table 5- 1: List of consulted stakeholders

Sr. No	Stakeholder name

1.	Rehman
2.	Abdulaziz
3.	Asghar Ali
4.	NiyazAli
5.	Parvez Hussain
6.	Muhammad Naeem
7.	Muhammad Zulfiqar
8.	Muhammad Zaroon
9.	Muhammad Arif
10.	Usman Ali
11.	Muhammad Jalal
12.	Muhammad Tofail
13.	Syed Barat Hussain
14.	Arif Khan
15.	Basheer Hussain
16.	Saddam Hussain
17.	Muhammad Javed
18.	Muhammad Aslam
19.	Hameed Ahmad
20.	Nauman Majid
21.	Muhammad Maqsood
22.	Muhammad Aslam

5.6.1 Secondary Stakeholders Consultation

The consultations were carried out with the local government officials and officials of the following departments:

1. District Office Environment
2. Proponent
3. Environmental Precautionar

Comments and recommendations of all government representatives are presented in table below:

S#	Participant	Designation	Concerns/Remarks
Responsible Authority			
1	Mr.Qaisar	Inspector Environment	<ul style="list-style-type: none"> • Environmental enhancement measures such as; Tree plantation, monitoring and safety should be ensured • HSE plan should be enforced strictly • Should work for local people benefit • Preventive measures should be adopted to avoid any unfortunate incident
Proponent			
1	M. Javed	Representative of Proponent	<ul style="list-style-type: none"> • Local employment will be ensured • Tree plantation will be done to make project environment friendly • No waste will be dumped improperly • Quality will be ensured
Environmental Practitioners and Experts			
1	Dr. Muhammad Faqir Irfan	PhD. Environment Lawyer	<ul style="list-style-type: none"> • Health and safety arrangements must be provided

CHAPTER6: POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 GENERAL

This chapter describes the potential environmental and social impacts of the proposed activities, predicts the magnitude of the impact and assesses the significance. The main intention of this section is to provide the mitigation measures that need to be adopted wherever necessary, to reduce, minimize, or compensate for the negative impacts.

6.2 IDENTIFICATION OF POTENTIAL IMPACTS

In the first step, potential impacts of the project are identified by desktop screening exercise, using checklists during field visits for collection of baseline data, professional judgment, published literature on environmental impacts of similar projects and standard environmental guidelines. Potential impacts are also identified through discussion with project proponent, consultation with stakeholder and community to identify their concerns. The main aspects associated with potential impacts are as follows:

- Water resources
- Ambient Air Quality
- Waste discharges
- Noise pollution
- Ecology of the area, including flora and fauna
- Vehicle movement
- Socio-economic conditions
- Archaeology

6.3 CLASSIFICATION OF IMPACTS

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

Category Receptor	of	Description

Community	People their social and cultural values, aspirations and archaeological sensitivity
Land and Soil	Land resources, soil resources
Air Quality	Ambient air quality
Water Resources	Ground and surface water resources
Ecosystem	Vegetation, wildlife and biodiversity

6.4 SCOPING CRITERIA FOR IMPACTS

The identified potential impacts of the project are evaluated on the basis of following criteria;

- The present baseline condition, the change in environmental parameters likely to be affected by the project related activities;
- Is there any impact that environmental standards or environmental guidelines applicable to the project will be breached?
- Is there a high risk of permanent, irreversible, and significant change to environmental condition due to particular project activity?
- Did the community express any concern about this aspect?

6.5 METHODOLOGY FOR IMPACT ASSESSMENT

The impact assessment methodology defines three levels of consequences (or severity) and likelihood (chance of occurrence) i.e. Low, Moderate/Medium or High. The significance of an impact is determined on the basis of the level of consequence and likelihood of the impact.

Table 6- 1: Definitions of severity and likelihood of impacts

Level	Severity of Impact (Consequence)	Likelihood
High	Serious / catastrophic damage to local and regional environment Serious threat to corporate reputation/ profitability / ability to do business	High likelihood of occurrence during lifetime of operation Regular / continuous part of operations
Moderate	Measurable damage to the environment Potential to affect reputation / cost Reduced efficiency	Moderate possibility of occurrence during lifetime of operation Periodic / occasional part of operations
Low	Negligible damage to the environment No risk to business	Unlikely to occur during lifetime of operation

Table 6- 2: Impact Significance Matrix

		Likelihood (Probability of occurrence)		
		High	Medium	Low
Impact (Consequence)	High	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

The prediction of impacts also includes the duration of impacts in terms of short-term or long-term, nature of impact, geographical location of the impact, reversibility of the impact. The criterion for impact assessment is illustrated in the Table

Table 6- 3: Impact Assessment Criteria

Impact Characteristics	Categories
Nature of the Impact	Direct: The environmental parameters that are directly affecting by this

	<p>project.</p> <p>-Indirect: The environmental parameters change due to the combinational effect by project and environmental impacts</p>
Duration of the Impact	<p>Short term: Lasting only till the duration of the project</p> <p>Medium term: Lasting from a few months to a year</p> <p>Long term: Lasting for a period much greater than medium term impacts</p>
Geographical Location of the impact	<p>Local: Within the area of project i.e. operation site and access roads</p> <p>Regional: Within the boundaries of the project area</p> <p>National: Within the boundaries of the country</p>
Reversibility of the impact	<p>Reversible: When a receptor resumes its pre-project condition</p> <p>Irreversible: When a receptor cannot resume its pre-project condition</p>

6.5.1 What is the problem?

Roidec Private Limited will establish an adhesive manufacturing unit at 225 Sundar Industrial Estate, Lahore. The major impact associated with the construction and operation of said industry includes solid waste management, wastewater management, noise emissions, tree plantation and fire-fighting arrangements.

6.5.2 When problem will occur and when it should be addressed?

The impacts from the said industry mainly occur during the construction and operational phase of the project. These issues include; noise generation, fugitive dust emissions, solid waste management, wastewater disposal, Health and Safety issues and change in the geographic features of the area. These all problems should be addressed on-site where they are being generated, to avoid the residual or adverse impacts. The tell the description and impacts to Government and public by reports and public hearing.

6.5.3 Where problem should be addressed?

The problem will be generated from site development and operation of the industry. So, it should be addressed on source, i.e. at site within the same timeframe.

6.5.4 How the problem should be addressed?

Problem should be addressed with its full detail i.e. its magnitude, possible impacts and problem, long time effect, environmental impacts, and proper mitigation measures will be provided according to the nature of the impacts/problems.

6.5.5 Ways of Achieving Mitigation Measures:

Following ways will be adopted to reduce the impacts of the said project:

6.5.5.1 Changing in Planning Design

The design of industry is developed considering environmental risk and hazards. As the area is industrial lot of industries are present there. Moreover, there is no endangered and threatened species present in the project area. Any human settlement or infrastructure was not dislocated or dismantled due to the project development. The proper roads and transportation system along with migration measures is there. The project is fare away from urban development. Not any impact will affect the urbanization. Hence, there is no need to change the design of the project.

6.5.5.2 Improved Management and Monitoring Practices

The anticipated impacts will be reduced significantly by adopting better management activities, as it will be carried out for the betterment of the society. While environmental monitoring will be conducted on the regular basis to keep the sources of the air pollution, wastewater generation, noise and public nuisances in-check. All the migration measure and advance technology will be implanted to mitigate the impact. All the practices will meet the Punjab environmental standards and international standard like OSHA and AEPA.

6.5.5.3 Compensation in Money Terms

Due to the development of the project, no tree cutting is involved, however, there is no protected or environmentally sensitive area present within 2.0 km vicinity of the project that could be impacted. Hence, no compensation in the monetary terms is required.

6.5.5.4 Replacement/Relocation/Rehabilitation

The project site is owned by the proponent and reserved for the said industry. No replacement, relocation and rehabilitation is required for the commencement of the aforesaid project.

6.6 Impact Summary

Environmental Parameters	Impact Assessment during Different Phases	
	Construction	Operational
A: Physical		
Land Resources		
Soil Erosion and Contamination	0	0
Transportation	-1t	-1 t
Solid Waste and By-Products	-1t	+1p
Land Use	NA	NA
Air Resources		
Noise Pollution	-1t	-1p
Air Emission	-2t	-1p
Dust	-1t	-1t
Water Resources		
Ground Water	-1t	-1p
Surface Water	NA	NA
Wastewater	-1t	-1p
B : Ecological		
Flora		
Tree Cutting	N/A	N/A
Fauna		
Terrestrial Fauna	N/A	N/A
C: Socio-Economic		
Employment Opportunities	+1t	+1p
Land Value Appreciation	N/A	N/A
D: Hazards		
Physical Hazards	-1t	-1p

Health and Safety	-1t	-1p
<i>Legends: 1= Low; 2= Medium; 3= High; 4= Extremely High; NA= Not Applicable; t= Temporary; p= Permanent; app= Applicable; 0= Negligible</i>		

6.7 IMPACTS DUE TO PROJECT LOCATION

The said project site is located in area surrounded by other industries. As all the rules and migration procedure is applied. The project site is owned by the company. Further, the project site is devoid of any human habitation hence evacuation of the project-affected persons will not be involved in this project. Thus, no resettlement and rehabilitation issues will be involved in the said project. This project will be developed while undertaking minimum cutting for making terraces for construction while making minimum modifications in the terrain conditions and implementing environmental measures.

The topsoil removed from the site will be restored in dumps during construction period and in the post construction phase. The top soil will be spread on the unbuilt area of the plot and tree plantations and green belt development will be taken up. As the top soil removed from the site will be reused for the growth of plants, no adverse impact will be envisaged due to removal of topsoil from the site.

6.8 DESIGN PHASE

In general, the design of the said project optimized the use of best available technology in order to prevent or minimize potentially significant environmental impacts associated with the project as well as to ensure high level business and environmental performances. In pre-construction / design phase, a management system will be provided at design level for the reduction of impacts. Design of the said project will adhere to all standard technical requirements in order to avoid adverse impacts on the environment and human health. Efficient infrastructure will be developed. Procurement of construction materials from approved dealers will be ensured.

6.9 IMPACTS ASSOCIATED WITH CONSTRUCTION PHASE

Sr. No	Aspect	Impacts	Mitigation Measures

1	Economy Improvement	<p>During construction phase, employment opportunities for local people will be generated.</p> <p>Raw material will be obtained locally increasing the economic value of area.</p>	<p>No specified mitigation measure is required. The contract is signed with the authorized construction companies. All of labor rules will applied on them.</p>
2	Air Quality	<p>During construction phase, suspended particulate matter are the main pollutants during the site development activities such as leveling of land, filling activities, transportation of construction material to the project site from various places.</p> <p>Fugitive emissions will be observed due to vehicular movement. But it will be negligible or temporary phenomenon.</p>	<p>Dust emissions will be minimized through strict enforcement of onsite speed controls.</p> <p>The routes will be sprinkled with water regularly to reduce the amount of dust generated by construction vehicles.</p> <p>Construction machinery will be kept away from the walkways.</p> <p>All the vehicles carrying the construction material will be fully covered and well maintained.</p> <p>The inspection of the vehicles and construction machinery will do on regular basis.</p> <p>All vehicles and construction machinery will be properly tuned, serviced and monitored on regular basis.</p>
3	Water Quality	<p>During construction phase, water will be required for construction of structures, sprinkling on roads for dust suppression, domestic uses of</p>	<p>During this phase, water conservation practices will be given proper consideration.</p>

		construction workers	
4	Relocation of Utilities	The project site is already near other industries. The construction will not relocate the existing public utilities.	No mitigation measure is required.
5	Solid Waste Generation	During excavation of the site for foundation works and landscaping, solid waste will be generated. The waste consisted of metal cuttings, rejected materials, surplus material, paper bags, cement bags, empty cartons and broken glass pieces.	<p>Recyclable material will be separated at source.</p> <p>The cement bags and other such items will be handed over to approve contractors on weekly basis.</p> <p>Other waste will be accumulated at waste area and will be taken by the municipal waste management company.</p>
6	Noise Pollution	During construction phase, the major sources of noise will be due to operation of construction equipment. The anticipated noise will be mostly confined to the facility itself.	<p>Several mitigation measures will be considered. For this purpose, most of the construction works will be done in day time.</p> <p>The advance machinery will be recommended to lower the noise and work efficiency.</p> <p>Proper PPEs (ears plugs and ears muffles) will be given to workers so that expose less to noise.</p>
7	Ecology	The project site is located in industrial area. It was devoid of thick forest and vegetation.	After the construction, tree plantation will be done to act as pollution barrier as well as to enhance the aesthetic beauty of

			the area.
8	Worker's Health, Safety and Environment	The construction activities had the potential to pose negative impact on the health and safety of workers in case of unfavorable working conditions.	<p>The contractor ensured that the workers and labors will be trained in safety procedures for all relevant aspects of the construction.</p> <p>Workers will be provided with proper safety equipment which were required on the basis of nature of the work.</p> <p>First aid kits will be kept available on the site to ensure safe working environment for the labors and workers.</p> <p>As per the requirement warning signs will be displayed in local language.</p> <p>Proper fencing will be done around the site.</p> <p>A safety officer will be appointed at the site for risk assessment and ensure the safety of workers.</p>

6.10 IMPACTS ASSOCIATED WITH OPERATION PHASE

During the operation phase different type of the process will be done. In this section, the combined environmental and socio-economic impacts associated with the said process of this project in operation phase are discussed. The impacts that are discussed are as follows:

Environmental Impacts

-
- Air emissions
 - Noise
 - Traffic
 - Solid waste and by-products
 - Wastewater
 - Resource Consumption
 - Abnormal conditions
 - Occupational Health and Safety

Socioeconomic Impacts

- Employment Opportunity
- Community Development

6.11 ENVIRONMENTAL IMPACTS

6.11.1 AIR EMISSIONS

POTENTIAL IMPACTS

Air emissions from the project are relatively small and specified. Fugitive dusts and emissions may result during raw material handling and storage which is relatively less likely to occur. Some volatile organic compounds may present due to miss-handling and unfortune events. Other potential sources for air emissions are combustion products (nitrogen oxides, sulfur dioxide, particulate matter, carbon monoxide) from standby diesel generators, boilers and combustion products from vehicles used for project activities.

Solvent-based adhesive production will result in emission of **volatile organic compounds (VOCs)** such as ethyl acetate during mixing, handling, and storage. These vapors may cause indoor air pollution, odor nuisance, and respiratory irritation among workers. Long-term VOC emissions may also contribute to photochemical smog formation.

MITIGATION MEASURES

The following mitigation measures will be implemented. The proposed mitigation measures to reduce the impacts on air quality during the operation activities are:

- Installation of localized exhaust ventilation systems at mixing and formulation units.
- Use of closed mixing systems to minimize vapor release.
- Promotion of water-based adhesives to reduce solvent consumption.
- Provision of masks and respirators to workers.
- Regular inspection and maintenance of ventilation systems.
- Plantation of indigenous trees within the premises and along the boundary.

RESIDUAL IMPACT

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

6.11.2 NOISE

POTENTIAL IMPACTS

The main sources of pollution from noise are during raw material , vehicle movements, operation of machines. The increased noise may be a source of disturbance to workers, working near to the machines. The main source of the noise are power house unit. But this area is closed and separated from other operational areas. So, the Noise level during operation phase of unit will be limited to specific site. In the dying, unit latest machinery is planted that has low level of noise. Workers could be exposed to high noise levels for limited time, however only concerned staff will be working in the area with required personal protective equipment (PPE) to minimize or reduce the noise exposure.

MITIGATION MEASURES

The following mitigation measures will be undertaken in order to further reduce the noise levels:

- Effective noise suppression design and plan will be made for all noise producing equipment i.e. high noise generating machines will be kept in isolation from other machines to minimize the overall cumulative noise.
- Noise barriers should be implanted
- The repairing and the small source of noise will be removed if it will possible.
- PPEs are provided to workers
- Proper tree plantation has been done
- Noise monitoring will be carried out periodically.

RESIDUAL IMPACTS

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

6.11.3 TRAFFIC

The operational phase of the unit will result in increased traffic. However, the impact will be minimal. Vehicles will be well maintained to prevent unnecessary exhaust emissions and drivers will be appropriately trained.

MITIGATION MEASURES

The following mitigation measure will be implemented.

- Nighttime driving of project vehicles will be limited where possible.
- Vehicles will remain confined to defined access.
- The route of the vehicles will be defined and given to drivers and security system.
- The road will be labeled according to the rules and regulations.
- Speed limits will be maintained.
- The timetable and schedule of the vehicles will be defined and the monitoring of vehicles will be done every time.
- Road signage relevant to the project traffic will be placed, where necessary.
- Community complaint register and other means will be adopted for the community to complain about non-adherence of traffic to speed limits, safe driving and other safety related concerns.
- All vehicle drivers will be trained in community safety aspects. Drivers will be trained in responsible and safe driving practices; safe speed limits for vehicles will be followed.

6.11.4 SOLID WASTE

Operational activities will generate solid waste including empty chemical drums, packaging material, off-spec adhesive batches, and sludge from wastewater treatment. Some of this waste may be hazardous due to chemical contamination. Improper handling may lead to soil contamination, fire hazards, and health risk. All waste generated from the project will be managed by proposed controls. The environmental impacts will be minimized after the implementation of the proposed mitigations.

MITIGATION MEASURES

The following mitigation measures will be implemented:

GENERAL WASTE MANAGEMENT PRACTICES

During operational phase of the project, a proper waste management plan will be devised and implemented. Key elements of the waste management system will include the following:

ON-SITE HANDLING

- There will be separated bins for segregation of different type of waste
- Proper waste collection system will be ensured. For this purpose, waste bins are placed inside the boundary.
- The recyclable waste will be sent to waste contractors.
- The site in charge will ensure the separation of waste at production line.
- Proper person will be hired for the collection and removal of waste from the site.
- Records of generated waste should be maintained.
- All non-hazardous waste that can be recycled or reused will be handed over to the contractors.

OTHER MANAGEMENT MEASURES

- Training will be provided to personnel for identification, segregation and management of waste.
- All containers of waste will be labeled properly.
- The proper waste management system will be applied.
- Small bins and large containers will be provided on every waste producing site at defined place causing no risk to worker and machinery.
- In-house audits of the waste management will be undertaken on regular basis.

RESIDUAL IMPACTS

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

6.11.5 WASTEWATER

During the operational phase, the project will generate significant quantities of wastewater, primarily from:

- Cleaning of mixing tanks and formulation vessels
- Washing of floors and equipment
- Accidental spillage washings
- Maintenance activities

This wastewater will contain adhesive residues, synthetic polymers, resins, plasticizers, solvents, suspended solids, and traces of additives. Such effluent is typically characterized by high Chemical Oxygen Demand (COD), moderate to high Biological Oxygen Demand (BOD), elevated Total Suspended Solids (TSS), and presence of toxic organic compounds.

Mitigation Measures

- A dedicated wastewater collection system will be installed to prevent mixing with stormwater.
- Wastewater will be treated through primary settling, oil/chemical separation, filtration, and neutralization processes.
- Sludge generated during treatment will be safely collected and disposed of through authorized handlers.
- Treated effluent will strictly comply with Punjab EPA wastewater discharge standards before disposal.
- No untreated effluent will be discharged into open drains or soil.
- Regular laboratory testing of wastewater (BOD, COD, TSS, pH) will be conducted.
- Records of wastewater generation and treatment will be maintained.

RESIDUAL IMPACTS

Implementation of the proposed mitigation measures and regular monitoring is not likely to leave any significant impact of the waste water from the unit.

6.11.6 ABNORMAL CONDITIONS

Abnormal events might include loss of power and diesters. The unit will have its own backup power supply using diesel generator to protect against a loss of power. This site is far from river so no changes of flood. As the project will be constructed above to the ground and high liniment so when the heavy rain occur the water flow will stand on project site.

6.11.7 OCCUPATIONAL HEALTH AND SAFETY

This section discusses the occupational health and safety impacts of the operation of said unit. Physical hazards may include exposure to same-level fall hazards due to slippery conditions. In a variety of situations, a worker can be exposed to lifting, carrying, and repetitive work and work posture injuries.

MITIGATION MEASURES

In order to reduce the physical hazards and other health and safety issues that may be encountered at workplace, following will be followed.

- Proper training will be provided for the proper usage of machineries and personal protective equipment (PPE) will be provided. It will be ensured that the individual who has received the correct training is operating a particular machine.
- Site supervisor or health and safety should be present on site
- Risk Assessment will be done on daily basis
- Emergency response plans will be remained active.
- Monitoring cameras and sensors will be implanted at the work site
- OSHA polices will be implemented on site
- Regulation of the health and safety polices will be done on regular basis
- Regular housekeeping practices will be ensured by keeping the floor dry and during washing; proper protective equipment are being used. Restricted entry should be ensured during washing.
- Training of staff in the handling of lifting materials.
- Timely maintenance and repair of electrical equipment will be conducted.
- Implementation of work rotations, provision of regular work breaks.
- At workplace, first aid facilities will be maintained at readily accessible places.

6.12 SOCIOECONOMIC IMPACTS

A summary of potential socio-economic impacts of the project is presented in Table below.

Table 6- 4: Potential Socioeconomic impacts of the project

Impact	Beneficial	Adverse
Economic	<ul style="list-style-type: none"> • Employment generation • Procurement of equipment and services • Local authority business tax / rates revenue • Increase in property value 	Negative economic Impacts are not anticipated
Social	<ul style="list-style-type: none"> • Indirect beneficial community impacts from employment • Provision of training to employees and workers 	Risks of occupational and environmental health issues.

By implementing the following mitigation measures, impact to community can be minimized.

- All vehicle drivers will be trained in community safety aspects.
- The company will maintain a social complaint register at the site to document all complaints received from local communities. The register will also record the measures taken to mitigate these concerns.
- It will be ensured that generators, vehicles, and other potentially noisy equipment used are in good condition. Noise from generators, vehicles and other equipment will be kept to the minimum through regular maintenance.
- Maximum number of unskilled and semi-skilled jobs will be reserved for the local communities.

6.12.1 EMPLOYMENT OPPORTUNITIES

The project is expected to have positive impact on economic condition of locals. Employment opportunities will be generated due to project activities.

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

Overall, the project will have a positive impact on the employment opportunities of Pakistan.

6.13 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

6.13.1 GREENBELT DEVELOPMENT

Apart from functioning as a pollutant sink, green belts provide other benefits like:

- Green belt helps in noise abatement for the surrounding area. Thus, it is recommended as noise barriers.
- Green belt will help to regulate the air quality
- Green belt also absorbs extra heat help to maintain the change of enthalpy
- Green belt will provide natural refreshment to workers
- It will increase the ornamental beauty of the industry
- Green belt helps in achieving bio diversity by providing possible habitats for birds and animals.
- Green belts increase the aesthetic value of the site.

Roidec Associates (Pvt) Ltd has already developed a greenbelt. Adequate number of small plants and trees are planted along the periphery of the unit and available open spaces.

CHAPTER 7: ENVIRONMENTAL MANGEMENT AND MONITORING PLANS**7.1 GENERAL**

This EIA provides the Environmental Management Plan (EMP) of the project to keep it environment benign as well as the monitoring plan to ensure the compliance of the established EMP.

Outline and key features of the EMP for construction and operations phase is presented in sub-sections below. As per the environmental legislation in Pakistan, the EMP for the operations phase, along with other documents, is to be submitted to the environmental protection agency to obtain confirmation for compliance and Environmental Approval for project operation. Even after implementation of the suggested mitigation measures, the impact may remain significant, and require regular monitoring. This section also underlies the monitoring framework for both construction and operation phases to check compliance of the EMP and to take timely actions for correction in case any accident of significant criteria, requirements or goals are found.

7.2 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified
- Define the responsibilities of the project proponent and contractor and provide a means of effective communication of environmental issues between them.
- Identify monitoring parameters in order to ensure the effectiveness of the mitigation measures
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.
- To apply the rules and regulation of the Punjab Environmental laws and international standards
- Making of environmental managemental polices
- Reviewing, regulating and improving of environmental policies on regular basis.

7.3 MANAGEMENT APPROACH

The organizational roles and responsibilities of the key players are summarized below:

Proponent: The project proponent will undertake overall responsibility for compliance with the EMP. Concerned Departments will carry out verification checks to ensure that the contractors are effectively implementing their environmental and social requirements.

Contractors: The contractors will implement the majority of environmental and social mitigation measures. The contractors will carry out field activities as part of the project. The contractors are subject to certain liabilities under the environmental laws of the country, and under its contract with proponent.

7.4 COMPONENTS OF THE EMP

THE EMP CONSISTS OF THE FOLLOWING:

- Management plan
- Monitoring Plan
- Communication and documentation
- Institutional capacity
- Environmental training

7.5 ENVIRONMENT MANAGEMENT PLAN

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

Table 7- 1: Environmental Management Plan

Objective	Management Action	Responsibility	Time framework	Residual impact
Construction phase				
Employment Opportunities				
To promote the employment of local persons	Recruitment of local workers will be undertaken without discrimination and in accordance with company recruitment policy by contractors involved in construction	Contractor	On commencement of construction activities	Unemployed people of area will get job opportunities and their standard of living improved
To promote the use of local service providers	Local procurement of goods and services will be undertaken wherever possible and cost effective and where practicable to the project	Contractor	On commencement of construction activities	Indirect job opportunities
Safety during construction				
To ensure safety on construction site	<ul style="list-style-type: none"> • Safety signage will be put in relevant places within the construction site • Site Health and Safety officer is present • Construction drivers are subjected to public safety awareness • Reckless driving by construction 	Contractor/Environmental manager/HSE manager	On commencement of construction activities	Safety of workers will be ensured by implementing proposed mitigation measures.

	<p>workers will be prohibited and monitored</p> <ul style="list-style-type: none"> Workers will be given PPEs such as; helmets, mask, ear-plugs/muffs, safety boots, etc. and its use will be strictly enforced Workers will be trained on the regular basis regarding personal safety Incidents will be reported directly to the concerned authority 			
Construction waste management				
<p>To prevent the contamination of soils and water resources due to inappropriate management and disposal of waste</p>	<ul style="list-style-type: none"> The construction site will have litter bins for waste collection Recycling or reuse of waste wherever possible. Application of a good strategy to collect, remove and safely dispose of waste on daily basis to ensure a clean environment in the factory site Integrated waste management system will be adopted for the proper management of the waste at site At the end of the construction phase, 	<p>Contractor</p>	<p>Throughout construction stage</p>	<p>Waste was disposed of/reused/ recycle or resale as per practices of area.</p>

	<p>left-over waste will be removed by using the standard waste management procedures</p> <ul style="list-style-type: none"> • All the idle machinery and equipment will be immediately removed from the site • Scrap and the debris will be removed from the site at the end of the construction stage after appropriate segregation of the material • All the domestic waste produce by the worker will be given to the municipal waste management company 			
Pollution control management				
To contain spillages	<ul style="list-style-type: none"> • Proper maintenance of construction vehicles and equipment will be undertaken • Appropriate environmental security measures including shovels and plastic bags etc will be provided to prevent accidental release to ground. • Appropriate procedures and protocols will be established and monitored for 	Contractor	On-site establishment	Potential for accidental release of materials during transport and handling on the site should be minimized.

	<p>materials transport and handling whilst on the site.</p> <ul style="list-style-type: none"> • Emergency response plan will be developed for any incident. 			
To manage sewage	Portable toilets will be provided at site.	Contractor	On commencement of construction	Portable toilets will be cleaned properly and regularly
Protection of biodiversity				
To avoid unnecessary disturbance of and quick recovery of biodiversity in the plant site	<ul style="list-style-type: none"> • Avoid destruction of biodiversity outside the designated factory construction site • Minimize clearing of vegetation during construction • Surface soil excavated during construction to be placed back on the sub-soil to fast vegetation recovery • Prepare and implement an appropriate landscaping programme to help in re-vegetation of affected project areas after construction • The flora of the site will be restored at the end of the construction phase by 	Contacto	Throughout construction phase	Although the land is industrial in nature but vegetation loss cannot be avoided, but successful restoration, improvement and long-term management of the surrounding areas and maintenance of planted trees will be provided

	<p>landscaping and planting native vegetation</p> <ul style="list-style-type: none"> • Defining the route for vehicles and machinery transport, defining the work area, the pathway for the worker area will also be defined and policy will form for the minimum use of outer land during construction. 			
Air quality & dust management				
To minimize the dust entrainment during construction	<ul style="list-style-type: none"> • Regular surface wetting will be implemented on dusty sections in the factory construction site • Strict on-site speed controls will be enforced for construction vehicles • All trucks hauling soil, sand and other loose materials will be covered • No excavation activity will be carried out during windy days • The watering of the route will be done on regular basis • Specified routes will also help to overcome the dust to evolve. 	Contractor	On commencement of construction activities	Dust propagation will be limited to construction area and will not influence local community. However, workers were supplied with dust masks especially on dry days.

	<ul style="list-style-type: none"> • Fuel-efficient and well-maintained haulage trucks will be employed to minimize exhaust emissions • Construction workers will be sensitized on measures to reduce air pollution 			
Noise				
To minimize disturbance due to noise	<ul style="list-style-type: none"> • Loading and unloading of materials will be done carefully to reduce noise disturbances to surrounding households • Residences are at a safe distance from site so no disturbance will be envisaged. • Drivers will be instructed to avoid unnecessary gunning of vehicles, hooting and buzzing. • Regular maintenance of the machinery will be done to reduce the noise • Vehicles will be tuned on regular basis 	Contractor	On commencement of construction activities	within PEQs

	<ul style="list-style-type: none"> The inspection of the vehicles will be done by health and safety officer on regular interval 			
Occupational health & safety				
To ensure healthy and Secure/safe environment in the construction site for all workers	<ul style="list-style-type: none"> Management will ensure that fire extinguishers should be located in strategic and visible places Health and Safety data sheet will be design and formed by Safety officer. All vehicles and construction equipment will be under control of competent personnel Inspection of material and harmonization to the occupational health and safety standards. Adequate security for workers will be provided during construction Sensitize workers to operate in teams 	Contractor	Throughout construction phase	Record of all incidents will be maintained and reported to HSE manager.
Operation phase				
Wastewater management				
Degradation of surface	<ul style="list-style-type: none"> A dedicated wastewater collection 	Roidec (Pvt)	Throughout project	None

<p>waters quality due to process water and sewage direct disposal</p>	<p>system will be installed to prevent mixing with stormwater.</p> <ul style="list-style-type: none"> • Wastewater will be treated through primary settling, oil/chemical separation, filtration, and neutralization processes. • Sludge generated during treatment will be safely collected and disposed of through authorized handlers. • Treated effluent will strictly comply with Punjab EPA wastewater discharge standards before disposal. • No untreated effluent will be discharged into open drains or soil. 	<p>Ltd</p>	<p>life cycle</p>	
<p>Air quality management</p>				
<p>Particulate emissions and stack emissions</p>	<ul style="list-style-type: none"> • Installation of localized exhaust ventilation systems at mixing and formulation units. • Use of closed mixing systems to minimize vapor release. • Promotion of water-based adhesives to reduce solvent consumption. • Provision of masks and respirators to 	<p>Roidec (Pvt) Ltd</p>	<p>Throughout operation phase</p>	<p>Local air quality will be virtually unaffected and will be based on PEQs</p>

	<p>workers.</p> <ul style="list-style-type: none"> • Regular inspection and maintenance of ventilation systems. 			
Noise & vibration				
<p>To minimize disturbance of communities due to noise</p>	<ul style="list-style-type: none"> • All the machinery will be installed and operated in a closed hall and from operation of machinery noise will not be a problem for the residents in the area nearby. Further Administration of the unit will take the precautionary measures to avoid the noise emissions. There is no possibility of Noise pollution • A thick greenbelt will be developed all around the plant which will be acting as noise barrier. • Introduction of control and monitoring rooms having good sound insulation properties. • All the workers will be provided with ear plugs. • Latest technology will be implanted 	<p>Roidec (Pvt) Ltd</p>	<p>Throughout project life cycle</p>	<p>Noise level will be based on PEQs</p>

	<p>which has low level of noise. The boiler and power house (closed system) will be planted away from the admin and the work area.</p>			
Soil and Groundwater Contamination Risk				
<p>Chemical spills, leakage from storage containers, or untreated wastewater discharge may contaminate soil and groundwater. Adhesive compounds may alter soil permeability and long-term fertility.</p>	<ul style="list-style-type: none"> • Impervious flooring in production and storage areas. • Secondary containment for chemical storage. • Immediate spill response and cleanup procedures. • Routine inspection of storage tanks and pipelines. 	<p>Management of Roidec Associates (Pvt) Ltd</p>	<p>Throughout project operation</p>	<p>Slight, localized soil or groundwater contamination if minor spills or leaks escape detection.</p> <p>Potential long-term alteration of soil properties in heavily affected areas, marginally reducing fertility or permeability.</p> <p>Minimal ecological risks to nearby habitats if trace contaminants persist beyond treatment.</p>
HSE				
<p>To minimize loss work injury/hazards/incidents/</p>	<ul style="list-style-type: none"> • Training regarding HSE should be given on the regular basis 	<p>Environmental manager/HSE</p>	<p>Throughout life cycle of project</p>	<p>Potential of injuries will be minimized</p>

accidents	<ul style="list-style-type: none"> Workers will be given PPEs such as; helmets, mask, ear-plugs/muffs, safety boots, etc. Risk assessment will be done on daily basis by HSE officer Permits and safety data sheets will be filled on regular basis and record will be maintained It should be strictly enforced to wear PPEs while working Workers will be trained on the regular basis regarding personal safety and disaster management Incidents should be reported directly to the concerned authority 	of Roidec Associates (Pvt) Ltd		
First aid				
To ensure safety and health	<ul style="list-style-type: none"> First aid box will be available at the site First aid training will be given to the employees on the regular basis Numbers of all the concerned/authorized persons that 	Environmental manager/HSE of Roidec Associates (Pvt) Ltd	Throughout life cycle of project	None

	will be contacted in the case of emergency will be displayed on-site			
Fire hazard				
To prevent any disaster	<ul style="list-style-type: none"> • Firefighting equipment including DCP type fire extinguisher, CO2 Type extinguisher, sand buckets, sand drums with spade and hose pipe cabinet will be installed inside the plant • All the equipment will be placed at strategic locations where the risk of out-burst of the fire is high. List of fire posts is annexed. • Smoking will not be permitted in the vicinity of the plant • Regular site inspection will be done to eliminate all the chances of the hazards • Checking and maintenance of the fire-fighting equipment will be carried out on the regular basis <p>✓ Emergency evacuation plan is</p>	Environmental manager/HSE	Throughout life cycle of project	Potential of disaster will be minimized by suggested mitigation measures implementation

	annexed.			
Employment				
To provide job opportunities and helping in improving living standard of people	<ul style="list-style-type: none"> • During this phase, skilled and unskilled labour will be required. • Employment opportunities for the unskilled workers will therefore increase which will enhance the positive benefits for the local people who are in dire need of income for sustenance. <p>✓ Indirect opportunities for employment will arise from the provision of services to the construction teams, such as sale of raw-material such as cement, bricks, sand etc., as well as food and beverages for the labour and after completion of construction phase serve as a permanent business opportunity.</p>	Roidec Associates (Pvt) Ltd	During construction and operation phase	Direct and indirect jobs

7.6 ENVIRONMENTAL MONITORING PLAN

Environmental monitoring is a vital component of the Environmental Management Plan. It is the mechanism through which the effectiveness of the environmental management Plan in protecting the environment is measured. The feedback provided by the environmental monitoring is instrumental in identifying any problem or lapse in the system under implementation and planning corrective actions.

Table 7-2: Environmental Monitoring Plan

Env. Components	Project Stage	Parameters	Instrument	Standards	Monitoring			Institutional Responsibility
					Location	Frequency	Duration	
Air	Construction	PM ₁₀ , NO ₂ , SPM ,O ₃	SO ₂ , CO, Air Quality Monitors/Gadgets	PEQS	Project site	Twice during construction	As per approved testing method	Contractor through approved monitoring lab
	Operation	Stack emissions	Air Quality Monitors/Gadgets	PEQs	stack	Quarterly	As per approved testing method	Through approved third party/monitoring lab

Noise Levels	Construction	Noise levels on dB(A) scale	Digital Sound Meter	PEQs	Project site	Twice during construction	Reading to be taken at 15 seconds interval for 15 minutes every hour and then averaged	Contractor through approved monitoring lab
	Operation	Noise levels on dB(A) scale	Digital Sound Meter	PEQs	Project site	Quarterly	Reading to be taken at 15 seconds interval for 15 minutes every hour and then averaged	Through approved third party/monitoring lab
Wastewater	Operation	BOD, COD, TSS etc	Through approved equipments	PEQs	WWTP	Monthly	As per approved testing method	Through approved third party/monitoring lab

7.7 INSTITUTIONAL CAPACITY OF THE UNIT

The organizational structure for the Environment Management Plan is outlined below:

7.7.1 Primary Responsibilities

The primary responsibility for implementing different aspects of the EMP within the company lies with the concerned departments of Roidec Associates (Pvt) Ltd .

7.7.2 Operation Management & Control

Conducting the operational activities in environmentally sound manner will be the responsibility of the concerned Manager; for which he will be trained.

7.7.3 Supervision & Monitoring

Senior Supervisor will be responsible for all environmental issues and for the implementation of EMP.

7.7.4 Communications & Documentation

An effective mechanism to store and communicate environmental information during the project is an essential requirement of an EMP.

7.7.4.1 Meetings

As environment is multidisciplinary subject with environmentalist having a dynamic role therefore In-charge environment would be considered as integral part in both constructional and operational team. Participation of Environmental in-charge in daily morning meeting and any other special meeting is mandatory. Besides internal meeting HSE in-charge/Environment in-charge is also responsible to conduct meeting with local in keeping administration in liaison.

7.7.4.2 Changes-Record Register

A change-record register will be maintained at the site, in order to document any changes in project design. These changes will be handled through the change management mechanism.

7.8 ENVIRONMENTAL TRAINING

Environmental training will help to ensure that the requirements of the EIA and EMP are clearly understood and followed by all project personnel in the course of the project.

Table 7-3: Training Program

Target audience	Trainers	Contents	Schedule
Selected management staff	Contractors	Key finding of mitigation measure	After every five months
All personnel	HSE Officer	Mitigation measures	Monthly
Technical Staff	HSE Officer	Waste disposal or sale out status, vehicle movement restriction and other mitigation measures	After every three month
Other staff	HSE Officer	Waste disposal, resource conservation and other mitigation workers	Monthly

7.9 EQUIPMENT MAINTENANCE DETAILS

The project is about textile industry namely “Roidec As (Pvt) Ltd ”. Machines in said unit will be maintained on the regular basis. Following is the maintenance details for the machines and equipments:

Task	Weekly	Monthly	Semi-Annually	Annually
Visual Inspection	✓			
Testing and Inspection		✓		
Maintenance of Machines				
Fire Mains and Nozzles				

Containers/Cylinders				
Control and Section Valves				

7.10 ENVIRONMENTAL BUDGET

Approximately PKR 1 million budget will be reserved for tree plantation, solid waste management, wastewater management and environmental monitoring. Monitoring tests for ambient air quality, noise and groundwater quality will also be conducted.

CHAPTER 8: CONCLUSION AND RECOMMENDATIONS**8.1 CONCLUSION**

The report presents Environmental Impact Assessment (EIA) of the said unit. EIA of said Project is performed according to guidelines of EPA. It includes description of the project, description of the environmental baselines, potential environmental impacts and suggested mitigation measures. An implementation mechanism for mitigation measures in the form of an Environmental Management Plan is included in the study.

The performed EIA showed all anticipated impacts (both positive and negative), associated with the project. Appropriate mitigation measures as explained in the environmental study will strengthened the environment and promote sustainable development.

The proposed adhesive manufacturing project of Roidec Private Limited will be a medium-scale chemical industry located in a designated industrial zone of Sundar Industrial Estate, Lahore. The project will focus on the production of water-based and solvent-based adhesives used in export-quality soccer ball manufacturing. From an environmental perspective, the project has been carefully planned with consideration of industrial zoning, land use compatibility, and modern manufacturing practices.

The Environmental Impact Assessment has identified that the most significant environmental concern associated with the project will be the generation of chemical-containing wastewater, followed by air emissions from solvent vapors, solid and hazardous waste generation, and occupational health and safety risks. If left unmanaged, these impacts may lead to water pollution, soil contamination, air quality deterioration, and health hazards for workers.

However, the assessment also concludes that the project will not cause irreversible or unmanageable environmental damage, provided that recommended mitigation measures are fully implemented. The adoption of water-based adhesives, controlled formulation processes, proper wastewater treatment systems, emission control measures, and strict safety protocols will significantly reduce the environmental footprint of the project. The location within a planned industrial estate further reduces the risk of impacts on sensitive receptors.

Based on overall assessment of the environmental impact of the project, it is concluded that the economic benefit from the project is not at the cost of environment. From the historical records and vast experience in sustainable development keeping environment as integral part of manufacturing system, Roidec (Pvt) Ltd is worthy of Environmental approval. Further the project is not likely to cause any significant adverse impact on the physical and biological environment but positive impact on social development and economic prosperity of the area, provided that suitable mitigation measures as identified in this study are implemented.

It is accordingly recommended that Environmental Approval for the project may be issued by the Punjab Environmental Protection Agency, subject to payment of the requisite scrutiny fee by the proponent of the project.

8.2 RECOMMENDATIONS

The Environmental Impact Assessment study and survey results are finally evaluated to recommend the following:

- Implementation of EMP must be given top priority.
- Proper PPEs including ear plugs, ear muffs, mufflers, goggles, gloves and shoes etc. should be provided to workers
- Train workers to use PPEs
- Advise workers to follow SOPs.
- Equipment maintenance and efficiency must be checked.
- No compromise on public health and environment should be allowed.
- Waste minimization practices should be employed and workers should be encouraged to adopt such methods.
- Wages should be distributed on time.
- Proper tree plantation plan should also be developed in order to make the unit environment friendly.
- Small waste storage bins should be installed at different corner for proper waste collection and discharge.
- Proper dispensary and first aid box should be provided for workers
- Smoking should be avoided within premises of project site and near fuel storage areas.

- The Security Guards shall also be trained to act in case of all possible emergency situations. The fire alarms can be activated to signal evacuation. At the same time, communication shall be made with hospitals, emergency services and police for urgent support.
- The proposed Environmental Management & Monitoring Plan should be implemented.
- The construction and installation should be completed in guidelines of accorded Environmental Approval.