ENVIRONMENTAL IMPACT ASSESMENT

REPORT OF

EXTENSION OF M/S NIMIR INDUSTRIAL CHEMICALS LTD, DIST. SHEIKHUPURA, PAKISTAN



PREPARED BY:

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Environmental Services

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Table of Contents

EXECUTIVE SUMMERY 1

INTRODUCTION 6

1.1 Purpose of Report 7

1.2 Identification of Project & Project Proponent 7

Screening 7

1.3 EIA Consultant 7

1.4 Brief Description of the Project 8

1.5 Location of the Project 9

1.6 Applicable Environmental Acts & Rules 10

1.7 Scoping 10

Significance Impact 13

PROJECT DESCRIPTION 14

2.1 INTRODUCTION 15

2.2 TYPE AND CATEGORY OF PROJECT 15

2.3 OBJECTIVE OF STUDY 15

2.4 OBJECTIVE OF THE PROJECT 15

Figure2.2: Plant Layout 16

2.4 SALIENT FEATURES OF THE PROJECT 18

2.6 PROCESS DESCRIPTION 22

2.7 ENVIRONMENT ASPECTS 27

2.8 PROJECT IMPLEMENTATION SCHEDULE 30

2.9 PROJECT COST ESTIMATE 30

2.10 Alternative Considerations and Reasons for their Rejection: 30

Design/technology alternatives, their selection and rejection criteria 31

Environmental Alternatives, their selection and rejection criteria 31

Economic Alternatives, their selection and rejection criteria 31

2.11 Existing Land Use 31

2.12 Vegetation features of the project 31

2.13 Cost and magnitude of the operation 32

2.14 Schedule of Implementation 32

2.15 Restoration / Rehabilitation Plan 32

2.16 Government approvals required by the project: 32

2.17 CONCLUSION 32

CHAPTER-III 33

3.1 Physical Environment/ Resources 34

3.1.2 Soils: 34

..... 35

3.1.9 Wastewater/ surface water: 38

3.2 Ecological Resources 40

Flora: 40

3.3 Socioeconomic and Cultural Study 42

CHAPTER-IV 45

ANTICIPATED ENVIRONMENT IMPACT AND MITIGATION MEASURES 45

ANTICIPATED ENVIRONMENT IMPACT AND MITIGATION MEASURES 46

4.1 INTRODUCTION 46

4.2 PROJECT LOCATION 46

M/S Nimir Industrial Chemicals Ltd situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura 46

4.3 IDENTIFICATION OF THE IMPACT 46

4.4 ENVIRONMENTAL IMPACTS DUE TO THE PROJECT DESIGN 47

4.5 IDENTIFICATION OF IMPACT DURING CONSTRUCTION PHASE 47

4.5.1 IMPACTS ON LAND ACTIVITIES 49
4.5.2 IMPACTS ON AIR QUALITY 50
4.5.3 IMPACTS ON NOISE 51
4.5.4 IMPACTS ON WATER QUALITY 52
4.5.5 IMPACTS ON BIOLOGICAL ENVIRONMENT 52
4.3.6 IMPACTS ON SOCIO-ECONOMICS 53
4.3.7 OCCUPATIONAL HEALTH AND SAFETY 53
4.4 IDENTIFICATION OF IMPACT DURING OPERATION PHASE 54
Potential Environmental Enhancement Measures 56
Impacts On Biological Environment 62
IMPACT ON SOCIO-ECONOMIC ENVIRONMENT 63
OCCUPATIONALHEALTH & SAFETY 64
Chapter- v 65
IMPACT ASSESMENT 65
IMPACT ASSESSMENT MATRIX 66
CHAPTER-VI 75
ANALYSIS OF ALTERNATIVES 75
ANALYSIS OF ALTERNATIVES 76
INTRODUCTION 76
SITE SELECTION 76
TECHNOLOGY ALTERNATIVES 76
CHAPTER-VII 78
ENVIRONMENT MONITORING PROGRAM 78
ENVIRONMENT MONITORING PROGRAM 79
INTRODUCTION 79
ENVIRONMENT ASPECTS TO BE MONITORED 79

ENVIRONMENT MONITORING PLAN 80
Monitoring methodologies 82
REPORTING AND DOCUMENTATION 82
FORMULATION OF ENVIRONMENT MANAGEMENT CELL (EMC) 82
LABORATORY FACILITY 83
BUDGETARY PROVISION FOR ENVIRONMENT MANAGEMENT 84
CHAPTER-VII 85
ADDITIONAL STUDIES 85
INTRODUCTION 86
SOCIAL IMPACT ASSESSMENT STUDIES (SIA) 86
PUBLIC CONSULTATION 86
HAZARD IDENTIFICATION 86
Hazard Identification & Risk Assessment (HIRA) 87
RISK ASSESSMENT 87
Potential risk and mitigation measure for during constructionphase 88
Risk during D.G. set operation 90
Hazard & associated Risk of storage and handling of raw material 90
SAFETY MEASURES RECOMMENDATION 93
Occupational health hazard and safety measures 95
Onsite Emergency Plan 97
Offsite Emergency Plan 97
Objectives of disaster management 97
Onsite Emergency Preparedness Plan 98
Disaster Management Cell 98
Key Personnel 100
CONCLUSION 102

CHAPTER VIII....104
PROJECT BENEFITS....105
INTRODUCTION....105
PROJECT BENEFITS....105
Employment Potential....106
INTRODUCTION....*108*
OBJECTIVES OF EMP....*108*
ENVIRONMENT MANAGEMENT PLAN FOR CONSTRUCTION PHASE....*108*
ENVIRONMENT MANAGEMENT PLAN FOR OPERATION PHASE....*109*
THE OBJECTIVES OF THE PROPOSED GREENBELT DEVELOPMENT WILL BE:....*110*
SELECTION OF PLANT SPECIES WILL BE BASED ON THE FOLLOWING CHARACTERISTICS....*110*
Odor Management Plan....*113*
Management of traffics....*114*
RAIN WATER HARVESTING OBJECTIVES:....*114*
SOCIOECONOMIC DEVELOPMENT....*115*
Schedule of implementation....*117*
Environmental Practitioners and Experts....*117*
Responsibilities of Functionaries....*119*
Proposed Environmental Management and Monitoring Plan (EMMP)....*120*
EMP Review and Revision....*120*
ENVIRONMENT MANAGEMENT COST....*121*
CONCLUSION....*121*
INVOLVEMENT OF STAKEHOLDER/ PUBLIC CONSULTATION....*123*
EIA and Public Consultation Process....*123*
Objectives of the Public/Stakeholders Consultation....*123*
Methodology....*123*

Responsible Authority 123

Issues Discussed with the stakeholders 124

Environmental Practitioners and Expert 124

Other Departments and agencies 126

Responsible Authority 126

Environmental Practitioners and Experts 126

Proponent Environment Management Team 126

Affected and Wider Community 126

Summary Of Issues Raised by Stakeholders 126

A summary of the key issues raised by stakeholders and how these are being addressed by Project Proponent is provided in Table below. 126

SUMMARY AND CONCLUSION 130

INTRODUCTION 130

SCOPE OF THE STUDY 130

DESCRIPTION OF THE ENVIRONMENT 130

Ambient Air Quality 131

Impact Assessment 135

ENVIRONMENTAL MANAGEMENT PLAN (EMP) 135

POST PROJECT ENVIRONMENTAL MONITORING PROGRAM 136

ADDITIONAL STUDY 138

PROJECT BENEFITS 138

CONCLUSION 138

ANNEXURES 140

Term of References for Environmental Impact Analysis 140

1.0 Introduction 140

2. Environmental Impact Analysis 140

3. Responsibility of Consultant 140

Glossary *142*

List of Abbreviation *144*

References 146

EXECUTIVE SUMMERY

This document of Environmental Impact Assessment is formulated for the Extension of M/S Nimir Industrial Chemicals Ltd. 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, District Sheikhupura, Pakistan. Environmental Impact Assessment (EIA) report the project has been conducted in accordance with the Punjab Environmental Protection (Amendment) Act 2012 and IEE/EIA Regulations 2000. Silent features of proposed project are described elaborately as below

SALIENT FEATURES OF PROJECT:

Sr. #	CONSTITUENT	DESCRIPTION
1)	**Title of Project**	Extension of M/S Nimir Industrial Chemicals Ltd.
2)	**Project Location:**	14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura
3)	**Project Overview:**	The proposed project is Extension of M/S Nimir Industrial Chemicals Ltd Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura. The proposed project falls in the category B (2) of the project requiring Environmental Impact Assessment (EIA) of Schedule-II of IEE/EIA Regulation 2000. Extension of M/S Nimir Industrial Chemicals Ltd Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura.
4)	**Project Proponent & Contact Person**	Mr. Syed Ali Irteza Hasni S/O Syed Azhar Hussain R/O 595 R-1 Johar Town Lahore
5)	**Total Area:**	45 Acres
6)	**Project Cost**	2.5 billion
2	**Project Component**	All the construction activities by Extension of M/S Nimir Industrial Chemicals Ltd Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura. will be carried out according to the schedule and will be completed in time. The utility services that will be provided at the Extension of M/S Nimir Industrial Chemicals Ltd include water supply system, electricity network, telecommunication system, network of sewerage and Waste Water Treatment Plant.
Environmental Precise		

1)	**Project Environmental Consultant**	IES Environmental Solutions (PVT) Ltd Office No 114 E Block, Nawab Town Raiwind road Lahore Phone: +92 334-9776233, 042 32326882 Email: info@iesolutions.pk Waqas.ahmed@iesolutions.pk
2)	**Water Requirement**	Domestic Water Requirement of proposed project is about 08 gallons per capita per day for total population of about 150-200 workers.
3)	**Electricity Requirement**	The design criterion for the electrical works will be in compliance with the requirements of WAPDA. Maintenance will be carried out by the management of the industry.
4)	**Solid Waste Management**	Solid waste will primarily consist of the domestic solid waste from the project. The garbage will be collected at a designated area within the area as an intermediate garbage disposal. From this place, garbage will be collected and transported to a suitable location for final disposal. The location for this final disposal will be decided in consultation with the City District Government.
5)	**Tree Plantation**	Trees will be planted in all open spaces and boundary of the project area. Green belts will also be developed

MAJOR IMPACTS AND RECOMMENDATION FOR MITIGATION MEASURES:

The construction of the project can create some adverse impact on the existing environment. The acoustic impacts, dust emission, traffic congestion, safety and sanitation during the construction period would be limited to construction of building and site preparation. Since the new building would be set up in existing premises, the resettlement won't be an issue here. During construction, the contractor will adopt all necessary measures to reduce the probable environmental impacts from different aspects. There are minimal impacts during operation period and industry will be responsible to take necessary steps during operation. The significant impacts in different phases i.e. (i) *due to project location and preparation*, (ii) *construction phase* and (ii) *operation phase* have been identified using the checklist process.

From this process, the main potential environmental impacts, which may arise due to construction, can be grouped as follows: (i) *Atmospheric emissions and Air quality*, (ii) *Noise generation*, (iii) *Water pollution and waste water disposal*, and (iv) *Health and safety*.

However, the magnitude of these impacts shall be very low and insignificant.

Environmental Impact and Mitigation Measure during Construction Phase

Activity	Environmental Impact	Mitigation Measure
Construction Phase Construction of building including Site Preparation,	• Change in existing profile and drainage pattern of the land • Loss of agricultural land due to land acquisition for industrial development • Generation of solid waste • Impact on the local water source due construction • Dust, noise and gaseous pollution from construction equipment and traffic • Dust pollution due to excavation, backfilling and concreting, hauling and dumping of earth materials and construction spoils	• Proper drainage facilities will be provided along the roads. • Appropriate measures like green areas plantation would be undertaken. • Control of quality of construction wastewater within the construction site through suitable drainage system with traps for arresting the sediment load for its proposed disposal into the main natural drainage system around the site • The garbage will be collected at a designated area within the area as an intermediate garbage disposal
Operational Phase During operational phase solid waste management, wastewater mitigations	• Disposal of domestic solid wastes • Disposal of sewage • Demand of water for domestic consumption • Air pollution due to vehicular emission • Noise pollution due to traffic noise • Demand for additional resources like water and electricity	• The development shall be mitigated by appropriate measures such that all emissions are in compliance with the air emission standards promulgated under the Environment Protection Act. • The solid waste must be managed on regular basis. • Limit water withdrawal to the amount that will not adversely affect the groundwater balance

To oversee the environmental performance of the project through its lifecycle enforcing the PEQS an Environmental Monitoring Program should be formulated which ensures effective surveillance of the environmental parameters at various stages of the project development and compliances with PEQS and legal obligations.

Brief Outline of Proposal

This report is related to the M/S Nimir Industrial Chemicals Ltd. 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura

The proposed project falls in the category B (2) of the project requiring Environmental Impact Assessment (EIA) of Schedule-II of IEE/EIA Regulation 2000. Extension of M/S Nimir Industrial Chemicals Ltd Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura.

Proposed Monitoring:

Monitoring at the proposed site has been conducted for:

- Air Environment (Meteorology, Ambient Air Quality, Noise Levels, Traffic Pattern, etc.)
- Water Environment (Quality, and Quantity of all potential water sources: Surface and Groundwater)
- Ecological Environment (Terrestrial and Aquatic Flora & Fauna)
- Socio-Economic Environment (Demographic profile, Occupational structure, educational status, literacy status, etc.)

Environmental Management Plan & Proposed Monitoring

Environmental impact of a project is worked out using various factors and parameters, so that an Environmental Management Plan can be evolved to take mitigation measures, wherever these might be considered necessary in order of appropriateness of elimination, reduction and compensation as the goals. The development of the EMP is to make some person responsible for implementing the mitigation measures as identified so that smooth implementation of the mitigation measures can be assured. Monitoring plans have also been included to ensure the compliance of the EMP by contractors and other responsible authorities. Brief Environmental management plan is described in below chapter.

Monitoring will be done on quarterly basis.

Conclusion

The Environmental Impact Assessment contains 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. While the objectives of this study have been to describe the project and its environmental impact, it also identifies adverse environmental factors associated with the project. Appropriate mitigation measures as explained in the environmental study should reduce, if not eliminate, these impacts so that these are within acceptable limits. It is further concluded that all potential environmental concerns associated with the project have been adequately addressed, and no further study is required in this context.

EIA REPORT

M/S Nimir Industrial Chemicals Ltd. 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura, Pakistan.

CHAPTER-I

INTRODUCTION

INTRODUCTION

1.1 Purpose of Report

This report has been prepared to confirm to the requirements of the Punjab Environmental Protection (Amendment) Act 2012 (PEPA), which states that:

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

It is of utter importance to examine the environmental impacts, both beneficial and adverse, of the proposed project, and to recommend and propose mitigating measures to prevent, minimize or mitigate such impacts. The EIA study of the proposed project is necessary to assess the environmental consequences of the extraction at the proposed sites and to suggest appropriate, practical and site-specific mitigation as well as enhancement measures.

The objectives of EIA study are to:

- Assess the environmental settings, including the identification of environmental sensitive areas and social baseline conditions of the project area.
- Identify the environmental impacts in terms of both quality and quantity.
- To develop an appropriate Environmental Management Plan (EMP), including mitigation and monitoring measures for adverse environmental impacts to enhance the capacity building.
- To propose rehabilitation development plan for the project site.

1.2 Identification of Project & Project Proponent

Screening

The proposed project falls in the category B (2) of the project requiring Environmental Impact Assessment (EIA) of Schedule-II of IEE/EIA Regulation 2000

Proponent: Mr. Syed Ali Irteza Hasni S/O Syed Azhar Hussain R/O 595 R-1 Johar Town Lahore

1.3 EIA Consultant

Proponent has selected IES Environmental Solutions for the formulation of report. It is an environmental consultancy firm that has an unrivalled reputation for providing high quality

services. IES Environmental Solutions PVT Ltd is a dynamic, responsive and innovative in providing cost-effective solution. IES Environmental Solutions PVT Ltd comprising of Environmental Engineers & Consultants, and rendering their services to clients in both industrial and the government sectors.

With the visionary leadership of its veteran management and enthusiasm of its team, it is committed to come up with innovative ways of maintaining and enriching the Environmental Profiles / Portfolios of its prestigious clients with activities having a strong and lasting impact to their corporate image. It has attracted and retained staff with an unrivalled depth and breadth of expertise and experience that they have from working, not just in consultancy but also in commercial, industrial and regulatory environments. With its pool of Environmental Consultants, Environmental Scientists and Environmental Engineers, company offers one stop solutions tailored to its client's needs.

Contact Details:

Qualified professionals with relevant experiences of conducting environmental assessment have contributed to the preparation of Environmental Impact Assessment Report (EIA). The team has been shown in Table below:

Table 1.1: List of Team Members

Sr. #	Name	Highest Qualification
01	Mr. Waqas Ahmad Khan	M.Phil. Environmental Sciences
Members		
02	Mahwish Jabeen	PhD Environmental sciences, GIS Expert
03	Mr. Abdul Rehman	MPhil Environmental Sciences (UOL)
04	Bilawal Zaffar	BS(Hons) Environmental Sciences (UOL)
05	Fajar Waheed	MPhil Environmental Sciences (UOL)
06	M. Faheem	Environmentalist
07	Iqra Zahid	BS(Hons) Environmental Sciences (UOL)
08	Muhammad Haris	BS(Hons) Environmental Sciences (UOL)
09	Mubeen Sohail	BS(Hons) Environmental Sciences (GCU)

1.4 Brief Description of the Project

The proposed project falls in the category B (2) of the project requiring Environmental Impact Assessment (EIA) of Schedule-II of IEE/EIA Regulation 2000. Extension of M/S Nimir Industrial Chemicals Ltd Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura.

Nature and size of the project:

Extension of M/S Nimir Industrial Chemicals Ltd Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura. The total area of the Project is 45 kanal and the total cost of the project is 2.5 billion

1.5 Location of the Project

Proposed project will be located at 14.8 km, Sheikhupura- Faisalabad Road, Bhikhi, Dist. Sheikhupura, Pakistan.



Figure 1 Location of the project

1.6 Applicable Environmental Acts & Rules

The following are some other acts and rules related to environment which will be applicable for the proposed project.

1. The Punjab Environmental (Protection) Act, 1997 (Amended 2012-2017)
2. The Environmental Samples Rules, 2001
3. Environmental Tribunal Rules, 2012
4. Punjab Environmental Quality Standard for Ambient Air
5. Punjab Environmental Quality Standard for Noise
6. The Punjab Environmental Quality Standard for Industrial Gases

1.7 Scoping

Spatial and Temporal Boundaries of the Assessment

Temporal and spatial boundaries for the effects assessment are defined by the characteristics of the project and the valued ecosystems and cultural components (VECC) being assessed. These boundaries encompass time periods and areas during and within which the VECCs are likely to interact with or be influenced by the project. Spatial boundaries vary according to the nature of the VECC but generally are defined in terms of:

- Habitat for sensitive life stages;

- Wildlife migration routes and ranges;
- Areas of potential effects from dispersed or intermittent project activities, such as, air transport, and road haul; and
- Areas within which there is potential for cumulative effects with other projects.

Temporal boundaries for project-related effects are defined in terms of the project phases:

Baseline – covers ecological, physical and human-related characteristics of the environment, as characterized in 2006, 2007 and 2008, prior to the initiation of the construction phase;

Construction – includes all activities associated with project construction and before commencement of project

- transportation corridors construction;
- mobilization of equipment and supplies to the site by road and air;
- construction of site facilities, including camp, infrastructure, ore stockpile, mill, waste rock storage dump, water management facilities (diversions, settling ponds, seepage collectors etc.)
- camp operations and personnel transport during construction;

Decommissioning – includes all activities to decommission site facilities and remove equipment and materials from the site, recontour the site and restore drainage patterns to stable long-term conditions, stabilize the wastes for safe long-term maintenance, and implement the final site reclamation procedures to prevent erosion and restore vegetation cover where feasible;

Closure – refers to conditions that will exist on the site after the site is abandoned and revegetation is complete.

Temporal boundaries are also defined for the cumulative effects assessment, spanning baseline to a point in the future, within which project effects on VECCs are predicted to overlap with effects of other projects or activities. Spatial and temporal boundaries for each VECC are detailed in respective report sections.

Important Issues and Concerns raised during consultation

Issue	Aspect/Concern raised by Stakeholders	Project Proponent Commitments
Employment Opportunities	Expectations of employment are very high. Job opportunities are less for herders as they generally have less skills and training.	Employment is the main priority of the industry. Mostly locally skill and unskilled labor will be prioritized and also there will be job in executive level. Around 100 people will be employed by the industry.

Training Opportunities	People are keen to consult with subject industry if the Project offers training and upgrading opportunities to enhance their trade or professional skills.	Development of the Training Strategy, including commitment of allocation of budget investment for training infrastructure, delivery and design. Installation of training facilities in for worker of the company and students will also be accommodating. The internship program will offer to the students to develop professional skills.
Health & safety	Truck traffic is a main concern because the road used by the Project passes through a number of small communities and different industries and there will be a high volume of trucks transporting concentrate.	Development of Transport Management Plan including traffic safety training. Traffic advisory signs will be installed along project site and all nearby specific areas.
Local economy and business development	Local service providers are keen to participate in providing services to provide raw material and expect to receive in order to adjust their businesses to meet specific needs. Local/regional companies and entrepreneurs have limited understanding about meeting the high volumes required by the Project and the quality standard, but are keen to know these requirements so they can become suppliers.	Proponent has main focus that they will all the material regarding construction and plant operation to buy from the local market. This will help the local and small business and to people who are keen interested to become suppliers.
Environmental Issues	Dust and noise impacts, particularly from the construction activities and in operation of mechanically unfit machines, are of concern to herders and other residents. Environmental degradation during road construction and use. Loss and change of vegetation due to soil degradation.	Implementation of controls under the Environmental Management Plans, including on and off-site dust and noise monitoring. A Participatory Environmental Monitoring Program will be launched to spread awareness.
Water quantity and quality	Water quality and quantity, and impacts from the wastewater disposal are all key concerns for nearby herders.	Implementation of consultation in relation to water use and development of the Participatory Environmental Monitoring Program. Water treatment will be done by the proponent that will help to safe disposal of the water.

Significance Impact

The construction of the project can create some adverse impact on the existing environment. The acoustic impacts, dust emission, traffic congestion, safety and sanitation during the construction period would be limited to construction of building and site preparation. Since the new building would be set up in existing warehouse premises, the resettlement won't be an issue here. During construction, the contractor will adopt all necessary measures to reduce the probable environmental impacts from different aspects. There are minimal impacts during operation period and Construction will be responsible to take necessary steps during operation. The significant impacts in different phases i.e. (i) due to project location and preparation, (ii) construction phase and (ii) operation phase have been identified using the checklist process. From this process, the main potential environmental impacts, which may arise due to construction, can be grouped as follows: (i) Atmospheric emissions and Air quality, (ii) Noise generation, (iii) Water pollution and waste water disposal, and (iv) Health and safety However, the magnitude of these impact shall be very low and insignificant

EIA REPORT

M/S NIMIR INDUSTRIAL CHEMICALS LTD. 14.8 KM, SHEIKHUPURA-FAISALABAD ROAD, BHIKHI, DIST. SHEIKHUPURA, PAKISTAN.

CHAPTER-II

PROJECT DESCRIPTION

PROJECT DESCRIPTION

2.1 INTRODUCTION

This chapter furnishes detail information on project type, its need, location, size/magnitude, technology and process. It also gives details on complete of the project its description, operating conditions and implementation schedule.

2.2 TYPE AND CATEGORY OF PROJECT

The proposed project is Extension of M/S Nimir Industrial Chemicals Ltd Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura falls in the category B (2) of the project requiring Environmental Impact Assessment (EIA) of Schedule-II of IEE/EIA Regulation 2000

2.3 OBJECTIVE OF STUDY

The overall objective of this EIA is to carry out a detailed environmental assessment of the project area; to assess impacts caused by the different activities of the proposed project and to address measures to mitigate adverse environmental impacts arising from the execution of the proposed project.

The specific objectives of the EIA Study are as follows:

- To determine pre-project state of affairs to assess post-project conditions if they have changed for better or worse
- Documentation of all the resources likely to be affected due to the implementation of the proposed project
- To provide maximum information to the proponent and other stakeholders about the existing environmental conditions and the implications of the proposed project
- Allow the Planners to minimize potential impacts of the proposed project on different environmental conditions such as physical environment, biological environment and socio-economic environment
- To facilitate decision makers to take informed decisions.

2.4 OBJECTIVE OF THE PROJECT

Soap Manufacturing, Home & Personal care industry in Pakistan is very huge and is one of the main key drivers for Pakistani surfactants market. The personal care ingredients market in Pakistan is currently valued at about $520 million. Products ranging from hair care, skin care & bath products, cosmetics and fragrances form the personal care product market. In Pakistan, this industry has grown steadily with the

increasing usage of specialty ingredients for formulations used in personal care products. This will improve the viability of the aerosol, personal care products and home care finishing line. In addition to the objective, creation of new job opportunities for local community.

INDUSTRY OVERVIEW

Soap manufacturing, Aerosol, Canes, personal care liquid plants and home care finishing line is one of major products of Nimir Industrial chemicals LTD which is used to produce tin cans, shampoo, hand sanitizer, lotion, toilet cleaner, bathroom cleaner, fabric whitener, multipurpose cleaner for mainly for export. Traditionally, aerosol, personal care liquid products and home care finishing products has been used in Pakistan for export purpose and for producing various chemicals.

PAKISTAN SCENARIO

Pakistan have been producing most recognized brands of Toilet soap, Medicated soap, Face Wash and Liquid Detergents in Pakistan since last three decades, worth over $60 million annually and capable to increase the turnover about 200%.

LOCATION AND SITE DETAILS

The proposed project will be located at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura, Pakistan. The proposed site is in the industrial and commercial area; The land requirement for proposed industry unit is already in possession and it is not prime agricultural and road is adjacent to proposed site.

There are no Tropical Forest, Biosphere Reserve, National Park, Wild Life Sanctuary and Coral Formation Reserves within 10 km influence zone. The topography of the proposed project site is nearly flat with some undulating patches. The existing land is used for industrial purpose.

The general location map is given in Figure 2.1. Plant layout of proposed project is given in Figure2.2

FIGURE 2.1: GENERAL LOCATION MAP OF PROPOSED PROJECT

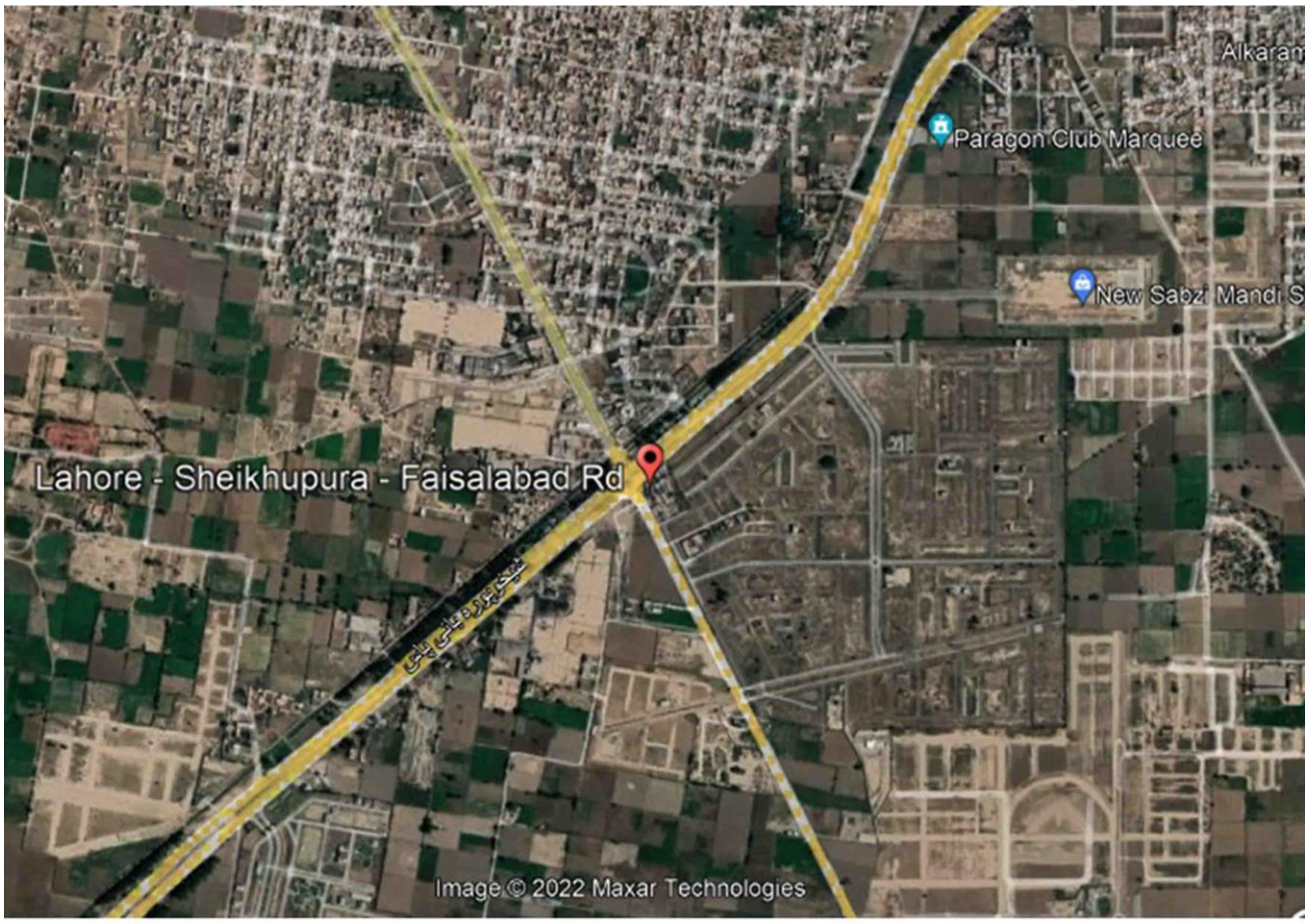
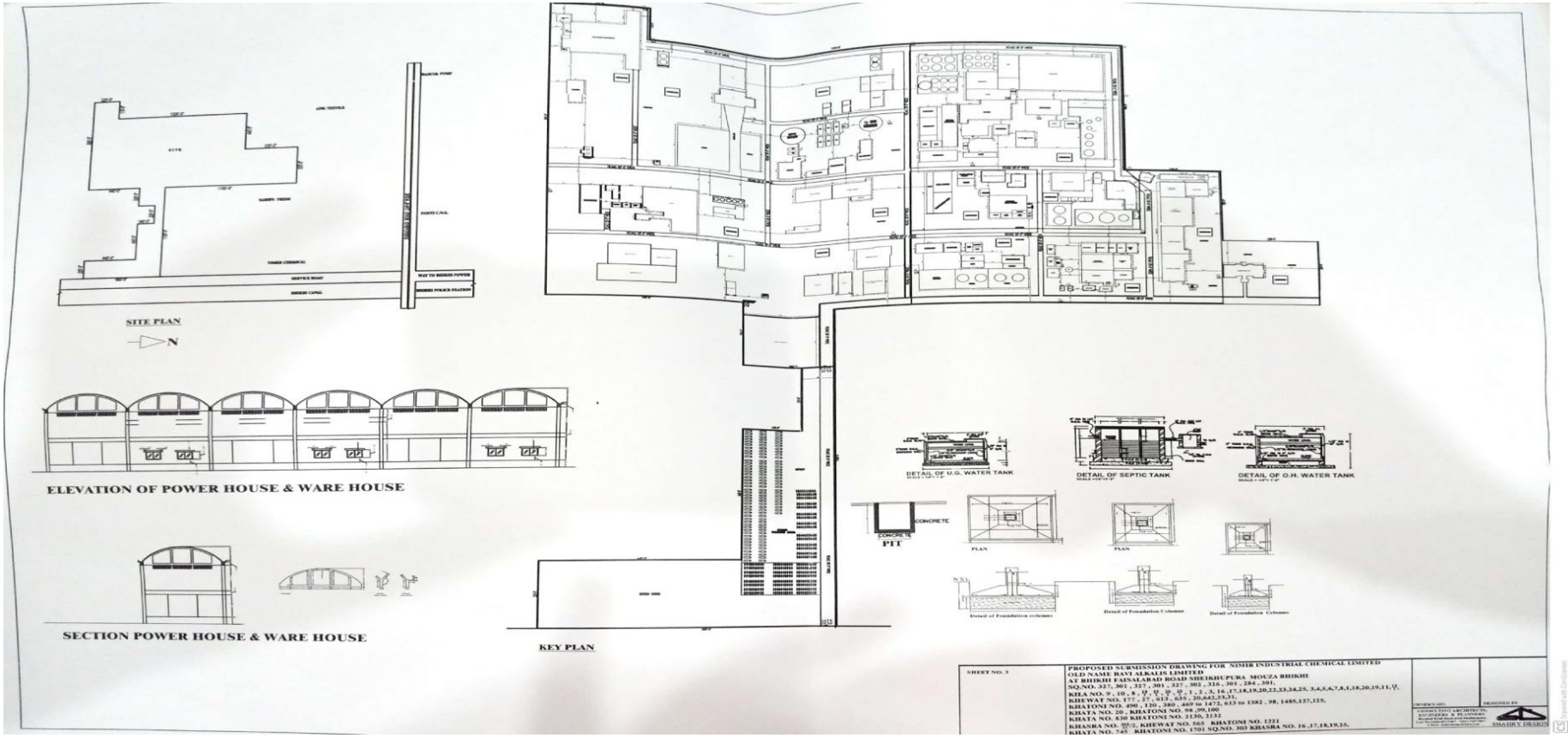
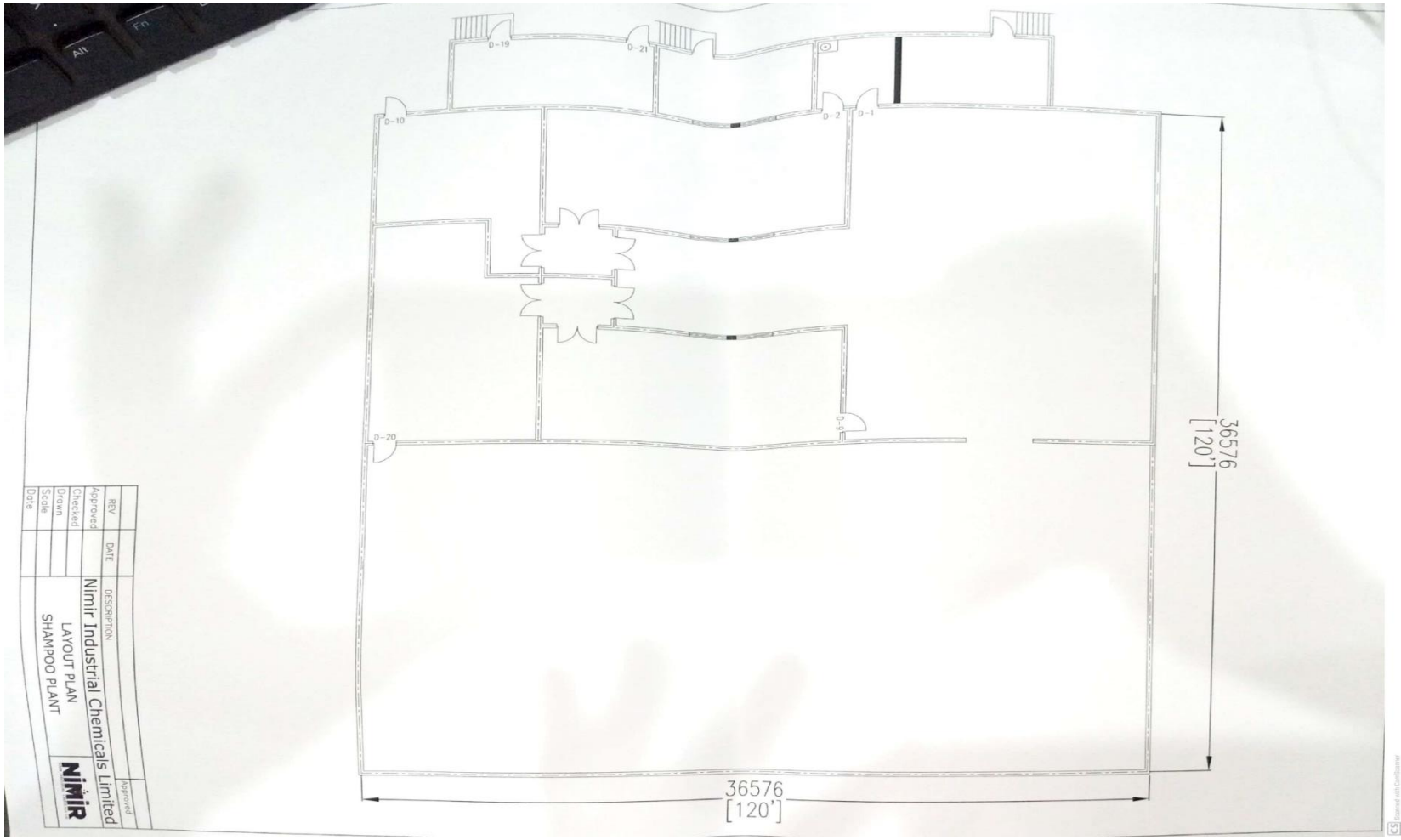


Figure2.2: Plant Layout




D-19
D-21
D-10
D-2
D-1
D-20
D-9
36576
[120']
36576
[120']
Nimir Industrial Chemicals Limited
LAYOUT PLAN
SHAMPOO PLANT
NIMIR
DESCRIPTION
DATE
REV
Approved
Checked
Drown
Scale
Date

2.4 SALIENT FEATURES OF THE PROJECT

Brief information of the project is given in Table 2.1

TABLE2.1: PROJECT IN FORMATION IN BRIEF

Sr. No.	Particulate	Description
1.	Name of the proponent	Syed Ali Irteza Hasni
2.	Project capacity	• **Personal care liquid plant** Products include shampoo, hand sanitizer, lotion Production capacity is 1500 Ton/year • **For home care finishing line** Products include toilet cleaner, bathroom cleaner, multipurpose cleaner, fabric whitener soap Production capacity is 50 M/year • **For aerosol** Products include tin cans Production capacity is 60 M/ year • **Fatty Acid and its Association units including Soap manufacturing and Packaging** FAE 70 Tons/day SNP 15 MT/hr. SFL 10 Tons/hr. • **ETP** 2400 cubic meter/day • **Power House Expansion** 20 MW • **Caustic & its associated plants Expansions** 120 Tons/Day • **CPW** 33 Ton/Day
3.	Location of the project	Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura, Pakistan
4.	Geographic Location	31°61'14.3"N and 73°89'04.1"E
5.	Land requirement	The total area of the project is 45 Kanal
6.	Units	• Aerosol and Cane project • Personal and Home care Finishing Line Project • Caustic & its associated plants Expansions • Fatty Acid and its associated units including Soap

		manufacturing and Packing • Power House Expansion • CWP • ETP
7.	Operation days	330 days
8.	Total water	2100 CMD
9.	Source of water	Ground Water, Own Deep Well, Rain Water Collection
10	Deep well bore	Quantity: 1 Size: 14 inch Daily consumption: 150 m^3/h
11	Production capacity	• **Personal care liquid plant** Products include shampoo, hand sanitizer, lotion Production capacity is 1500 Ton/year • **For home care finishing line** Products include toilet cleaner, bathroom cleaner, multipurpose cleaner, fabric whitener soap Production capacity is 50 M/year • **For aerosol** Products include tin cans Production capacity is 60 M/ year • **Fatty Acid and its Association units including Soap manufacturing and manufacturing** FAE 70 Tons/day SNP 15 MT/hr. SFL 10 Tons/hr. • **ETP** 2400 cubic meter/day • **Power House Expansion** 20 MW • **Caustic & its associated plants Expansions** 120 Tons/Day
12	Equipment's	• **For personal care liquid plant** 1 Liquid Filling Line 2 Batch Mixing Equipment 1 SLES Storage Tank 1 Hot Water storage tank

		1 DI water storage tank • **For home care finishing line** Home Care Filling Line Batch Mixing Equipment Storage Tanks Mixing Tanks • **For aerosol** 2 Aerosol Filling Line 4 Batch Mixing Equipment 3 LPG Gas Storage Tanks 4 Ethanol storage tank • **Fatty Acid and its Association units including Soap manufacturing and packing** FAE---- Splitters, Distillation Column, Expansion Vessel, Pumps SNP---- Tanks, Plodder, Reactor, Heat Exchanger SFL----- Conveyors, Mixer, Simplex & Duplex Plodder, Tripple roll Mill, stamper etc. • **ETP** Equalization Tank, DAF Mixing Tank, Coagulation Tank • **Power House Expansion** Steam drum, Feed Pumps, Furnace, Economizer, Blower • **Caustic & its associated plants Expansions** Saturator Settler Electrolysers, Hcl Furnace • **CPW** Reactors Absorber Tanks
13.	Electricity	Source: WAPDA, generator

		Consumption: 1460 KWh
14	Raw material	• **For aerosol** D-Panthenol, Vitamin E, LPG, Ethanol • **For personal care liquid plant** Ethanol, PEG/PPG- 17/6 Copolymer, propylene glycol, DM, EU, Acrylates/c 10-30 alkyl acrylate, Tetra hydroxypropyl ethylene Dia, Fir Citromax 490223 • **For home care finishing line** HCl, Sodium Hypo • **Fatty Acid and its Association units including Soap manufacturing and packing** Soap Noodles Fillers (e.g., titanium Dioxide, Sodium silicate etc.) Additives (e.g., colors, glycerin etc.) Fragrances (as per provided by the customer) Preservatives etc.
15	Waste water generation source	• **For aerosol** Production process: 200 l/h Recycled/ reuse water: 50 l/h • **For personal care liquid plant** Production process:3500 L/ shift Recycled/ reuse water: 1500 L/ shift • **For home care finishing line** Production process: 200 l/h Recycled/ reuse water:50 l/h
16	Effluent treatment system	Nimir Chemicals PVT Ltd treated their waste water by physical, chemical, biological and sludge treatment to decrease the toxicity.
17	Man-power	Number of administrative personal: 14 Number of production personal: 64
18	Total project cost	The total Cost of the project is 2.5 billion

Electricity requirement

The estimated power requirement will be 1340 kWh.

Fuel Requirement

Pakistani LPG gas is used.

Manpower requirement

During construction phase 90 skilled and unskilled labors will be required. Local labors will have been gaged during construction phase. During operation phase skilled labor like Process Engineers, Supervisor and Operators will be required.

Total initial manpower requirement during operation phase is given below. The required skilled manpower shall be made available from the local area and appropriate training will be imparted to get required skill for the operation of the plant.

TABLE2.5: TOTAL MANPOWER REQUIREMENT

Sr.No	Staff	Nos.
1.	Administrative personal	14
2.	Production manager	64
3.	Workers	90
	Total	164

2.6 PROCESS DESCRIPTION

A) personal and Home Care

Shampoo, hand sanitizer, lotion etc. will be manufactured by. The main equipment's which is used in this operation are as follow:

- Liquid filling line
- Batch mixing equipment
- SLES storage tanks
- Hot water storage tanks
- DI water storage tanks

METHODS

Liquid Filling Line

The liquid filling process starts with either our 90 series horizontal piston filler or 45 series inline piston filler. The product is deposited into the container using a stainless steel 316-L filler, with either single or multiple heads.

Batch Mixing Equipment

The batching equipment generally consists of a weigh hopper loaded from overhead bins by gravity, that discharges either into the truck below or onto a belt that goes to the mixer. Weigh the cementitious materials independently of aggregates either on separate scales or in separate compartments.

SLES Storage tank

SLES-70% should be stored preferably in stainless steel or fiber glass tanks. SLES-70% must be stored at temperature below 50° Storage tanks must be heated with water at a temperature below 50°C. SLES-70% is a paste which can be pumped at room temperature.

Hot water storage tank

A hot water storage tank (also called a hot water tank, thermal storage tank, hot water thermal storage unit, heat storage tank and hot water cylinder) is a water tank used for storing hot water for space heating or domestic use. Water is a convenient heat storage medium because it has a high specific heat capacity. This means, compared to other substances, it can store more heat per unit of weight. Water is non-toxic and low cost.

DI water storage tank

For DI Water, storage is recommended in FDA food grade, ANSI, NSF 61 certified HDPE / XLPE vertical water tanks, cone bottom tanks, and double wall tanks. Tanks should be rated to 1.0 specific gravity or greater. Deionized Water tank installation is recommended with PVC fittings, EPDM gaskets, and 316 SS bolts.

EQUIPMENT LIST

TABLE 2.6: LIST OF EQUIPMENT'S REQUIRED

Sr. No	EQUIPMENTS	QUANTITY
1	Liquid filling line	1
2	Batch mixing equipment	6
3	SLES Storage tank	1
4	Hot water storage tanks	1
5	DI water storage tanks	1
6	Home care filling line	2
7	Mixing tanks	3
8	Storage tanks	3
9	Aerosol filling line	2

10	LPG gas storage tanks	3
11	Ethanol storage tanks	4

B) FATTY ACID AND ITS ASSOCIATED UNITS INCLUDING SOAP MANUFACTURING AND PACKING

Soap finishing process is followed by following steps;

RAW MATERIAL FOR SOAP:

Raw Material is issued from material store. Raw material for soap may consist of the followings:

1. Soap Noodles
2. Fillers (e.g., titanium Dioxide, Sodium silicate etc.)
3. Additives (e.g., colors, glycerin etc.)
4. Fragrances (as per provided by the customer)
5. Preservatives etc.

1. Batch Mixing Section:

All the raw materials/chemicals/ingredients that are issued from material store are dispensed according to given formulation and added to the mixer (e.g., noodles, chemicals, perfumes, color and preservatives etc.) and mixed thoroughly. The mixer has a total capacity of approx. 450kgs. This premixed batch is sent to the Simplex Plodder. Here all the material is mixed homogenously followed by screens of required mesh size for a defined time.

2. Soap Milling:

As the batch is prepared, it is transferred to the Triple Roll Mill for milling and the same batch is transferred to final plodder by the help of delivery conveyors. During milling all the chemicals and ingredients are homogenized (Temp of the Chilled water in the rolls are maintained between 8 to 12 degrees Celsius. This homogeneous mixture of soap is fed to the final Duplex plodder, where refining of soap is finalized and extruded long bar is made under vacuum approx. 550 to 600 mmHg and cut into small billets by the help of electronic bar TV cutter. These bars are stamped by machine to required shape and size.

3. Soap Stamping (Press):

Here the billets from TV cutter are fed to soap press machine STUR-7 and stamped to required shape and size i.e.

4. Wrapping Section:

Stamped tablets, then fed to the wrapping machines. Here wrapping is also done according to the

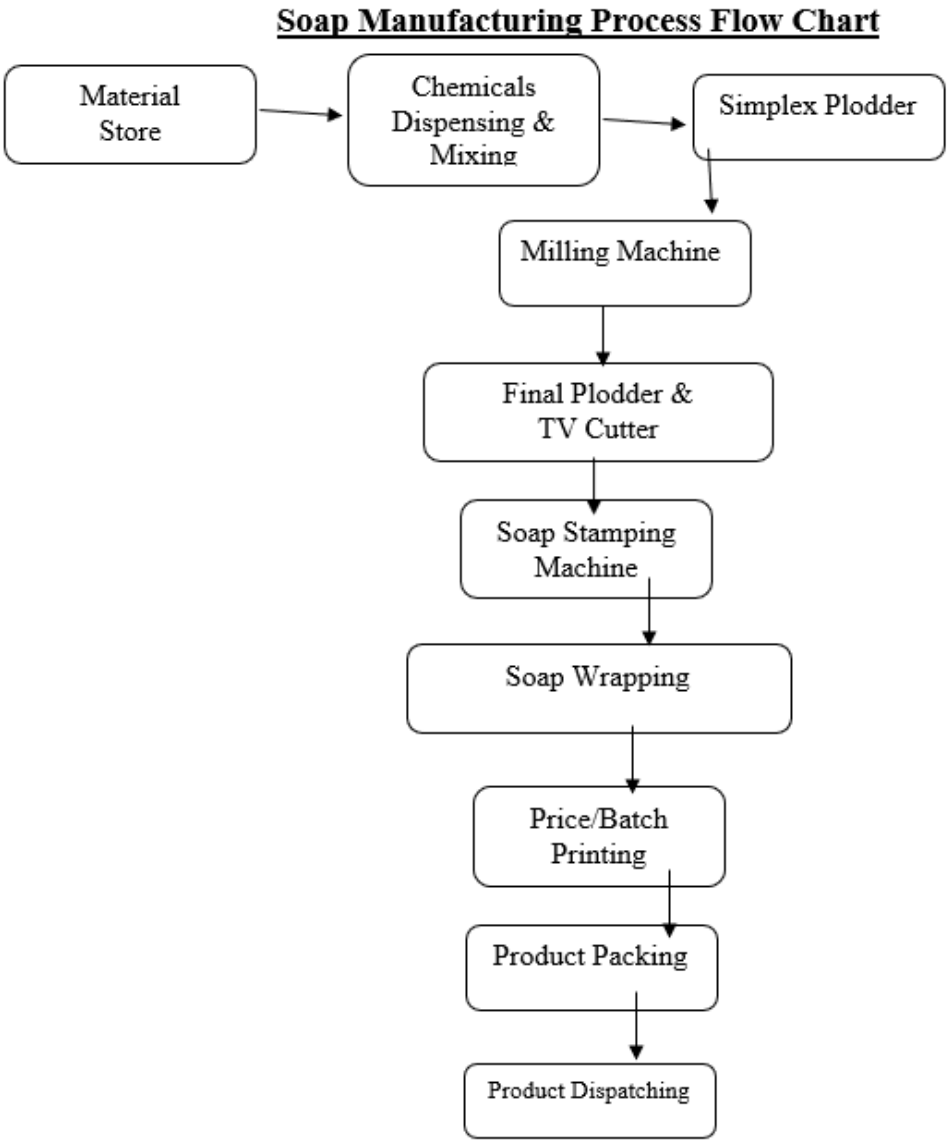
requirement of the tablet size. The heating set point @ the end of wrapping section are (Right Heater 150 degree Celsius) (Left heater 150 degree Celsius) (Bottom heater 170 degree Celsius)

5. Batch/Price Coding:

The wrapped tablet is then passed through batch/price coding printer. Here coding is done as per requirement.

6. Outer Filling:

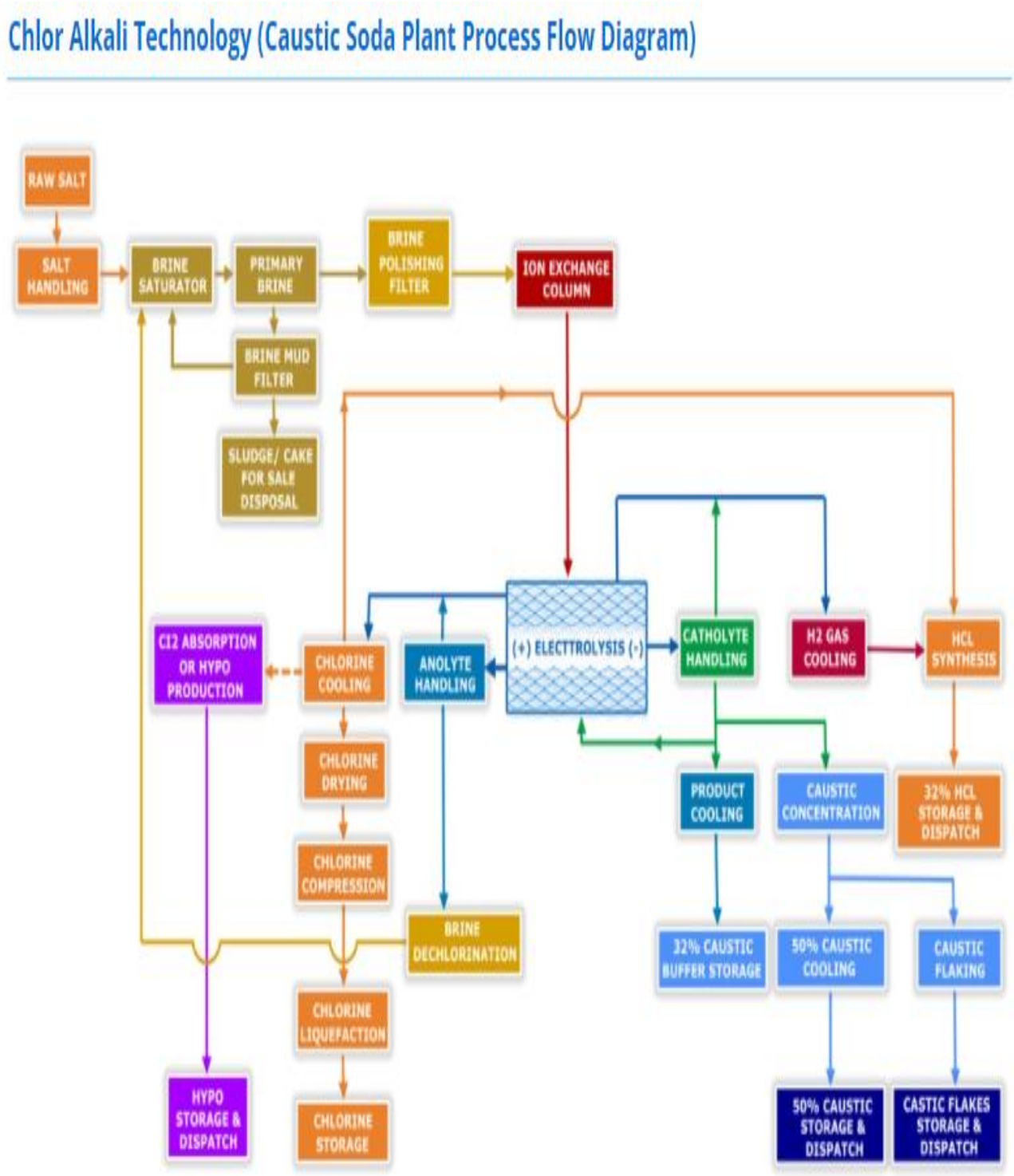
The wrapped products are packed into the cartons. The packers and QAD assures that the numbers of tablets in the cartons are according to specifications provided by the customer.



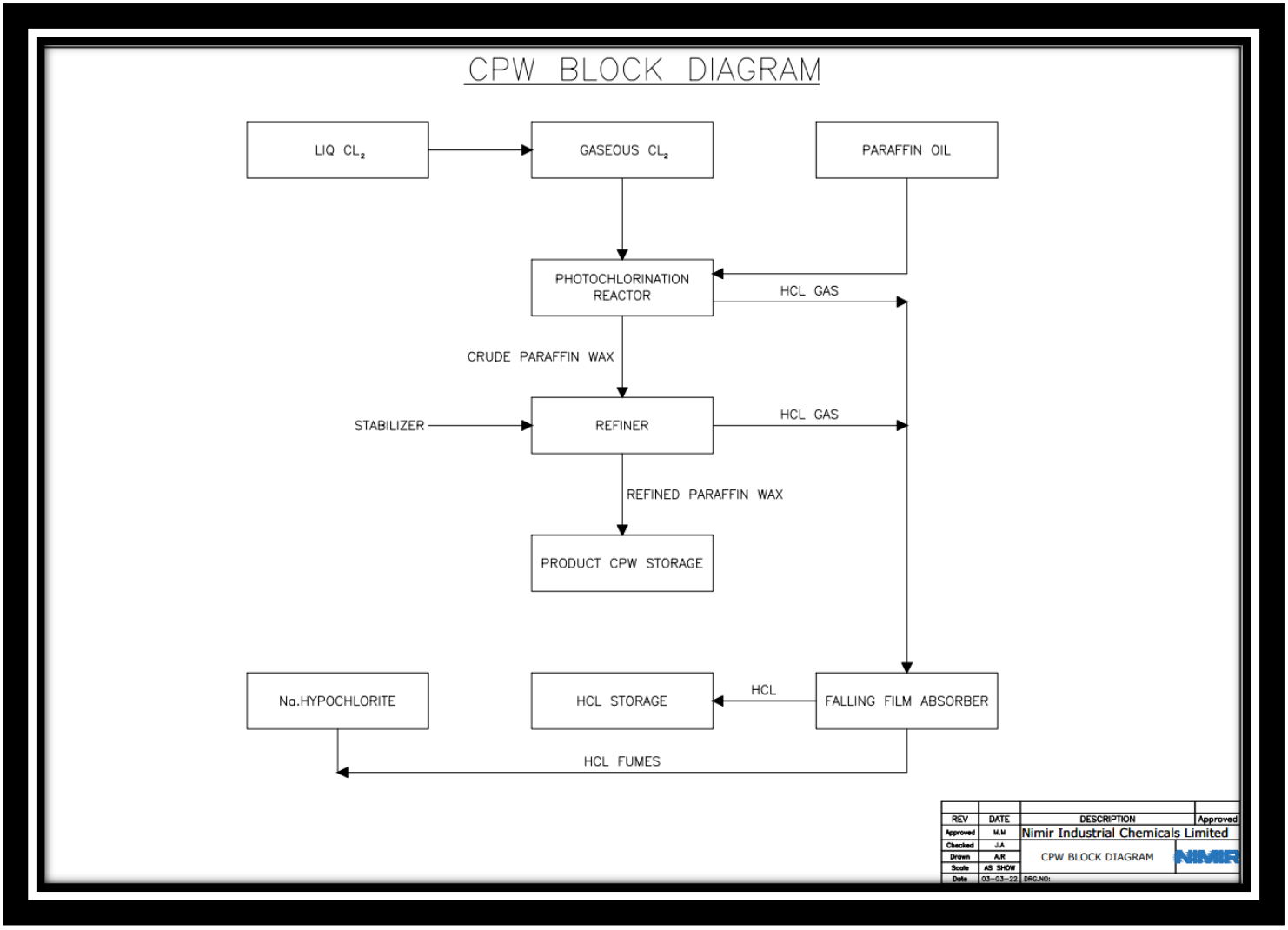
NIMIR INDUSTRIAL CHEMICALS LIMITE	MANUFACTURING PROCESS FLOW (SOAP FINISHING OPERATION)

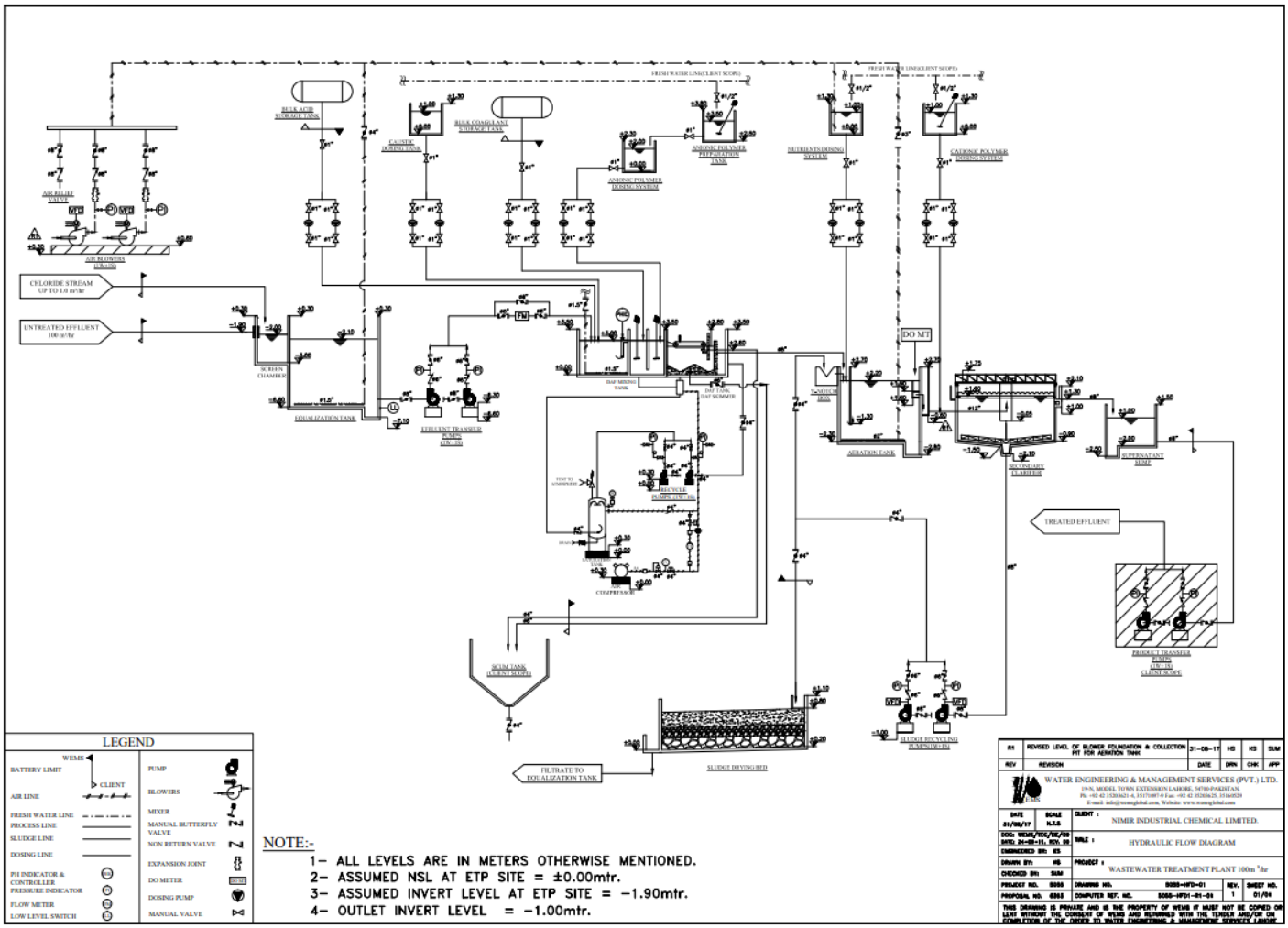
Step	Functional Area	Process Flow	Description	Responsible
1	RB	Material ordering as per production plan	Plan Raw and Packing Materials required as per production plan, well and advance as per policy.	RB
2	Ware-house / Stores	Material receipt from supplier	Received RMs / PMs to be checked for defects, physical counting and status of the material. Generate request for analysis. Co-Ordinate with QAD at the time of sampling and unload at allocated place in the ware house.	WH
3	Quality Control	Sample & Test Material	Sample according to sampling plan, test and decide for the fate of material.	QC
4		Meets Material (No)	If material does not conform, put the reject sticker and generate Non-Conforming Form for onward solvation.	QA
5		Yes — Approved	Approved Material	QC/WH
6	Manufacturing Planning	Raise Issue Notes	As per production plan raise issue request for required Raw materials/ chemicals/ Packaging material.	PRODUCTION
7	Issuance of Materials	Issue Notes are (No)	Check issue Notes for correctness, right quantities,	WH
8		Yes — Issue materials against	Weigh/count materials individually,sign off Issue request and ensure to hand over the requested materials to Production. Get them double checked and get the issue note signed by the recipient department.	WH
9	Manufacturing Process	Issue Notes (No)	Check issued materials quantities, anything is missing returnback to Stores for correction, also detailed process description is mentioned above.	PRODUCTION
10		Yes — Manufacture bulk/ fill	Perform Line-clearance and start manufacturing by adding mixers according to formulation, mill/ plod by ensuring the soap passing through correct sieve. Stamp and pack the tablet.	PRODUCTION
11A	Quality Assurance	Process / on line	Collect samples, inspect and take appropiate action as and when required.	PRODUCTION / QC/QA
11B		Packed product	Collect samples, inspect and take appropiate action as and when required.	PRODUCTION / QA
12	Quality Assurance	Test bulk / Inspect "Packed stock" Mfg	Test-bulk material as per relevent Bulk -monograph and do packed product inspection as per "Finished product Release"SOP. Check Documents for correctness.	QA
13		Meet Spec (No)	BULK: Bulk meets monograph, "RELEASE FOR PACKING" according to finished product SOP. Packed stock:Inspection results of stock are OK.	QA
14		Yes — Release bulk /		QA/WH

C) Caustic Soda



D) CPW


CPW BLOCK DIAGRAM
LIQ CL_2
GASEOUS CL_2
PARAFFIN OIL
PHOTOCHLORINATION REACTOR
HCL GAS
CRUDE PARAFFIN WAX
STABILIZER
REFINER
HCL GAS
REFINED PARAFFIN WAX
PRODUCT CPW STORAGE
Na.HYPOCHLORITE
HCL STORAGE
HCL
FALLING FILM ABSORBER
HCL FUMES
REV
DATE
DESCRIPTION
Approved
Nimir Industrial Chemicals Limited
CPW BLOCK DIAGRAM
NIMIR



Air Pollution

- Air pollution during construction phase will be due to material handling, dust emission, vehicular movement and emission from machinery. Air emissions / pollution during operation phase will be mainly form flue gases, manufacturing process, material & Ash handling and from vehicular movement.
- Necessary preventive measures shall be taken during construction phase so that the ambient air quality will confirm to National Ambient Air Quality standards.
- To avoid the generation of dust emission water sprinklers will be provided to suppress the dust.
- Water sprinkler will be provided at stack area to control fugitive emission
- Work zone area including internal roads in the plant will be asphalted or concreted.
- Water spraying system will be installed for regular spraying of water on road and work zone to minimizing fugitive dust emission.

2.8 PROJECT IMPLEMENTATION SCHEDULE

Project action will start after getting Environment Clearance from EPA Punjab and after getting the consent to establish from EPA Punjab and local NOC by district government. Estimated time schedule of project implementation will be as mentioned in Table

TABLE2.8: PROJECT IMPLEMENTATION

Sr. No	Activity	Period
1	Plumbing and sanitary	1 Month
2	Electrical work	1 Month
3	Mechanical work	1 Month
4	Fire alarm system	15 days
5	Telephone and network system	15 days
6	Mobilization/ demobilization	2 months
7	Structural work	03 months
	Total	**9 months**

2.9 PROJECT COST ESTIMATE

The total cost of the project is estimated about 2.5 billion. The project cost estimates include land & land development, civil, building structure, plant & machinery band other expenses, contingencies @ 2% on building, plant & machinery, margin money of working capital.

2.10 Alternative Considerations and Reasons for their Rejection:

To fulfill the commercial aspects of the project under reference of this EIA Report, it is to be sited at a place where commercial/ industrial activity is either already going on or there are bright prospects of the same. Concurrently, it must also meet the legal requirements of the Punjab Environmental Protection Act, 1997 (Amended 2012). Availability of land at the best convenient place is equally important among other considerations for the site selection. Availability of access roads, communication facilities, electricity, basic infrastructure, sewerage etc. is yet the other necessary requirements.

Selected Site

The proposed project is Extension of M/S Nimir Industrial Chemicals Ltd Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura. Site is good enough for the construction of industry, other reasons for selecting this site are following

Reason for selection of project site:

The land was selected for the following reasons;

- ✓ Economically feasible
- ✓ Trained or untrained workforce is available
- ✓ Neighboring industries and local public have no objection regarding project activities

Suitability of the Site

The site does not fall in environmental sensitive area and all commodities are at a suitable distance from project site as they will not impacted by the construction activities even locals will get more benefits and job opportunities. No replacement, relocation and rehabilitation are required for the development of proposed project

Design/technology alternatives, their selection and rejection criteria

The proposed project is Extension of M/S Nimir Industrial Chemicals Ltd Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura. Site is good enough for the Extension of M/S Nimir Industrial Chemicals Ltd Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura.

Environmental Alternatives, their selection and rejection criteria

The project simply involves the construction of Extension of M/S Nimir Industrial Chemicals Ltd Situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura. This selected site is environmentally friendly and sustainable. There is no specie present that will be harm due to Project. Hence, there is no environmentally alternative considered for this specific project.

Economic Alternatives, their selection and rejection criteria

The current selected mythology, designing and technique is economically efficient and provides extensive job creation avenues. It refers to the shift of materials used in the proposed project towards environmentally friendly and sustainable materials in present case. All machinery, equipment and materials procured for the said project will be environmentally friendly and sustainable. Hence, there is no material alternative considered in this case.

2.11 Existing Land Use

The land available for project is empty plot. There is no tree and vegetation in the land.

The project site is situated 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura. All laws and by laws of the government are applicable to any land planning and use as well.

2.12 Vegetation features of the project

During the construction of project, no trees will be removed.

2.13 Cost and magnitude of the operation

The project is currently the Extension M/S Nimir Industrial Chemicals Ltd **situated at** 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura. Total area of the project is 45 kanal and cost of the project is 2.5 billion

2.14 Schedule of Implementation

New job opportunities will arise especially for the locals during construction.

Detailed feasibility studies and designing of the project have been completed. Necessary legal, administrative and financial formalities are being finalized. The project is expected to be completed within 9-10 months from the date of environmental approval. Subsequently the operational and maintenance aspects of the project will be undertaken by the proponent.

2.15 Restoration / Rehabilitation Plan

All possible precaution will be taken to prevent an untoward incident in terms of life and property losses. The demolition materials will possibly be reused and recycled. All excavated surfaces will be restored in environment friendly way.

One completion of the project, the debris will be removed from the site in order to maintain the esthetic of the project. All measures will be undertaken for ensuring occupational safety, security and clean environment in the project area.

2.16 Government approvals required by the project:

Project proponent will get NOCs from all concerned departments after the environmental approval from EPA. Copy of each NOC will be submitted to EPA prior to operation of the project.

2.17 CONCLUSION

Chapter II describes the size, magnitude and basic requirements of the project. Environmental impacts due to proposed project activities have been identified. From the project description it is clear that major impacts are anticipated from wastewater, solid waste generation and air emissions. To predict the environmental impact of the project, baseline studies have been conducted in the month of September to December 2021. Baseline study reveals that the existing environmental condition in the proposed project area help to understand extent of existing pollution and thereafter the impact of the proposed activities from the prediction or through the air modeling.

EIA REPORT

M/S NIMIR INDUSTRIAL CHEMICALS LTD. 14.8 KM, SHEIKHUPURA-FAISALABAD ROAD, BHIKHI, DIST. SHEIKHUPURA, PAKISTAN.

CHAPTER-III

DESCRIPTION OF THE ENVIRONMET

This chapter describes the baseline conditions, which cover the existing physical, ecological and socio-economic environment of the project as well as study area.

Data was collected by reviewing secondary source and field survey and previous similar studies for the subject project in the Sheikhupura city.

3.1 Physical Environment/ Resources

3.1.1 Topography:

Topographically speaking, Sheikhupura lies between the river Ravi which flows along its boundaries with India and river Sutlej which flow its boundary with Sheikhupura District. The districts may be divided into two parts, a low lying or reverie area along the two bordering rivers and upland, away from the rivers. The reverie area is generally inundating during monsoon season. The water level in this area is higher than in the upland. The soil is sandy. The upland is flat plains sloping from north-west to south-west. The general height of the area is from 150 to 200 meters above the sea level.

3.1.2 Soils:

These are river transported deposits (alluvium), which are quite thick and fairly homogeneous in extent. The top soil consists of brown, soft to firm clayey silt / silty clay having slight plasticity and contents of dissolved salts. The top layer is likely to extend about 3 to 6 meter below natural ground, where it is underlain by silty fine sand/fine sand. This layer generally continues to deeper depths. These layers of silty clay and sandy gravel may also exist below 10-meter depth.

3.1.3 Climate:

Sheikhupura has extremes of climate; the summer season begins from April and continues till September. June is the hottest month. The mean maximum and minimum temperature for this month are about 45 and 27 degrees Celsius respectively. The winter seasons lasts from November to February. January is the coldest month. The mean maximum and minimum temperatures for the coldest month are 22 and 0 degree Celsius respectively. Rainfall Towards the end of June monsoon conditions appear and during the following two and a half months the rainy season alternates with sultry weather. The winter rain falls during January, February and March ranging from 23 to 31 millimeters.

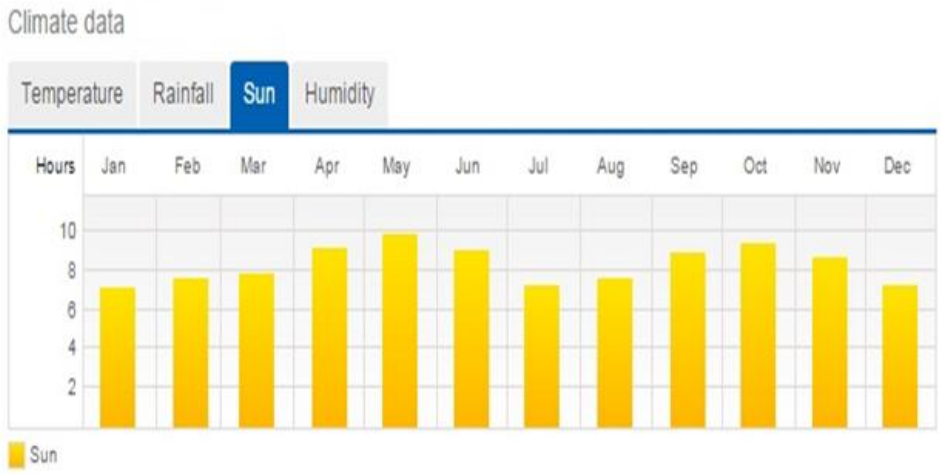


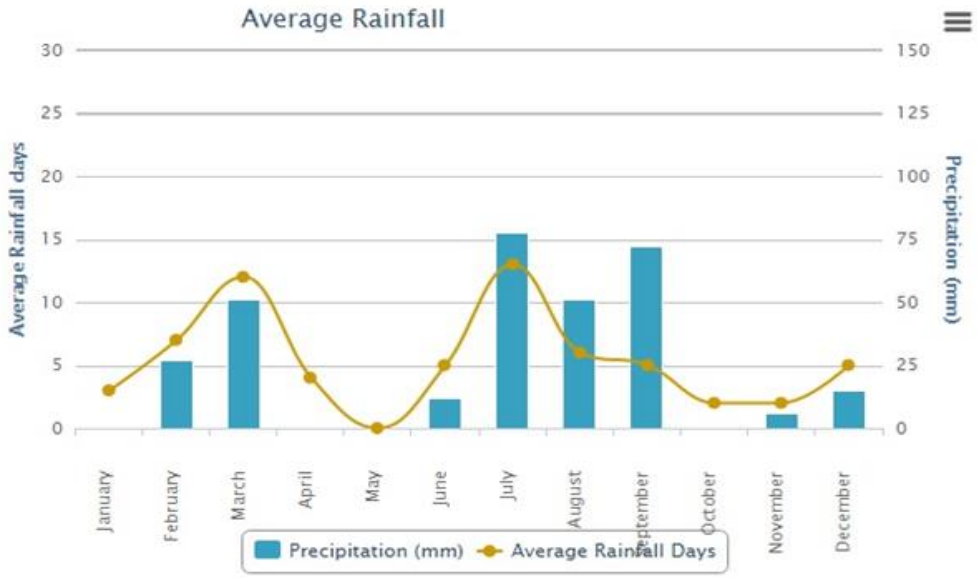
3.1.4 Temperature

Over the course of a year, the temperature typically varies from 5°C to 30°C and is rarely below 2°C or above 44°C.

3.1.5 Precipitation

The probability that precipitation will be observed at this location varies throughout the year. Precipitation is most likely around July and September and. Precipitation is least likely around May and October.





3.1.6 Humidity:

Maximum average humidity of district Sheikhupura is in month of July and minimum humidity is observed in April as shown in graph below;



Ambient Air Quality:

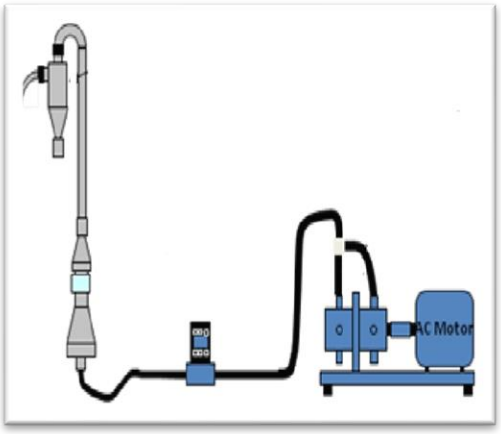
The project is located in commercial area of District Sheikhupura. The major sources of air pollution in the area are surrounding industrial activities and transportation or vehicular traffic.

To record the baseline ambient air quality of the project area, monitoring was conducted at advised locations to assess the concentration of priority pollutants (Carbon monoxide, Nitrogen dioxide, Sulphur dioxide and PM10) in the air.

Instruments used for monitoring Ambient Air Quality.

Ambient air monitoring was conducted by using Lamotte Kit.

Particulate Matter (PM10)



For PM10 mini volume air sampler was used. In PM10 Sampler air is drawn into the Omni directional inlet head at a flow rate of 20 LPM. The air is then accelerated toward the first impaction stage where particulate with aerodynamic diameters greater than 10 µm are collected (filtered out). The air stream, carrying particulate 10 microns and smaller, continues down the inlet toward the second impaction stage where particles larger than 2.5 microns are collected. Finally, particulate 2.5mm and smaller continue down the inlet where they are collected on a 46.2 mm diameter, ring supported filter media disc.

Lab results for Ambient Air Quality

PEQS: Punjab Environmental Quality Standards

Discussion of Results

The ambient air result was within the PEQS Limits during the monitoring hours. The ambient air

quality was monitored before construction, the market business, industrial processes and traffic was operational.

Noise Level Monitoring:

Basic Environmental conditions:

During the measurement following conditions were prevailed on site

Metrological Conditions:

During the noise level monitoring weather was dry and sky was clear. Air was blowing at high speed

Monitoring Instrument:

The description of the instrument used for the noise level monitoring is given below:

Name: Digital sound level meter

Model: AR824

Company: Intel Instruments plus

Features: +/-1.5 dB accuracy with 0.1 dB resolution

A&C weighting



Four Measurement Level Ranges

- ✓ Overall range: 30-130 dB
- ✓ Frequency Range: 31.5 Hz to 8 kHz
- ✓ AC and DC output
- ✓ Record Max values over time
- ✓ Over range indication
- ✓ Auto power off and Max Hold functions
- ✓ Utilizes 0.5"(12.7mm) condenser microphone

Calibration:

- ✓ Self-calibration time: 10 sec (every turn on)
- ✓ Specification:
- ✓ Display: Large 5 Digit LCD
- ✓ Resolution: 0.1 dB
- ✓ Overall Range: 30 to 130 dB "A", 35 to 130 dB "C"
- ✓ Sound Level Ranges: 30-80 dB, 50-100 dB, 60-110 dB, 80-130 dB
- ✓ Basic Accuracy: +/-1.5 dB
- ✓ Time Weighting: Fast or Slow
- ✓ Sampling Frequency: 2/sec

Methodology adopted:

- ✓ Noise level measurements were carried out in a way that monitoring round was completed in one go.

Sources of Noise Pollution

Major sources of noise generation are industrial activities and vehicular traffic along the main road. Noise levels were monitored within and outside of boundary walls of the project site. Noise profile of the project site near the main road is shown in sub-section.

Lab Results for Noise level

Discussion of Results

Noise level at west boundary was higher the PEQS Limits during the monitoring hours due to link road present at that side and traffic was flowing. At the time of monitoring the surrounding industries and traffic was operational.

Water Quality:

The surface water is of good for irrigation.

3.1.8 Ground water:

Underground water is available and its quality is not enough good for drinking at lesser depths. The residents of area mostly use ground water for drinking which is contaminated due to industrial activities in the area. Water is continuously being contaminated by the injection of industrial wastewater through injection well in the study area.

3.1.9 Wastewater/ surface water:

Proper sewerage system is not available in the area; there is no drain for the disposal of industrial wastewater as well. Mostly industries are injecting water in ground or may use in their own land for irrigation. It is highly recommended that water from the industries must be treated before use in irrigation. Govt. must take steps to provide proper industrial and domestic sewerage system in the area.

Surface water of the area is good for irrigation







3.2 Ecological Resources

3.2.1 Fisheries:

The project area is almost free from any commercial fishing activity. There are no lakes, even natural water ponds in the vicinity. Therefore, Fishery or any worth mentioning aquatic biology in this area is out of question.

3.2.2 Biodiversity:

Natural capital of a country mainly includes all of the country's wilderness areas and scenic landscapes, including also with their associated flora and fauna. Pakistan has a total of nine major ecological zones. The contribution of the "Natural Capital" is recognized at three distinct levels: species, genera, and communities (habitat and ecosystem) both collectively and within each level, the range or variety of the resources are referred to as the "Biological Diversity". The term has relevance for each of Pakistan's administrative units district, province, and particularly country. The more the number of species, genera, and habitats and ecosystems present within these units, the greater is said to be the biodiversity. The biodiversity of the area, with this background, is discussed as under.

Flora:

Project site is free from any protected plant species. Flora of the district has been greatly modified by human agency of the old open forests of small trees and shrubs; there remains only a few Rakhs or portions of forest which are kept as gazing ground for cattle etc. Amongst trees the most important are Kikar (Acacia arbica), Shisham or Tahli (Dalbergia sissoo), Beri (Zizyphus jajaba), Toot (Morus marlaccae), Sharin (Albizzia lebbek, Dharek (Malia azerdaracb), Phulahi (Acacia modesta), and Nim (Melia indica), Piple (Ficus indica) are planted for shade.The growth in Rakhs is composed mainly of three kinds of trees Jand (Prosopis spicigera), Karril (Capparis aphylla), and van or Jal (Salvadora obeoides). Occasionally pelu (acacia Loucophhloea) and Farash (Tamarix articulate) are also found. Pilchi (Tamarix gallio) is found on moist sandy soil along the rivers and is used for wicker-work, basket making etc.









Fauna:

Project site is free from any protected animal species. Wolf and jackal are the only wild animals of an importance. The former being met with occasionally in the low land wastes of Sheikhupura but jackal is found everywhere.

Forests:

An area of 13784 acres is under forest in the district. There is also linear plantation of 1604 kilometers alongside the roads/rails/canals in the district. Trees grown in the area are Kau, Phalai, Kikar and Shisham.





Rare or endangered species:

There are no game reserves or protected lands/areas or endangered or rare species either in the area in the range of 5km from the project site

3.3 Socioeconomic and Cultural Study

3.3.1 Education:

Sheikhupura is having a higher literacy rate when it is compared with other cities of the country. It is made possible due to its prolific educational institutions. Population

According to the 1998 census, Sheikhupura population was 6,318,745. Mid-2006 government estimates put the population at somewhere around 10 million, which makes it the second largest city in Pakistan, after Karachi. It is considered to be one of the 30 largest cities of the world.

3.3.2 Language

1 Punjabi

2 Urdu, being the national language of Pakistan is universally spoken and understood, while English is also understood and spoken by educated people. Famous singer *Ustad Bade Ghulam Ali khan* was also from Sheikhupura gharana of Indian classical music

3.3.3 Tribes & People

The principal tribes and tribes residing in Sheikhupura District are Pathan, Ansari, Bhatti, Malik, Arain, Jut, Sherwani, Safdar, Sunyare Rajput, Rehmani Mayo, Dogar, and Sheikh, the refugees from East Punjab that settled in the district largely belong to these tribes and clans. There are mueens or village artisans including Christians, blacksmiths, carpenters, potters, barbers, weavers etc. These mueens are found in all villages and are generally paid in kind at the time of each harvest.

3.3.4 Dress:

The local dress consists of a Kurta without collar covered by a waist-coat or Kurti and a loose loin cloth or trousers. A long piece of cloth called Chaddar is usually thrown over the willers. Achkan and Sherwani are worn on formal occasions by most people, but quite a large number of Muhajirs (refugees) wear these as normal dresses. In the villages, a Kurta with The-band (sheet round of legs) and Safa on willers is the most common dress. The Pagri still carries a sign of respectability and some people in the cities while most people in the villages have this as the sole head-dress. The women's clothes are generally more colorful with popular shades of red and yellow. Women clothing consists of Shalwar, Kamiz and Dopatta or Chaddar to cover their heads and upper part of the body. Phulkari is a silk embroidered shawl often fancied by the rural women-folks. Saree is only worn by women in towns and cities on formal occasions. The most common footwear for men in the villages is shoes of rough leather usually made by the village shoemaker. Boots are worn by those living in the cities and towns while women folk-wear sandal or slippers. Purdah is very common amongst the lower, middle and upper middle-class women but rare amongst women of upper class.

3.3.5 Public Health/ welfare:

Though earlier very few specialist doctors were available and most of the people resorted to the adjacent city of Sheikhupura for their health care needs. But now, in Sheikhupura District Headquarter Hospital is providing health facilities. Where as many small hospitals and clinics are providing basic health services as well, in rural and urban area.

3.3.6 Recreational Resources and Development:

The project area has not any private recreational facilities.

Aesthetic Values:

Like the general trend among the citizens of area, most of the people have low awareness about environment. Even then, some people take cleanliness and neatness of the environment lightly. Some people throw municipal solid wastes (MSWs) on the streets. Sense of personal responsibility to keep the environment clean as good citizens is even now lacking among a few people.

3.3.7 Quality of Life Values

- **Religion**

  The population of Sheikhupura is over 99% Muslim.

- **Customs**

The peoples are very much concerned about castes and beliefs, visiting shrines is very common among them.

- **Electric Supply**

  WAPDA power supply will be available at the site.

- **Telephone Facilities**

  Both Landline and Cellular telephone facilities are present in the project area.

- **Educational Facilities**

  No educational facility is present in the vicinity of the project area.

- **Agriculture**

Major crops of the town are wheat, grain, peas, barley are the important crops of Rabi season, while Kharif crops are cotton, sugarcane, potato, bajra, oil seeds which are shipped by rail and road to other parts of the country.

Site of physical, cultural heritage:

There are no documented or protected sites of archaeological, cultural, historical & religious significance in the project area. No visible signs were observed of such sites while conducting the field work.

EIA REPORT

M/S NIMIR INDUSTRIAL CHEMICALS LTD. 14.8 KM, SHEIKHUPURA-FAISALABAD ROAD, BHIKHI, DIST. SHEIKHUPURA, PAKISTAN.

CHAPTER-IV

ANTICIPATED ENVIRONMENT IMPACT AND MITIGATION MEASURES

ANTICIPATED ENVIRONMENT IMPACT AND MITIGATION MEASURES

4.1 INTRODUCTION

This chapter deals with the prediction and evaluation of impacts resulting from the various activities during construction and operation phase of the proposed project. "Environmental Impact" refers to the alteration of environmental conditions or creation of a new set of environmental conditions, adverse or beneficial, caused or induced by the action or set of actions under consideration. Both the beneficial (positive) and adverse (negative) impacts on various components of environment are identified based on the nature of the various activities associated with proposed project. Predictions are super imposed over baseline environmental status to derive ultimate environmental scenario.

For identifying the impact due to proposed project, baseline monitoring has been carried out in the month of October 2021 to December 2021. The existing environmental conditions have been described in the Chapter3 Impacts on various environmental attributes during construction as well as operation and mitigation measures have been discussed in this chapter.

4.2 PROJECT LOCATION

Extension of M/S Nimir Industrial Chemicals Ltd situated at 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura

4.3 IDENTIFICATION OF THE IMPACT

Impacts are identified during construction and operation phase. Below mentioned environmental parameters are considered while identifying the impact.

- ***AIR ENVIRONMENT***

  Sources, ambient air quality, emission control, environment and health effects

- ***WATER ENVIRONMENT***

  Sources, water & wastewater quality, environmental and health effects

- ***NOISE ENVIRONMENT***

  Sources, control measures, environment and health effects

- ***SOIL/LAND ENVIRONMENT***

  Land use, change in land use pattern, pollution sources, soil quality change, environment and health effects.

- ***BIOLOGICAL ENVIRONMENT***

Flora and fauna of the study area, vegetation and habitat change and control measures

- ***SOCIOECONOMIC ENVIRONMENT***

Demo graphical details, economic status, employment status, infrastructure availability, environmental and health effects

- ***OCCUPATIONALHEALTHANDSAFETYENVIRONMENT***

Identification of health hazard due to operation material handling and exposure of hazardous chemical, health and safety plan and disaster management.

4.4 ENVIRONMENTAL IMPACTS DUE TO THE PROJECT DESIGN

- Structural stability of the proposed project
- Soil structure and soil bearing capacity
- Emergency exit in the warehouse emergency situations
- Firefighting system
- Wastewater disposal system design
- Separate Drain Channels and pumping station for Rain Water
- Electricity hazardous

Impact significance: moderate to high or may be negative

Nature of impact: direct

Duration: Long-term

Timing: Constructional phase & Operation phase

Reversibility: NA

Likelihood: moderate to high

Consequences: moderate to high or may be negative

Mitigation measures and recommendations

Following are the mitigation measures and recommendation to minimize the anticipated impacts

- Road infrastructure should be according to the laws and regulations
- Firefighting system should be design for the emergency situations
- Separate Drain Channels and pumping station for Rain Water
- Electricity system should be design safe and sound, electricity wires should be covered by thick plastic/electricity resistant covers.

4.5 IDENTIFICATION OF IMPACT DURING CONSTRUCTION PHASE

Activities like leveling of site, construction and erection of main plant structures and equipment.

Impact matrix for different environmental components for construction phase is given in below mentioned table.

TABLE4.1: CONSTRUCTION PHASE IMPACT MATRIX

Environment components	**Construction Phase**					
	Project activity → / **Impacts on** ↓	**Site clearing**	**Sit preparation**	**Transportation of material**	**Civil/ construction**	**Influx of construction workers**
Resources utilization	Fuel			√	√	√
	Electricity					√
	Water				√	√
	Construction material ex. Stone				√	
Air	Air Quality	√	√	√	√	√
Soil/ Land	Soil erosion	√	√			
	Contamination			√		√
	Alteration of Soil properties/Soil Quality	√	√	√	√	√
	Land topography	√	√		√	
Noise	Noise Pollution	√	√	√	√	
Ecology	Effect on tress, grasses	√	√	√		√

	herbs & Shrubs					
Occupational	Health				√	
Health & Hazards	Sanitation					√
	Generation of temporary And permanent Jobs	√	√	√	√	

4.5.1 IMPACTS ON LAND ACTIVITIES

- Excavation, land clearance
- Wastewater and solid waste from construction activity
- Waste generation from labor force
- Sewage generation

Impacts

- Site preparation activities shall change land use and land cover which will result in loss of fertility of top soil and will change then attar alter rain of the land. Fertile soil and nature of terrain supports associated living of organisms. Change in land cover affects the specific niche of the organism.
- During site preparation change in land cover and land use was envisaged. Excavated top soil will be reused for back filling and in green belt development.
- Proposed land is vacant land; hence there will be no tree cutting is envisaged.
- Construction debris leads to ground water pollution, surrounding aesthetics & human health.
- Spillage & leakage of fuel as well as contamination of land due to spill of construction material may impact the land to some extent.
- There will be generation of garbage and sewage by the worker and other staff involved during construction phase. Untreated sewage and garbage disposal on land might pollute the land which may change physical and chemical properties of soil. Change in soil properties ultimately affects the living organisms present in the soil. Open dumping or improper disposal of sewage and garbage provides breeding ground for pathogenic bacteria and other creatures which may spread diseases like Diarrhea, Infections with intestinal helminths (worms), Malaria, Typhoid and other infectious diseases.

Proposed mitigation measures:

- The construction activities like excavation for foundation, site preparation and vehicular movements will definitely bring the changes in the landscape. However, these changes shall be of short duration with no much impact. Excavated soil will be stored properly to avoid the spread of wind-blown dust and shall be reused for back filling and landscape development.
- Spillage & leakage of fuel will be prevented by providing well lined/ paved area for the works having potential of leakage/ spillage of fuel or material. Hence contamination of land due to spillage/ leakage of fuel or construction material with soil would not arise.
- Disposal of untreated sewage & garbage generated by workers & other staff will be required in a systematic manner otherwise it will add into the contamination of land. The sewage will be treated properly and garbage if any shall be disposed utilized to make composts to avoid the impact of these pollutants on the land.

4.5.2 IMPACTS ON AIR QUALITY

The impacts on the ambient air quality during construction phase will be temporary and restricted to project site. However, necessary mitigation measures like shutdown of machineries when not in use, sprinkling of water, cover excavated/ construction materials by sheets, etc. will be taken. Thus, no adverse impacts on the surrounding environment are anticipated due to proposed project.

Activities

- Dust will be emitted during the leveling, grading, earthworks, foundation works and other construction related activities and also during transportation

Impacts

- Marginal increase in the levels of SO_2, NOx, PM and CO with in the plant area
- Dust accumulation on leaf retard the photosynthesis rate of plant which affect growth plants
- Health problems to construction workers Ex. eye irritation, coughing & sneezing

Proposed mitigation Measures:

- Excavation activity strictly restricted to in windy days
- Trucks will be allowed at site during construction phase.
- Frequently water sprinkling will be carried out in dust emission area.
- Use of Tarpaulin on the trucks to suppress the dust emission during transportation of raw material
- To avoid health hazards during construction phase, personal protective equipment's will be provided to workers

4.5.3 IMPACTS ON NOISE

QUALITY

ACTIVITY

- Digging and excavation etc.
- Construction material loading and unloading, fabrication and
- Handling of equipment and materials

Impacts

- Predicted noise pollution sources and its impacts during the construction phase:
- Operation of construction machineries, equipment and associated mechanical works will generate the noise.

Noise from Vehicular movement.

Noise level will be in the range of 70 - 85 dB (A) at receptor point from the associated work of construction. This generation will be of temporary nature and limited up to project boundary.

The exposure of workers to noise of high decibel may cause head ache or other occupational health hazards.

Noise pollution during construction phase is temporary and restricted to project boundary only.

Proposed mitigation Measures:

- Noise from Vehicular movement will be within the limit by implementing the policy of maintenance of Vehicles.
- Transportation of construction machinery or raw material shall be allowed only during day time to reduce the impacts of increased noise
- The construction equipment/machineries shall be turned off when not in use
- Loud horn of vehicles will not be allowed at project area. Regular maintenance & lubrication of construction equipment & machineries will be under taken to reduce the noise generation.
- All rotating parts of construction machinery will be well lubricated.
- Adequate Personal Protective Equipment (PPEs) like ear muff, ear plug, hand gloves, gum boots etc. will be provided to worker which helps to prevent occupation health problems.
- Overall, the impact of noise generated on the environment is likely to be insignificant, reversible and restricted to plant boundary.

4.5.4 IMPACTS ON WATER QUALITY

During construction water requirement will be 6-7 CMD & it will be met from water storage tank build in existing factory premises. Impact on water quality during construction phase may be due to sewage generated from the construction work force stationed at the site.

Further, the construction activities are more related to mechanical fabrication, assembly and erection, the need of water requirement will be small.

Activity

- Sewage generation maximum 15-20 CMD from construction labor (130-150)
- Run off from construction activity during rainy season
- Stagnation of sewage and construction waste water if any

Impacts

- Disposal of untreated sewage will lead to ground pollution & foul odor in the area.
- Surface run-off during rainy season may contain more of eroded soi land other loose matter.
- Stagnant water attracts flies, mosquitoes, and growth of water hyacinth.

Proposed mitigation Measures

- Generated sewage 15-20 CMD will be treated in ETP
- Temporary of toilet arrangement will be make available
- The earth work will be avoided during rainy season and will be completed during the winter and summer seasons only.
- Strengthening of the green belt in and around plant will be undertaken during the monsoon season which helps to avoid soil erosion.

4.5.5 IMPACTS ON BIOLOGICAL ENVIRONMENT

The project area does not encroach into any wildlife sanctuary/national park/eco-sensitive area /protected area. Hence project would not have adverse impact on the wildlife. Proposed site is flat, however there is very little ground vegetation with some grasses and herby vegetation. It could, therefore, be concluded that the project would not have major. The construction of the plant is not likely to have any impact on aquatic eco-system, as there are no major surface waterbodies in the immediate vicinity of the plant.

Activity

- Clearance of site

Impacts

- Loss of grass species
- Soil erosion

Proposed mitigation measures:

- Development of thick green belt and in a course of time
- Emphasized on indigenous, local, nesting, tress while development of greenbelt

4.3.6 IMPACTS ON SOCIO-ECONOMICS

- Construction phase will be increase in floating population.
- Additional stress on road, transport, communication, drinking water, sanitation and other facilities will take place.
- The project will provide temporary employment of skilled and highly skilled manpower.
- Most of the people will be employees of contractors/sub-contractors.
- Most of them a power during the construction period will be from local area.
- During the construction phase there will be increased demand of services
- The influx of population is very limited it is anticipated hence, there will be no social conflicts between the visitor and present communities. The movement of labor and the movement of vehicles carrying equipment/construction material are expected to increase the stress on the local transport and road network

4.3.7 OCCUPATIONAL HEALTH AND SAFETY

Construction activities involved many health & safety issues.

Activity

- Working at height
- Storage of hazardous material/chemicals ex. diesel, petrolic.
- Work without protective equipment and/or safety belt
- Site sanitation

Impact

- Loss of life due to accident such as falling, improper safety
- Fire & explosion due to hazardous material
- Foul odor due to degradation of food waste, other bio-degradable waste

Proposed mitigation measures:

- All personal protective equipment's will be provided. Mask, helmet, hand gloze etc.
- Safety trainings will be conducted
- Helmet will be compulsory while working on construction site
- Safety instructions will be placed at construction area
- Emergency preparedness plan will be implemented from construction phase
- Sign boards such as safety, isolated area, risk prone area will be placed

4.4 IDENTIFICATION OF IMPACT DURING OPERATION PHASE

During operation phase emission from manufacturing processes will cause considerable impacts on air, water and soil environment. Gaseous emission deteriorates the air quality, which ultimately will affect other environmental parameters. The impacts may be direct or indirect, short or long term and reversible or irreversible.

TABLE 4.2: OPERATION PHASE IMPACT MATRIX FOR CUMULATIVE IMPACT ASSESSMENT OF PROPOSED UNIT

components	**Activities** → **Impacts on**	**Manufacturing**	**Storage of raw material & Products**	**Fugitive and Stack emissions**	**Effluent generation**	**Solid disposal**	**Traffic**	**Runoff**	**Green belt development**
Resources utilization	Fuel			√					
	Electricity	√	√						
	Water	√							
Air	Air Quality	√	√	√	√	√	√		√
Soil/Land	Contamination		√		√	√		√	
	Alteration of Soil properties/ Soil Quality		√		√	√		√	√
Noise	Noise pollution	√	√				√		√
Ecology	Effect on trees, grasses, herbs & shrubs, fauna			√	√	√	√	√	√
Occupational Health &Hazards	Health	√	√	√	√	√	√	√	√
	Sanitation			√	√	√	√		
	Generation of temporary and permanent Jobs	√	√						

On the basis of the above-mentioned impact prediction, the anticipated considerable impacts on the

environment are;

- Ambient Air Quality
- Water Quality
- Noise Levels
- Water Resources

IMPACTS ON LAND/ SOIL

The solid waste generations from the proposed project will be having negative impact on the soil characteristics. The negative impacts will be minimized by proper disposal of solid waste generated in the plant.

QUANTITATIVE ANTICIPATED IMPACT AND MEASURES

Impacts

- Deterioration of soil characteristics with in plant premises
- Ground water pollution due to disposal of waste
- Negative effect on aesthetic environment

IMPACTS ON AIR

During operation phase emission from manufacturing processes will cause considerable impacts on air, water and soil environment. Gaseous emission deteriorates the air quality, which ultimately will affect other environmental parameters.

Activity

- Main sources of air emission will be from the boiler stacks
- Air pollutants like PM_{10}, SO_2, NO_x, CO_2 &VOC's will be emitted from manufacturing process.

Emission from vehicular movement. Particulate emissions in the project area envisaged primarily due to emissions from traffic of road, which is close to the project site. During the operation phase of the proposed project, movement of goods vehicles, loading and unloading operations may contribute to air emission.

Impacts

- Marginal increase in the levels of PM, SO_2 and NOx as the Air Control Equipment-Electrostatic Precipitator will be installed.
- Emission from vehicular movement leads to increase in PM level
- Dust inhalation by workers will results in eye irritation, coughing & sneezing
- Dust accumulation affect growth of plants

Proposed mitigation measures

- Fugitive emissions from raw material storage yards, loading and unloading operations will be controlled water sprinkling system, whenever necessary.
- All internal roads shall be constructed as tar roads and regular water sprinkling shall be carried out on all the Kaccha roads for preventing fugitive dust emissions.
- Huge tree plantation will be carried out around plant area for minimizing environmental impacts of the proposed activities over a period of time. Plantation program shall be designed and a budget should be allocated for this purpose every year. Total 33% of the area will be developing for greening.
- Factory will maintain good housekeeping in all units

Potential Environmental Enhancement Measures

The proposed project will be installed with all precautionary measures to enhance and safe the environment. Following necessary measures will be adopted during construction and operation:

- Sprinkling of water will be done on dusty road and tracks
- PPEs will be provided during construction activity
- Constructional waste and domestic solid waste will be disposed-off or utilized properly
- Machinery will never be left unattended
- No overloading would be allowed in any case.
- Safety signs and boards will be placed during construction
- Machinery will be kept maintained
- Waste water will be treated through waste treatment plant that will be installed within the industry
- Proper SOPs will be followed with proper schedule along with the HSE conditions
- Area will be restored with native plants. A proper tree plantation plan will be formulated to save the environment
- Solid waste will be handed over to contractors and agreement will be made.
- Noise will be controlled by adopting proper measures

- PPEs will be provided to workers during working
- Firefighting equipment's and system will be installed
- Safety signs will be placed at all locations where required
- Hygienic conditions will be ensured and proper quality will be maintained by quality control testing.
- First aid facilities will be made available
- Any possible measure will be adopted to make the project safe and environmentally friendly.

CUMULATIVE IMPACT ON TRAFFIC DENSITY

Existing Road network details

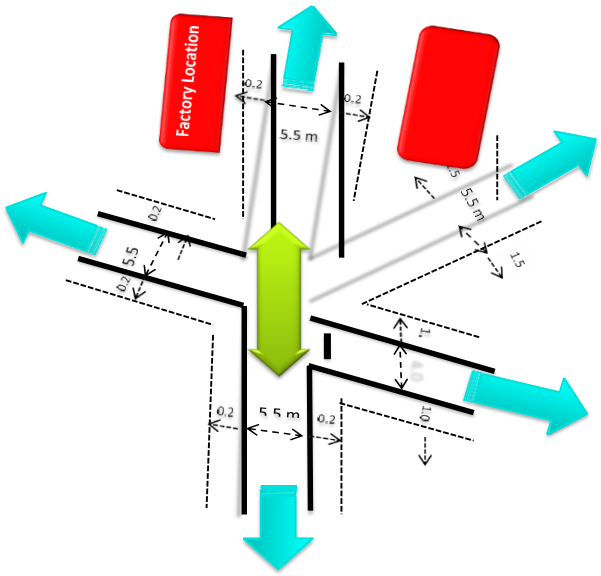


FIGURE 4.1: ROAD NETWORK NEAR TO FACTORY

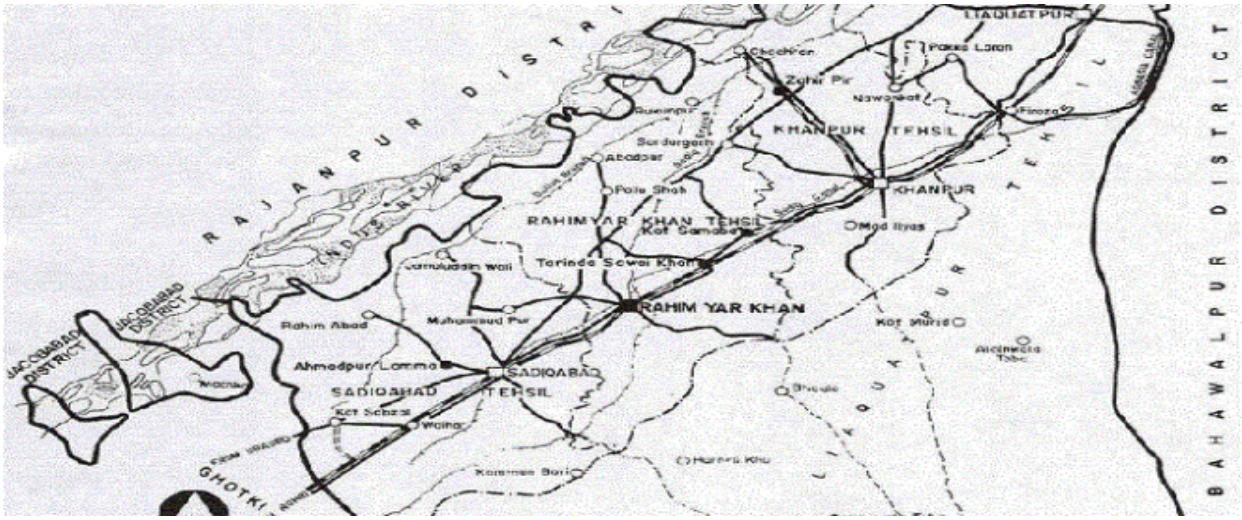


FIGURE4.3: ROAD CONNECTIVITY

Existing traffic data

A 24-hour traffic survey was conducted on each of the afore said roads separately for ascertaining the existing traffic on each of the roads. The findings of the traffic survey are depicted in below mentioned table.

- The peak traffic hours on each of the roads were found to be from 9 a.m.– 12 p.m.in the morning hours and 4p.m.–7p.m. in the evening.
- As is evident the major component of the traffic composition in terms of vehicles on SH-61 is Ching chi Rikshaw, motorcycle, tractor, and animal cots.
- The major component of the traffic composition in terms of vehicles on road, which is adjacent to the factory.

Roads of intermediate width, i.e., having a carriage way of 5.5m with normal earthen shoulders should have 1000 Passenger car units per day in both directions. It has observed that vehicle count is less than standard PCU count (i.e., < 5000). Hence, the present road capacity is sufficient for the current traffic load.

Impact from Transportation of Raw Materials and Finished Products

Transportation of raw material and products will be mainly through Sheikhupura road. Presently, the background emissions in the project area are primarily due to emissions from the Vehicular Traffic on the Sheikhupura road. During the construction phase of the project, movement of goods vehicles and loading & unloading operations may contribute to emission of pollutants. It is recommended that good quality road network shall be developed within the premises so that air pollution due to dust shall be minimized. However, factory will ensure proper arrangement of transportation and their movement, for existing and proposed unit and hence this would not lead to any major impact.

All the trucks, carrying various raw materials will be covered with tarpaulin. At loading and unloading points, arrangement for water sprinkling will be made so that dusts generation during transportation of materials will be minimized further.

Estimated Traffic from Project

With the implementation of the project the traffic is likely to increase slightly on the existing road network near the plant and its surroundings during construction and operation phase. The raw material and finished products of the proposed project will be transported by the following roads enlisted below:

- Sheikhupura road
- Sheikhupura- Faisalabad Road

The impact of the traffic is assessed on the basis of;

- Adequacy of the existing road network
- Impact on air quality

Construction Phase

Trucks will be used in transporting construction material and plant components to the proposed plants during construction phase. The estimated number of vehicles would be as tabulated in table below for a period of stipulated 14 months. Construction work of project will be done during off season of to avoid additional load on road.

TABLE4.3: TRAFFIC COMPOSITION IN BOTH DIRECTIONS

(Proposed traffic super imposed over baseline traffic during construction)

S. No.	Name of the road	Bullock cart	Agricultural Tractor/ Truck	Passenger Car, Tempo, Cars	Two wheelers	Total
1	Sheikhupura road	50	300	200	1500	**2050**

Roads of intermediate width, i.e., having a carriage way of 5.5m with normal earthen shoulders should have 5000 Passenger car units per day in both directions. It has observed that vehicle count is less than standard PCU count (i.e., < 5000). Hence, the present road capacity is sufficient for the expected traffic load during construction phase.

Operation Phase

All the raw materials and finished products will be ultimately approached on adjacent Sheikhupura road. Hence vehicular count on Sheikhupura road has been considered.

Roads of intermediate width, i.e., having a carriage way of 5.5m with normal earthen shoulders should have 1000 Passenger car units per day in both directions. It has observed that vehicle count is slightly lesser than standard PCU count (i.e., >1000). Hence, the present road capacity sufficient for the expected traffic loads.

Conclusion

The conclusion regarding adequacy of the existing road network is tabulated in Table 4.4

Sr. No.	Road Name	Predicted Total PCU's	Existing carriage way width (m) of the road	Recommended PCU's as per applicable IRC codes (IRC 73-1980)	Whether up-gradation /expansion of roads required (Yes/No)
1.	Main Road	1200	5.5	5000	No

Impact

As mentioned above the predicted final PCU's work out to be as follows:

1- Main Road adjacent to factory Sheikhupura road

MODEL INPUT

For modeling purpose, representing the worst prediction due to traffic, the peak hourly generated traffic on the state highway- 97 is considered, as it is the adjacent road to factory and which the main road for transportation. The data on the village road is not considered due to low volume of traffic. The Peak Hourly Traffic used for model prediction is tabulated below in Table 4.1

TABLE4.5: PEAK HOURLY PROJECTED TRAFFIC–OPERATION PHASE

Time	Name of the road	Agricultural Tractor	Passenger car, Ching-Chi	Two Wheelers
9am-11am	Sheikhupura road	40	50	235

TABLE4.6: SPEED OF THE VEHICLES (KMPH)

Bus/Truck/Tractors	Agricultural Tractor	Passenger car, Ching-chi	Two Wheelers
30	5-10	10-40	20-50

The vehicular emission norms in the year 200 recommended in Auto Fuel Policy decided by the EPA Punjab and EPA Pakistan have been used to provide the emission factors for the different vehicle types.

The air quality scenarios were developed for all stability classes using the representative wind speeds (minimum wind speed in the respective stability) for the particular stability class.

For model computations, the receptor locations have been chosen to account for its location with respect to center of the road. The scenarios were modeled for cross wind direction representing the worst-case scenario.

TABLE 4.7: RESULTS AND DISCUSSION:

Category Pollutants	**Two Wheelers (g/km)**	**Passenger Cars (Petrol) (g/km)**	**Passenger Cars (Diesel) (g/km)**	LCV **(Diesel) (g/km)**	HCV **(Diesel) (g/km)**
CO	94	65	14.4	109.8	372
PM	0.3525	0.2	3.8	14.25	76.88
NOx	58.75	0.5	0.7	0.70	0.70

Mitigation measures

- Roads and inter sections up gradation
- Expansion of road width from 5.5 m to 6.5m
- Maintenance of roads from time to time
- Maintenance of the vehicles
- Erection of traffic signals at strategic locations if required
- Overloading of the vehicles shall be avoided. Optimums loading of the trucks and cross checking at

weigh bridge.

- Pollution under Control '(PUC) certificates shall be issued to the vehicles.
- Water sprinkling on roads leading to plant and within plant
- Dense tree plantation along the roadside

IMPACTS ON NOISE QUALITY

Ambient noise levels will be increased during operation phase due to machineries and other industrial activities. However, the impacts of noise during this phase will be confined with in plant boundary or within the source of generation.

- Elevated workplace or environmental noise can cause hearing impairment, hypertension, is chemic heart disease, annoyance, and sleep disturbance.

Mitigation measures

- Vibrating pads & acoustic enclosure will be provided to noise generating equipment to control noise level with in norms
- Latest technology and utmost care will be taken at the time of equipment/machinery installation
- Lubrication of moving/ rotating part or component of machineries will be done on regular basis
- The insulation provided for prevention of loss of heat and personnel safety gears will also act as noise reducers
- The operators working in the high-noise areas will be provided with ear-muffs or plugs
- Acoustician closures and silencers will be provided to the Equipment wherever necessary
- Proper green belt will be developed to reduce the noise level

  Thus, it is envisaged that there will not be any adverse impacts of noise. The green belt developed within the premises will have significant beneficial impacts on reduction of noise within the periphery and outside the boundary.

ODOR *MANAGEMENT ACTIVITY*

- Typical compounds generating odor in industry
- Causes of odor are stale cane, bad mill sanitation, bacterial growth in the inter connecting pipes & unattended drains etc.
- Typical odor compounds in proposed unit
- Causes of odor are bad management offer mentation house, long retention of wash, unattended drains & ETP

Impacts

- Nausea, insomnia and dis-comfort.
- Nasal irritation rigger symptoms in individuals with breathing problems or asthma.

Mitigation measures

- Better management
- Use of mill sanitation biocides to minimize the growth of aerobic / anaerobic micro–organisms
- Steaming of major pipelines
- Proper cleaning of drains
- Better housekeeping by regular steaming of all fermentation equipment's
- Regular steaming of all fermentation equipment.
- Use of efficient biocides to control bacterial contamination.

IMPACTSON WATER QUALITY

Direct discharge of untreated sewage & effluent on land, generated from proposed unit will lead to ground pollution as well as soil quality. Various activities their impacts and mitigation measures for the same has been describes in below mentioned paragraphs.

Activities

- Surface water extraction
- Effluent generation from unit
- Run off storm water

Impacts

- No negative impacts are envisaged on surface water availability and drawl will be restricted during lean season. The industry has constructed water storage reservoir of for use of fresh water during lean season. The reservoir will be filled up with storm water available at the premise.
- Discharge of waste water within & outside plant boundary will lead to the ground water pollution.
- Discharge of effluent loss of soil fertility and deteriorate the soil quality.
- Discharge of effluent in the surface water body alters the water characteristics and may leads to eutrophication of water bodies. Further, its dark color hinders photosynthesis by blocking sunlight and is therefore deleterious to aquatic life.

Mitigation measures

- All the wastewater generated from the proposed plant, will be sent to ETP

Impacts On Biological Environment

There will be no impacts on natural vegetation and species diversity due to the proposed unit. There

will be no tree cutting or shrub removal will take place. The proposed green belt development help to control temperature and keep the surroundings cool. It will attract avifauna and create suitable habitat to micro flora and fauna. The green belt will help as a sink to dust and gaseous pollutants. While developing proposed green belt native, ornamental, medicinal values trees will be planted; which results in enrichment of biodiversity & beautification of area.

There are no wild life sanctuaries with in the study zone. Within the 10 km from project site dry vegetation is found. The impact on flora is insignificant. As site is flat with some undulating patches, very little leveling activities will be required. Hence no impact on existing landscape is anticipated.

Activity and its impacts

Impacts on ecology shall be from the following sources:

- Fuel gas emissions in the air will lead to increase in concentration of Particulate Matter, Sulphur Dioxide and Oxides of Nitrogen. An increase in air pollutants may affect the vegetation growth in and around the area
- Dust emission is envisaged during material handling & transportation, which affects the growth of vegetation.
- Disposal of solid/hazardous waste on land pollute the soil, which eventually affect the vegetation

Mitigation measures

To mitigate the above-mentioned impact following mitigation measures will be implemented:

- Air pollution control equipment like Electrostatic Precipitator (ESP) will be provided to reduce the emission of particulate matter
- Well-designed material storage area as well as handling facilities will be provided to prevent particulate emissions from the storage, handling & transportation activities.
- Solid waste storage area will be designed as per the guide lines to avoid the leach ate percolation into the ground or waterbodies.
- Green belt area will be developed in & around the plant premises and shall be maintained properly.
- There is no any discharge from the project activities. However, no any impact on the biological environment has been found any alteration or destruction to the biological environment.
- All efforts will be put-up by the factory management to maintain the ecological balance and improve the environment in terms of ecology and green Belt development. Industry will follow the zero discharge norms. Hence no adverse impacts on surrounding ecology.

IMPACT ON SOCIO-ECONOMIC ENVIRONMENT

- The impacts of the proposed Unit will lead to the positive impact on surrounding. The proposed project

will generate the employment to local people. Thus, the said project will not have any significant impact on Socio-economic pattern of the surrounding region.

OCCUPATIONALHEALTH & SAFETY

- Work place area involving production unit, raw material handling area etc.
- It is envisaged that occupational health hazards shall be associated with operational activities such as spillage and exposure to the chemical, mechanical hazards like cuts and hits and electrical shocks.
- Accident due to fall from height, burn injury and trap in the machine or motors during operation.

All these above-mentioned impact or risk associated with various operational activities of the plant shall be mitigated by implementing the following measures:

- All safety signs will be placed at proper location
- First aid kits will be made available at every department
- Pre-employment Medical checkup and periodical medical checkup shall be undertaken to know the occupational health hazards at the early stage.
- Work permit system will be introduced to avoid the entry or un-authorized working to avoid the incidences which can lead to the accident if proper care is not taken
- All arrangement required for Fire hydrant system shall made at every vulnerable location to have the firefighting facility.
- A part from above, all required Fire Extinguishers shall be provided at appropriate locations
- All staff and workers will be trained in firefighting operations and emergency preparedness plan or to tackle the accident
- A part from all engineering control measures, if required necessary PPEs shall be provided as last protection measures to the employees.
- Good housekeeping also plays important role in avoiding the undesirable incidences/accidents, hence good housekeeping practices will be employed throughout the Factory premises.

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M/S NIMIR INDUSTRIAL CHEMICALS LTD SITUATED AT 14.8 KM, SHEIKHUPURA-FAISALABAD ROAD, BHIKHI, DIST. SHEIKHUPURA

Chapter- v

IMPACT ASSESMENT

IMPACT ASSESSMENT MATRIX

Impact matrix facilitates to identify components and phases of project activities for determination of likely impacts. Matrix identifies the interaction between project activities and environmental components using a grid like table. Entries are made in the cell which highlights impact severity in the form of symbols or numbers or descriptive comments. The impact of different project activities on various environmental components like biological environment, air environment, aesthetics and socio-economic have been summarized in a form of a matrix in Table

- Environmental Pollution
  - Water: surface and ground water pollution
  - Air: Ambient air quality
  - Soil: Soil quality
  - Land: Change in land use pattern and topography
- Biological Environment
  - Existing Flora and fauna
  - Aquatic Ecosystem
- Socioeconomic Environment
  - Health and safety, cultural, aesthetic and economic aspects

Evaluation Marking Criteria

Description		Value
No / Zero Impact	:	0
Minor/ Negligible negative impacts	:	-1
Minor / Negligible positive impacts	:	+1
Significant negative impact	:	-2
Significant positive impact	:	+2
High negative impact	:	-3
High positive impact	:	+3

TABLE4.7: IMPACT MATRIX OF PROPOSED PROJECT

		Pre-construction		Construction Phase					Operation and maintenance			
1	2	3	4	5	6	7	8	9	10	11	12	13
Environment components	Project activity / Parameters	Land acquisition	Site clearing	Site preparation	Excavation/ Temporary structure	Transportation of material	Civil/construction work	Influx of construction	Transportation of material	Movement of energy	Operation of cooling	Pollution control
Resources utilization	Fuel	0	0	0	0	0	0	0	-1	-1	0	0
	Electricity	0	0	0	0	0	-1	-1	0	0	0	0
	Water	0	0	0	0	0	-1	-1	0	-1	-1	0
	Construction material ex. Stone	0	0	0	0	0	-1	0	0	0	0	0
	Land	0	0	0	0	0	0	-1	0	0	0	0
Air	Air Quality	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1
	Climate	0	0	0	0	0	0	0	0	0	0	0
Water	Alteration of surface/ ground water bodies	0	0	0	0	0	0	0	0	0	0	0
	Alteration of surface run-off and inter flow	0	0	0	0	0	0	0	0	0	0	0
	Alteration of Hydraulic Regime	0	0	0	0	0	0	0	0	0	0	0

	Contamination	0	0	0	0	0	0	-1	0	0	-1	0
Soil/Land	Soil erosion	0	0	0	-1	0	0	0	0	0	0	0
	Contamination	0	0	0	0	0	-1	-1	0	-1	-1	-1
	Alteration of Soil properties/Soil Quality	0	0	-1	-1	0	-1	-1	0	-1	-1	-1
	Land topography	0	-1	-1	-1	0	0	0	0	0	0	0
Noise	Noise pollution	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-2
Occupational Health & Hazards	Health	0	0	-1	-1	-1	-1	0	-1	0	-1	-1
	Sanitation	0	0	0	0	0	0	-1	0	0	0	0

		Pre-construction		Construction Phase					Operation and maintenance			
1	2	3	4	5	6	7	8	9	10	11	12	13
Environment components	Project activity Parameters	Land acquisition	Site clearing	Site preparation	Excavation/ Temporary structure	Transportation of material	Civil/construction work	Influx of construction	Transportation of material	Movement of energy	Operation of cooling	Pollution control
Ecology	Effect on trees, grasses, herbs & shrubs	0	-1	-1	-1	-1	0	0	-1	0	0	-3
	Effect on farm land	0	0	0	0	-1	0	0	0	0	0	0
	Effect on aquatic	0	0	0	0	0	0	0	0	0	0	0
	Effects on fauna ex.Birds, butterflies' Mammals etc.	0	0	0	0	0	0	0	0	0	0	0
	Habitat change and removal	0	0	0	0	0	0	0	0	0	0	0
	Introduce new exoticspecies	0	0	0	0	0	0	0	0	0	0	0
Socioeconomic	Creation of new economic activities	+1	0	0	0	0	+	0	+	0	+1	0
	Commercial value ofproperties	+1	0	0	0	0	0	0	0	0	0	0
	Generation of temporary and permanent Jobs	0	0	0	0	0	1	0	0	0	+1	1
	Effect on crops	0	0	0	0	0	0	0	0	0	0	0
	Reduction of farm land productivity	0	0	0	0	0	0	0	0	0	0	0

	Income for the stateand private sector	+1	0	0	0	+1	0	0	+1	0	+2	0
	Savings in foreign currency for the state	0	0	0	0	0	0	0	0	0	+2	0
	Training in new technologies and newskills to workers	0	0	0	0	0	0	0	0	0	+1	+1
	Political/social Conflicts	0	0	0	0	0	0	0	0	0	0	0
	Land use change	0	0	-1	-1	0	0	-1	0	0	0	0
	Aesthetics and human interest	0	0	0	0	0	0	0	0	0	0	0
	Cultural status	0	0	0	0	0	0	0	0	0	0	0

Serial	Environmental Issues/ Impacts	Mitigation Measures
PLANNING, SITE SELECTION AND DESIGN STAGE		
1	Observance of administrative and legal formalities	It is recommended for obtaining of approval from other relevant departments
2	Acquisition of land	The proposed land is the property of the project proponent.
3	Loss of environmentally sensitive areas	There is no any sensitive area near the project site however the project proponent will achieve the PEQS at the boundary wall of the subject project to avoid the environmental impacts on the nearby industrial unit
4	Changes in traffic pattern	There is no need to change the traffic pattern due the development of the subject project because no. of industries has been developed at the same link road only few vehicles will visit the project on daily basis.
5	Potential conflicts with stakeholders	There is no any conflict at the current stage of the project. Neighboring industries were visited regarding their concerns. They have no any objection regarding development of the subject project as per proposed design. It is recommended to Settle the issues through scoping and specific group discussions.
6	Resettlement issues	No resettlement issues
7	Project Design	Structure Stability Assessment of soil has been done, as per building design i.e., total area of building. (Annexure- B) Provision of Emergency Exits, Assembly Points, firefighting arrangements, water storage for firefighting should be incorporated in the design. Installation of Dust/flue gases/odor controlling devices should be incorporated in the design. Project proponent is committed to provide all these provision in the design of the project.
SITE DEVELOPMENT STAGE		
1	Erosion due to stripping and site clearance	Sprinkling of water on road side or dusty tracks
2	Generation of dust	Careful loading and unloading of materials are recommended. Sprinkling of water on site and surrounding areas is recommended.
3	Generation of noise	Avoid suing forbidden horns at the site. Do not throw heavy equipment and construction materials in haphazard manner.
4	Local flooding/ponding	Immediate repair and maintenance of water supply pipes and sewers in case of any defect will be undertaken.

5	Outbreak of fire	Firefighting equipment must be maintained at the site in good working condition.
6	Safety	Safety of the workers and others must be ensured. Privacy of the neighbors must not be disturbed.
7	Labor issues	Employ the local labor as far as possible Wages of the labor should be as per Government policy
ESTABLISHMENT STAGE		
1	Contamination of land and water	Hazardous substances like oil, fuel, etc. should be kept on concreted surface. Essential services like water supply, sewerage disposal and solid waste management must be in working condition.
2	Impacts of dust, noise and flue gases on neighbors	Sprinkle water on dusty tracks is recommended Avoid suing forbidden horns at the site. Do not throw heavy equipment and construction materials in haphazard manner. Proper tunings of vehicles and machinery must be ensured. Schedule construction timings should be implemented for minimum disturbance to neighbors. Continuous Environmental monitoring must be ensured as per proposed monitoring plan.
OPERATION STAGE		
1	Contamination of land and water sources	Continuous vigilance on maintenance of services Tarpaulin sheets must be placed to avoid leaching of oil into ground
2	Fire breakouts	Training of workers regarding flammable substances will be ensured. SOPs of fire prevention will be adopted like forbidden of smoking, regular testing of electricity infrastructures and regular testing of gas supply system to the industry. Firefighting equipment must be kept in working condition at site
3	Safety/security concerns	Safety of the workers and others will be ensured. Privacy of the neighbors will not be disturbed.
4	Malfunction of utilities	It is proposed to appoint maintenance engineer with technicians like plumber and electrician for smooth operation of utility services.
5	Occupational Health, Safety and Environment	• Regular medical check-ups must be ensured to improve the working condition and efficiency of workers. • Relevant safety devices like belts, gloves and testers must be strictly used by the operators at the work site. Safety of management, workers and visitors must be ensured. Observance construction and safety codes must be ensured.

		• Provision of emergency exits must be ensured.
6	Production of Solid Waste	Area for solid waste must be reserved within the subject project. The solid waste must be managed on regular basis. The domestic waste will be disposed-off in environment friendly way.

SUMMARY OF ANTICIPATED IMPACTS AND PROPOSED MITIGATIONMEASURES

Significant impact from the project activities and its mitigation measures aresummarize

Conclusion of impact matrix assessment

Proposed project will not have any significant negative impacts on the environment. In absence of pollution control equipment, project will have high negative impact. Appropriate Environmental Management Plan (EMP) nullifies all high potential adverse impacts. Moreover, implementation of EMP helps to convert negative impact into positive impacts. Thus, proposed project is certainly safe from the environmental point of view.

EIA REPORT

M/S NIMIR INDUSTRIAL CHEMICALS LTD. 14.8 KM, SHEIKHUPURA-FAISALABAD ROAD, BHIKHI, DIST. SHEIKHUPURA, PAKISTAN.

CHAPTER-VI

ANALYSIS OF ALTERNATIVES

ANALYSIS OF ALTERNATIVES

INTRODUCTION

Chapter provides the information on various alternatives for the site and technology. The industry shall explore and adopt cleaner technologies and improve the management practices to reduce generation of pollutants.

SITE SELECTION

Extension of M/S Nimir Industrial Chemicals Ltd. 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura, Site selection for the existing site was made consideringthe following points

Availability of raw material/fuel

Proximity of molasses as a raw material and cost-effective transportation logistics

Availability of water supply

The availability of water from the source is adequate to meet the requirement of the proposed unit.

Availability of infrastructural facility

Industrial infrastructural facilities such as roads, transport, security, water, power, administration etc. are available at site. The plant area does not fall under the industrial areas/ cluster.

Environmental features of site

There are no any eco-sensitive areas such as biosphere, mangrove, protected forest, national parks etc. or environmental sensitive locations such as protected monuments, historical places within 10 km from the site.

TECHNOLOGY ALTERNATIVES

The technology selection is done on the basis of following considerations

- Least Stress on Resources
- Reduce, recycle and reuse of wastes
- Reduce the pollution from the industry
- No risk to human and property

Technology selection will be done on the basis of efficient utilization of raw material, water, electricity, fuel and considering the recycle and reuse of wastes generated from industry

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M/S Nimir Industrial Chemicals Ltd. 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura, Pakistan.

CHAPTER-VII

ENVIRONMENT MONITORING PROGRAM

ENVIRONMENT MONITORING PROGRAM

INTRODUCTION

Present chapter delivers environment monitoring program, its frequency, parameters and methodology for air, water, noise, and solid hazardous waste/ soil environment. It also furnishes the information of reporting system of environmental parameters and responsibility of environmental monitoring program.

An environmental monitoring plan provides a delivery mechanism to address the adverse environmental impacts of a project during its execution by periodic monitoring of important environmental parameter so as to maintain the environmental quality within the standards, and to introduce standards of good practice to be adopted for all project works.

An environmental monitoring program is important as,

It assists in detecting the impacts and control measures.

Evaluates the performance and effectiveness of mitigation measures proposed in the Environment Management Plan (EMP) and suggests improvements in management plan, if required.

An Environmental Monitoring Program has scheduled with the following objective

- To verify the result of the impact assessment study with respect to newdevelopments
- To study the parameters which have been identified as critical?
- Status of pollution load within the project site and its vicinity
- Generation of data for predictive or corrective purpose in respect of pollution
- To check or assess the efficiency of controlling measures

ENVIRONMENT ASPECTS TO BE MONITORED

Proposed project shall monitor the following environmental aspects to ensure effectiveness of EMP and mitigate any impact envisaged during the commissioning and operation phase.

Ambient air and stack monitoring

Ambient air quality will be monitored at three locations and pollutants monitored will be Respirable Suspended Particulate Matter (PM 10, 2.5), Sulphur Dioxide (SO_2) and Oxides of Nitrogen (NOx).

Monthly monitoring of stack will be carried out for the parameters such as PM, SO_2 and NOx to assess the performance of pollution control facilities installed for the unit

Water and waste water quality

- Surface and ground water samples towards downstream of project will be collectedand analyzed periodically.
- Characteristics of Cooling Tower and Boiler fed water will be check periodically.
- The characteristics of Spent Wash, cooling tower blow down, boiler blow down,process and steam condensate wastewater will be analyzed periodically.
- Environment Statement Reports will be filed as per the schedule prescribed by Pollution Control Board
- Analysis of water, wastewater will be in laboratories approved by Environmental Protection Agencies.

Soil and Solid/ Hazardous Waste

- One surface soil sample from proposed ETP, spent wash storage lagoon and project site will be taken and analyzed as per the standard method.
- Solid hazardous waste will be disposed of regularly as per EMP. Management willkeep record of Ash generation and its disposal i.e., by selling.

Noise monitoring

Ten noise monitoring location will be selected considering noise generation area

- Personal protective equipment like ear plugs/ear muffs will be provided toemployees working near such noisy area.
- The noise attenuation measures will be taken at the design stage.

Occupational health and safety

Routine medical examination of personnel will be carried out at regular intervals and followed for all workers to determine any changes in health condition due to the working conditions. Pre-medical check-up will also be carried out at the time of employment.

ENVIRONMENT MONITORING PLAN

The post project monitoring plan will be as follows,

- Prior to the commencement of operation
- After 6 months of commencement of operation
- Once in a year from the commencement of operation

Environmental parameters to be monitored and its frequency after commissioning of proposed project

is mentioned in Table 6.1

Table 6.1: Environmental monitoring schedule

Sr.	Particulate	Parameters	Number of locations	Frequency
1.	Ambient airquality	PM_{10}, $PM_{2.5}$, SO_2, NOx, CO, etc.	Ambient air quality at minimum 3-5 locations. 1 location within the plant premises, 1 location inupwind, 1 location indownwind direction and 1 location in cross wind	Monthly
2.	Stack gas	PM, SO_2 and NOx	Number of stacks	Monthly
3.	Work place	$PM_{2.5}$, SO_2, NOx, CO,O_3	Process emission in workplace area/ plants (for each area/plant minimum 2 locations and 1 location outside plant area near vent)	Monthly
4.	Waste water	pH, EC, SS, TDS, O&G, Ammoniacal Nitrogen, COD, BOD, Chloride, Sulphide etc.	Wastewater from allsources. Inlet & outlet of ETP,Condensate treatment plant	Monthly
5.	Surface water and ground water	pH, Salinity, Conductivity, TDS,Turbidity, DO, BOD, Phosphate, Nitrates,Sulphates, Chlorides,	3-5 location Ground as well as Surfacewater	Half yearly
6.	Solid waste	Ash	Process dust generatedsludge and ash.	Monthly
7.	Noise	Equivalent noise level - dB (A) at min. Noise Levels measurementa high noise	5 locations at all source and outside the Plant area.	Monthly
8.	Green belt	Number of plantations (units), number of survived plants/ trees, number of poor plant/ trees.	In and around the plantsite	Monthly
9.	Soil	Texture, pH, electrical conductivity, cation exchange capacity,alkali metals, Sodium	2-3 near Solid/ hazardous Waste storage. At least five locations from	Quarterly

10.	Occupational health	Health and fitness checkup of employees getting exposed to various hazards and all other staff	All worker	Yearly/ twice ayear

Monitoring methodologies

followed for monitoring will be recommended/ standard method approved / Recommended by EPA Punjab. Environmental samples will be collected as per the guidelines provided by EPA Punjab. The method

Detail of the same is mentioned in Table 6.2.

Table 6.2: Methodology of Environmental Monitoring

Sr.	Description	Method	
		Sampling/Preservation	Analysis
1.	Ambient air monitoring	Samplers (Designed as per EPA Punjab) to collect $PM_{2.5}$, PM_{10} & the gaseous samples	Standard method mentioned EPA Punjab standard
2.	Stack gas monitoring	Samplers (Designed as per EPA Punjab) to collect particulate matter & the gaseous samples	- Standard method mentioned EPA Punjab standard
3.	Water and wastewater	Standard methods for examination of water and wastewater	Standard methods for examination of water and waste water published
4.	Noise monitoring	Instrument: Sound level meter	-
5.	Soil monitoring	Collected as per soil analysis reference book, M.I. Jackson and soil analysis reference book by C.A. Black	Analysis reference book, M.I. Jackson and soil analysis reference book by C.A. Black

REPORTING AND DOCUMENTATION

All the necessary reports and documents will be prepared to comply with statutory rules and regulations. The records of the monitoring program along with the results of all the parameters being monitored will be maintained on regular basis.

FORMULATION OF ENVIRONMENT MANAGEMENT CELL (EMC)

The Environmental Management Cell shall be responsible for the environmentalmanagement,

monitoring and implementation activities of the proposed unit. EMC will carry out various activity of environment under the supervision of the Head of the plant. EMCcell shall be responsible for;

- Monitoring of efficiency of pollution control equipment's
- Preparation of maintenance schedule of pollution control equipment andtreatment plants and see that it is followed strictly.
- Monitoring activities within core and buffer zone of proposed project as permonitoring schedule.
- Inspection and regular cleaning of setting tanks, drainage system etc.
- Greenbelt development and maintenance
- Water and energy conservation measures
- Good housekeeping

LABORATORY FACILITY

The plant will have an in-house environmental laboratory for the routine monitoring of water and wastewater. The outside agencies will also be hired for analysis of other environment aspects like air, noise and soil. The following equipment's are recommended to the project proponent for implementing the post project environmental monitoring program. Following are the list of instruments which are suggested to implement at the site for proper monitoring of operation of the plant

Table 6.3: List of laboratory instruments

Sr. No	Name of equipment
1.	pH meter, TDS Meter,
2.	COD Digester
3.	BOD Incubator
4.	Oven
5.	Analytical Balance
6.	Hot Plates & Water Bath
7.	Refrigerator
8.	Magnetic Stirrer
9.	Vacuum Pump
10.	DO Meter

11.	Required Glassware's, chemicals and reagents

BUDGETARY PROVISION FOR ENVIRONMENT MANAGEMENT

The costs involved in environmental monitoring and management to mitigate the adverse effects will be put on account for the proposed project. The approximate cost for the EMP will be Rs.8 million PKR. Bifurcation of the EMP cost is given in Table 6.4.

Table 6.4: Environment Management Cost

Sr. No	Description	Capital (Million)	Recurring (Million)
1.	Air Pollution Control	1	1
2.	Water Pollution Control	1	0.5
3.	Solid waste Management	1	0.3
4.	Environmental Monitoring and Management	1	0.7
5.	Rainwater Harvesting	1	0.3
6.	Occupational Health	1	0.5
7.	Green belt development	1	0.3
8.	**Total**	**8**	**3.6**

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M/S Nimir Industrial Chemicals Ltd. 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura, Pakistan.

CHAPTER-VII

ADDITIONAL STUDIES

ADDITIONAL STUDIES

INTRODUCTION

Additional studies like review of social impact and public consultation were undertaken. Apart from the public consultation, major portion is dedicated to the study of hazard identification and risk assessment. It also covers the requirement for onsite and offsite disaster (natural and manmade) preparedness plan including emergency management plan including.

SOCIAL IMPACT ASSESSMENT STUDIES (SIA)

Rehabilitation and Resettlement (R & R) and Social Impact Assessment (SIA) studies has not found any relevance for the proposed project site as there would not be any temporary or permanent displacement of the personnel or goods as the proposed project will be located on unoccupied open land. At present no agricultural cultivation of the crops is being takenon the proposed land. Hence, no R & R and SIA studies or plan were undertaken for the particular site.

Proposed project activity will not cause any negative impacts on the environment and on the society as it will increase the direct and indirect job opportunities along with indirect work to the local people residing in the area.

There will be some development of secondary service market near the site which will be beneficial to the local economy.

PUBLIC CONSULTATION

The Public Hearing will be conducted after the submission of the draft EIA to the EPA Punjab. The details of public hearing minutes will be unified in this report after completion of Public Hearing. Public Hearing for the proposed project will be conducted. Draft EIA/EMP report with executive summary in English will be submitted to EPA Punjab. During the public consultation, all the dignitaries including Collector, SRO, RO and local Numberdar will be present for the meeting.

HAZARD IDENTIFICATION

In practical terms, hazard identification is a thorough look at the workplace and processes to identify those things, situations, processes that may cause harm, particularly to the working force and nearby population. After identification of the potential hazards, one has to evaluate it potential to cause harm and then decide what type of control measures shall be taken to control it from the happening. Hazard identification is very important tool as it is integral part of a good occupational health and safety management plan. The aim of the hazard identification process is to reduce level of risk by taking precautions or initiating control during project execution.

The various hazard analysis techniques that may be applied are Hazard and Operability (HAZOP) studies, Fault – Tree Analysis (FTA), event –tree analysis and failure and effects mode analysis.

Hazard Identification & Risk Assessment (HIRA)

The purpose of a Hazard Identification and Risk Assessment (HIRA) is to understand what risks or threats to public safety, property or the environment exist.

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Figure 7.1 (a): Hazard Identification & Risk Assessment (HIRA) process

Hazard Identification and Risk Assessment (HIRA) Process,

- Identification of hazards
- Analyze or evaluate the risk associated with the hazards
- Determine appropriate ways to eliminate or control the hazards
- Evaluate the likelihood of an injury or illness occurring, and its severity
- Review of all available health and safety information about the hazard including MSDS,
- manufacturer's literature, information from organizations and results of testing
- Identify actions necessary to eliminate or control the risk
- Monitoring to confirm the risk is controlled
- Keep any documentation or records that may be necessary. Documentation may include detailing the process used to assess the risk, outlining any evaluations, or detailing how conclusions were made.

RISK ASSESSMENT

Risk analysis deals with the identification and quantification of risks, the plant equivalent and personnel are exposed to, due to accidents resulting from the hazards present in the factory. Risk classification table is given in Table 7.2.

Table 7.2: Risk classification and score table

Impact \ Likelihood	Rare (1)	Unlikely (2)	Possible (3)	Likely (4)	Almost Certain (5)
Catastrophic (5)	Moderate Risk	Moderate Risk	High Risk	Critical Risk	Critical Risk
Major (4)	Low Risk	Moderate Risk	High Risk	High Risk	Critical Risk
Moderate (3)	Low Risk	Moderate Risk	Moderate Risk	High Risk	High Risk
Minor (2)	Low Risk	Low Risk	Moderate Risk	Moderate Risk	Moderate Risk
Insignificant (1)	Low Risk	Low Risk	Low Risk	Low Risk	Moderate Risk

Risk Score	Risk Level Category	Description
1 to 4	Low Risk	Manage by routine procedures and operations; should not require much attention but should be reviewed at least every 18 months.
5 to 10	Moderate Risk	Manage by specific monitoring or response procedures; should be monitored ad reviewed every 12 months.
11 to 18	High Risk	Requires escalation to VP; should be constantly monitored

Potential risk and mitigation measure for during constructionphase

Risk impact and mitigation measures during construction phase are describes in Table7.3

Table:7.3: - Risk Impact and rating matrix during construction

Activity	Associated	Health impact	Risk	Proposed mitigation
Loading and Unloading of material	**Accidents**	Physical Injury	M	• Providing Training • Providing PPEs toworkers • Training to workers
Excavation	• Falling objects or objects near an excavation • Slips, trips, andfalls	Property Loss Physical injury	M	• Work Permit Systemwill be followed. • Excavated material will be stacked safely.
Construction	• Structure may fall down • Workers may fall down from the height.	Physical Injury Physically handicapped Property Loss	H	• Work Permit Systemwill be followed. • Height work permit will be issued to the person.
Cutting and Welding	fire or explosion Electric shock from electrical welding	Physical InjuryBurn Injury Property loss	H	• Standards Work Procedure • Training will be provided • Proper PPEs will be provided. • Regular monitoringof Electrical equipment's to avoid loose connection • Area will be barricaded
Installation of Machineries.	• Structure may collapse	Property loss Physical Injury	M	• Only authorized person will operate the machine • Appropriate platform will be

Risk during D.G. set operation

Table 7.5: Risk Impact and rating matrix for D.G. set operation

Sr	Activity	Associated	Associated Risk	Risk	Proposed mitigation
1.	Working	High noise	Noise induced	M	• Use of PPEs
2.	Maintenancee	Fire	Burns, Serious injury	H	• Restricted Entry • Use of flame proof
3.	HSD Storage	Leakage/Fire	Risk of severe physical injuryand burn	H	• Storage will be away from ignition source • Regular monitoring to check the leakages andspillages
4.	DG set maintenancee	Mechanical Hazard	Physical injury	M	• PPEs • Leakage and heat inthe joint will be checked before maintenance • First aid box at approachable place

Hazard & associated Risk of storage and handling of raw material

Impact matric for risk associated with storage and handling of material is given in Table 7.6. Grain and alcohol storage Tanks details are given in Table 7.8. Material safety data sheetsfor Chemicals are enclosed as Annexures.

Table 7.6: Impact matrix of Storage and handling of raw material

Sr.	Activity	Associated Hazards	Associated Risk /Health impact	Risk	Proposed mitigation measures
1.	Storage, handling, loading & Unloading of material	Exposure, leakage, Fire, Explosion	Physical Injury, burn, Eye irritation and respiratory problem	H	• Provision of Eye wash • Inspection and regular monitoring of storage area • Training to PPEs will be provided as Nose mask, Hand Gloves • Proper system for loading operation to prevents spillage • Provision of level indicators for storage tanks • Spill kit for Acid and other chemicals • Proper ventilation • First aid boxes
2	Transportation	Fire Accident	Burns Serious injury	H	• Firefighting Facility • Training to driver • TREM Card • First Aid Box

Table 7.7: Impact matrix of storage of aerosols

Sr.	Activity	Associated	Associated Risk/	Risk	Proposed mitigation
1	Storage and Handling	Explosion	• May causeslight irritation • May cause irritation	H	• Proper ventilationshall be provided • Inspection and regular monitoring of storagearea • Training to Workers for proper handling • PPEs will be provided as Nose mask, Handgloves • Provision of level indicators for storageTanks • If causes eye irritation wash area with soap, flood eye with water and water

Material Safety Data Sheet (MSDS) for ethyl alcohol is enclosed as Annexure. Impact matric of risk associated with storage and transportation of alcohol along with control and mitigation measures are given in Table 7.9.

SAFETY MEASURES RECOMMENDATION

Storage and material handling area

- Proper ventilation shall be provided
- Area will be marked as “No smoking Zone”
- Use of proper PPEs
- Pressure relief valves shall be provided
- Provision of Safety valves and rupture disk
- Provision of fire hydrant system along with otherportable fire extinguishers
- Adequate distance between the storage Tanks
- Provision of dyke wall to the Tanks
- Proper earthing to the Tank

DG Sets

- Acoustic enclosures to be provided
- Entry near the unit shall be restricted
- Qualified and highly trained engineers shall beappointed

Storage and Handling

- Keeping away from oxidizers, heat and flames.
- Avoidance of plastics, rubber and coatings in the storage area.
- Cool, dry, and ventilated storage and closed containers.
- Leakage should be washed out and diluted.
- Regular monitoring and maintenance to avoid leakages.
- If major leakage in tanks can be mitigated by transferring the material to another tank.
- Transfer the material to another tank.
- Grounding of the container and transferring of equipment to eliminate static electricsparks. In case of any emergency following measures would be taken:
    - First Aid Measures
    - Use of extinguishing media surrounding the fire as water, dry chemicals (BC or ABC powder), sand, dolomite, etc.

- Foam system for firefighting will be provided to control fire from the alcohol storage tank. The foam

thus produced will suppress fire by separating the fuel from the air (oxygen), and hence avoiding the fire and explosion to occur in the tank. Foam would blanket the fuel surface smothering the fire. The fuel will also be cooled by the water content of the foam. The foam blanket suppresses the release of flammable vapors that can mix with the air.

- Special Fire Fighting Procedures; Keeping the fire upwind. Shutting down of all possible sources of ignition, keeping of run-off water out of sewers and water sources. Avoidance of water in straight hose stream which will scatter and spreadfire. Use of spray or fog nozzles will be promoted, cool containers will be exposed to flames with water from the side until well after the fire is out.

Storage

- Store in good quality ventilated and leak-proof tanks (mild steel, stainless steel,polyethylene, PVC) at ambient temperatures, out of moisture.
- Continuous mixing of molasses should be done.
- If there is increase in temperature beyond 30°C external cooling of tanks should beprovided. A temperature recorder should be provided to the tanks.
- Avoid microbiological contamination or dilution with water.
- Regular monitoring and maintenance to avoid leakages.

Building & workspace

- Adequate space will be provided for equipment repair or removal
- Equipment maintenance shops will be set up with appropriate safety provisions forhazards associated with maintenance activities
- Lightning protection will be provided

Electric items

- Medium and high voltage cables will be completely enclosed
- Electrical equipment will be grounded adequately
- Wiring will be properly insulated, grounded, and non-exposed
- Emergency shutoff switch, clearly labeled, at all machinery units will be provided
- DG set will be provided as stand by source of power
- Maintenance tools with insulated handles will be provided

Fire

The fire protection system is to provide for early detection, alarm, containment and suppression of fires. The complete fire protection system will comprise of the following. Fire hydrant network will be provided for firefighting in the entire project area along with following firefighting equipment will be provided

- Different type of Fire Extinguishers, Detectors and fire Alarm shall be provided

- Fire hydrant system
- Fire Tender with chemicals foam and required arrangement for firefighting to controlthe fire from the alcohol storage
    - Foam system shall be contained aqueous film forming compound of 3 to 6% alcohol resistance foam concentrated with ISI mark 4889
    - Water storage Tank exclusively for firefightingoperation
    - Rubber mat will be used near panelarea
    - Periodical training to the identified supervisors and Employees in the field of Firefighting and safety
    - Emergency exits at specific locations and will be marked on the layout
    - Cautionary note, safety posters, stickers will be displayed at appropriate locations
    - First Aid boxes will be made available at appropriate locations
    - Emergency Control Center Provision shall be made to establish an Emergency Control Centre (ECC) from which emergency operations are directed and coordinated. This center is activated as soon as on–site emergency is declared. ECC is equipped with adequate communication systems in the form of telephones (Emergency telephone numbers.) and other equipment's to allow unhampered organizations and other nearby facility personnel.

Occupational health hazard and safety measures

During operation handling of chemicals and other material used, a practice of preventive maintenance shall be adopted to take care of employee's health. The various safety equipment such as breathing apparatus, gum boots, goggles and helmets will be provided to the workers/operators. Besides, all the first aid, firefighting devices will also be inspected, tested and maintained periodically so that it is available in ready to use condition. Provision of pre-medical and periodical health check-up for all the employees shall be implemented and record maintained. If any abnormality is noticed due to occupational exposure, necessary

Treatment will be assured from qualified physician. Following measures shall be implemented to avoid the occupational hazards to the employees:

- Regular housekeeping of the entire plant area
- Regular or preventive maintenance of floor, platforms, staircases and passages toavoid the slip incident
- Provision of obstruction free walkways and workplace
- Periodical training to the employees for the proper operation of the Plant andvarious processes
- Restricted entry into the plant premises
- Checking and calibration of all Instruments and Fire Devices to keep them in properoperating

conditions

- Installation of Electrical devises as per the prescribed standards
- Provision of D.G. Sets to avoid the complication during power failure
- Provision of required fire Extinguishers at different locations for easy access
- Provision of lighting Arrester
- Various types of PPEs like breathing apparatus, ear muffs, earplug, masks, leather hand gloves; asbestos hand gloves; acid/alkali proof rubber hand gloves; electrical resistance hand gloves and gum boots, goggles and helmets will be made available

Provision of First aid Boxes and periodical checking for required medicine and other material to take care of superficial bodily injuries during work

DISASTER MANAGEMENT PLAN (DMP)

A disaster is an unforeseen combination of circumstances that causes serious body injuries, loss of life or extensive damage to the plant, Machineries or to the environment.

Following uncontrollable situation may lead to disaster or plant emergency:

Manmade

- Plant failure
- Rupture or damage of the line, vessel or Tank
- Excessive leakage of flammable material

Natural

- Cyclone
- Earthquake
- Flood
- Fire
- Terrorist attack

Disaster management plan is a written document where all the details regarding the causes of



disaster are noted along with required control measures. It also gives details about the responsible personnel shall be available on-site during emergency and their role to control the disaster to a minimum level or from spreading the outside to protect the plant and machinery including employees and nearby areas. The DMP to tackle the emergency can be divided into the two parts for the ease of operation and to effectively control the emergencies within shortest possible time.

Figure 7.2: Disaster management process

Onsite Emergency Plan

If an accident / incident takes place in a factory and its effects are confined to the factory premises only, then it is termed as an Onsite Emergency. It involves employees and other infrastructure within the organization. In this plan, the company officers and employees are given pre-decided responsibilities to handle the emergency. All other required resources to tackle this type of emergency are available from within the factory. The individual employee or designated persons will be held responsible to take or initiate appropriate action as and when required. All the employees / responsible persons required to take or initiate the action at the time of emergency are trained appropriately so that they can perform their task without any difficulty. To make the handling of emergencies absolutely perfect, mock drills need to be conducted periodically for a particular scenario. During mock drills, particular scenario is simulated to understand the gravity and requirements of action. During the mock drills, all the important points or happenings are noted and discussed tofind out the lacunae or for the further improvement in the written plan.

Offsite Emergency Plan

If the accident or incident occurred in the factory premises, factory will need help from outside sources because of magnitude of emergency then it termed as Offsite Emergency. This offsite emergency cannot be controlled only by using the internal resources and need timely help from the outside companies or from the government authorities to tackle such type of emergencies to avoid the loss of property, human health or environment in and around the premises. An offsite emergency management plan involves government bodiesas well as nearby industries for necessary help and to control the emergency.

Objectives of disaster management

- To control the incident or accidents from the happening
- To eliminate the emergencies if possible
- Prepare for the emergency handling

- To see whether required activities are performed in right order by the individuals ornot
- To find out the required changes for coordinated activities
- To reduce the time of activities to control the emergencies
- To minimize the effects of the incident on person, property and environment
- Continuous improvement

Onsite Emergency Preparedness Plan

Main elements of on-site Emergency Preparedness Plans are:

- Leadership and emergency management cell
- Defined role and responsibilities of the key personnel
- Emergency actions to be executed by the Members of the Committee
- Protective and rescue equipment
- Medical care Unit
- Training and periodic review
- Periodical Mock drills, its monitoring and analysis to find out the short coming forthe improvement
- List of available firefighting equipment, its maintenance and records
- Training to the committee members and feedback on requirements if any
- Line of command
- Requirement of Siren and alarm system
- Written document
- List of available resources with the Company
- List of resources available from outside during the emergency
- Important phone numbers of authorities

Disaster Management Cell

Disaster Management Cell (DMC) consisting of authorized head that will be responsible for the handling of emergency situations. All the details of team members will be available atthe site; their contact details will be displayed in the plant and will be informed to other employees. DMC will make the employees to understand and aware about the hazards and associated risks that may give rise to an emergency situation at the plant. DMC will train and inform the employees regarding their role and responsibilities during emergency and dos and don’ts. Following team of personnel will be required to fulfill their responsibilities to tackle the emergency.

TEAM A

The general manager (GM) along with manager of each section will be responsible for handling of any kind of emergency in the factory. They will inform the concern employees or authorities about the emergency situation and action that need to be initiated. They will take initiative in directing the action of the people.

TEAM B

After knowing the emergency situation, in-charge of individual section / department will communicate with In-charge **(HSE)** for any specific instruction and then he will guide other employees of the section to leave the workplace after taking safe shut down. They will be asked to assemble at Assembly point upwind of the Factory. After reaching the assembly points they should watch the activities undertaken by the Team A and wait for further instruction if any form the Manager. The Manager / Supervisor will act as an Incident Controller at his Section or the Emergency location and need to wait for further instruction from Disaster Main Controller

TEAM C

The maintenance In-charge and other maintenance head from each department such as Mechanical Engineering, Electrical Engineering, Instrumentation and Civil Engineering along with Safety and Fire will form this Team who will actually fight the situation to control the emergency. All the required equipment and firefighting accessories will be available to their disposal. They will have all safety appliances in their custody / use and they will act to minimize effect of incidence. They will keep informing the progress to DMC and for want of any help. After the emergency is under control, they will inform the DMC and DMC will inform all other Teams involved that emergency is under control. The HSE shall appraisethe situation and if found Ok, he will inform control room to declare all clear sound / sirenso that employees can resume the duties.

TEAM D

This Team is mainly concern with the security and outside news and will take the instruction from the DMC. It will consist of security department and welfare officer who will be available at the office with all necessary records including names of Team Members and other required help from outside. They will have the list of people along with their addresses and telephone numbers. They will keep the records of important offices of the Government authorities such as Directorate of Industrial Safety and Health, Boiler Inspector of factory, Commissioner of Police, local Police station, Fire Brigade, company Doctors, private Doctors and other important contact which will be helpful during and after the emergency.

All required facilities shall be made available at a particular location in the Factory foremergency use. All the personnel involved in emergency shall proceed or will be brought to the factory. Based on the

information gathered and provided by the incident controller of a particular section where there is emergency, if required emergency shall be declared by the During emergency and as per the information received by the HSE from IC, the Team members from the Rescue team shall look out for the casualties if any on the site and will provided necessary help. The required medical and other help shall be provided based on the requirement and assessment of the gravity of the situation. The team will also carry out the head count if required and as per the instruction of HSE or the Occupier. Further, the detail shall be provided to outside agencies by the nominated authorized person from the Factory to avoid the mismatch of the situation so that right message goes to the media. During emergency, care shall be taken to avoid the panic situation within and outside the factory premises or in the general public.

Key Personnel

The actions necessary in an emergency will clearly depend upon the prevailing circumstances. Nevertheless, it is imperative that the required actions are initiated and directed by nominated people, each having specified responsibilities as part of coordinate plan. Such nominated personnel are known as Key Personnel.

The Key Personnel are:

- General Manager Site/Project
- HSE Manager
- Production Manager
- Fire and Security Officer (FSO)
- Team Leaders (TL)

Requirement of Equipment and Materials

- Based on actual assessment of emergency, there can be requirement of Extra First Aidpersonnel to deal with casualties and need to be provided from outside
- All types of PPEs
- Emergency engineering works, provision of extra or replacement of light, isolation of equipment, temporary by pass electrical lines etc.
- Assembly point, emergency control center, sign boards
- Moving Tankers or other vehicles from area of risk
- Fire protection and firefighting facilities
- Emergency lighting and standby power
- Material safety data sheets for hazardous chemicals
- Plan showing hazardous material storage area

- List of emergency equipment
- List of important telephone numbers and addresses
    - Nearest hospitals and ambulance service center
    - Nearest fire station
    - Govt. Officials
    - Names and address & contact telephone number of key personnel

The onsite emergency plan will be documented and circulated to all concerned for knowledge, study, to understand and easy follow up. The emergency plan will be rehearsed and practiced at regular intervals i.e. Mock drills shall be conducted at suitable interval to test efficiency of plan, personnel, equipment and coordinated efforts to increase confidence level of personnel during emergencies.

Training

- Training on fire fighting
- Training on spill control
- Training on toxic release control
- Training on good housekeeping
- Training on use of PPEs

Communication

Following means of communication will be been made available,

- Telephones
- Walkie-talkies
- Mobiles
- Public announcement system
- Emergency Sire

Offsite Emergency Plan

In case the hazard spreads out-side the premises Team A under the instruction of DMC will communicate to the District Magistrate, Commissioner of the Police and inform the situation as Off-Site Emergency. Types of emergency facilities/actions required from outside bodies are,

- Firefighting facilities required: Factory will have its own firefighting facilities but during emergency, fire brigade may be called from nearby areas or other establishments
- Police help shall be required during emergency for control of people, traffic and security arrangements
- Medical help required: seriously injured personnel may be referred to theHospital/Primary Health Centre depending upon injuries

Information to authorities

- Emergency situations will be informed to the local Panchayat official regarding the likely hazards from the industry and the steps to be taken when there is an Off-Site Emergency. It is preferable that the Local Panchayat Officials are also trained on simple protective methods through demonstrations and practice
- Deputy Commissioner, SSP of the Police and District Control Room if exists

7.1.2 General Natural Disaster Management Measures

Seismic zone for the proposed project site comes under zone III (Moderate).

- Factory Management shall train their staff to manage emergencies arises from fire,flood, lightning and leakages.
- As soon as the emergency warning receives from District Disaster Management Authority, the raw materialas well as finished products shall be kept to a minimum to avoid spillage or misuse
- All the material and products shall be stored properly to avoid the damage or mixingwith other All the employees will have the list of important phone numbers and contact details to help in getting therequired help in time. These numbers shall be displayed at distinct location within Factory premises Company's designated person from Team A will be main contact person for all the employees for anytype required help from outside
- District level disaster management units
- Health & Family Welfare
- Nearest Doctors & Ambulance
- Forest & Environment department
- Police Station
- Village heads & Panchayat
- Company's Emergency Management Cell Members
- Transport
- Electricity
- PWD
- Substation details from where Company takes power
- Civil Supplies
- Animal Husbandry
- Agriculture

CONCLUSION

Project proponent will implement all preventive measures to tackle all type of emergencies arising out of operation or malfunction of individual units. The required resources for Onsite and Offsite emergency management plan will be properly planned and provided to implement the plan effectively. The factory shallgive highest priority towards Health and safety of the employees and people residing nearby areas. Management shall conduct the training to the nearby villagers to appraise them about their role during emergency. All nearby people shall be given training on do's and don'ts during emergency situation. As the hazards involved during operation and production activities will be known to the Management, all required mitigation measures shall be implemented in time to avoid the emergency situation from the arising. Unfortunately, if there is any emergency onsite of offsite, it will be tackled effectively due to availability of required resources at the site. Similarly, all the concern staff and members ofthe Teams shall be trained appropriately to tackle the emergencies in the plant. By knowing the type of emergency situation that may arise during operation of the plant, appropriate control measures will be implemented to reduce the gravity of the emergencies. Similarly, to avoid the emergency situation, all required mitigation measures will be implemented as recommended.

EIA REPORT

M/S Nimir Industrial Chemicals Ltd. 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura, Pakistan.

CHAPTER VIII

PROJECT BENEFITS

PROJECT BENEFITS

INTRODUCTION

Project benefit chapter furnishes the benefits of the project towards the society. This chapter is intended to give improvements in the physical infrastructure, improvements in the social infrastructure, employment potential – skilled, semi-skilled and unskilled and other tangible benefit from this project

PROJECT BENEFITS

Improvements in the physical infrastructure

The industry is established in the rural region of the province. The establishment of industry will provide direct and indirect employment to more than 350 local rural persons. Major part of these labors will be mainly from local villagers who are expected to engage themselves both in agriculture and project activities. This will enhance their income and lead to overall economic growth of the area. It helps to sustain the development of this area including further development of physical infrastructural facilities The following physical infrastructure facilities will improve due to proposed project.

- Road transport facilities
- The road connectivity will get improved due to the industry.
- This improved physical infrastructure will be an added facility to the community for surface transport.
- Water supply
- Efforts will be more focused on recycling of wastewater after adequate treatment. Thus, water extraction for process will be minimized.

Improvements in the social infrastructure

The industry will be established in the rural region and economically backward. Creation of job opportunity and other business activity will improve the economy and attitude of the public towards education and health. This may result in the creation of additional education and health care facilities in this rural area

- The proposed project will change the pattern of demand of various items of food and non-food products.
- It will help to generate sufficient income to local people.
- Living in harmony is an important aspect of the society. This can happen only if, all the components are comfortably placed. Persons engaged in their respective vocation and accruing

job satisfaction leads to this. This will become possible by this venture.

- Rural sector economy is generally growing slow because of lack of amenities and facilities.
- Proposed project helps to provide steady support of money-flow, such utilities can come to that area and sustain.
- This improved physical infrastructure will increase purchasing power of the farmers.
- They will be able to invest in modern agricultural practices.
- It will develop economy brings with literacy and healthy living. Ultimately educational and health level will increase, if there is confirm income source.

Employment Potential

- The industry will be established in the rural region of the state.
- The industry will provide skilled, semi-skilled, unskilled people, direct and indirect employment to more than 350 local rural persons.
- It can be stated that by this activity employment potential is certainly increasing in all walks of life – skilled, semi-skilled and unskilled.

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M/S Nimir Industrial Chemicals Ltd. 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura, Pakistan.

CHAPTER X

ENVIRONMENT MANAGEMENT PLAN

ENVIRONMENT MANAGEMENT PLAN

INTRODUCTION

Environment Management Plan (EMP) is a system to address potential adverse impacts, to instruct project proponent to introduce standards of good practice to be adopted for all project activities. EMP is a site-specific document for the project, to ensure that the project will be implemented in an environmentally sustainable manner and where all concerned persons of the industry as well as contractors, understand the potential environmental risks arising from the proposed project to implement appropriate actions so that risk can be managed properly. Detail description pertaining to identification of pollution sources, its assessment and related impact along with mitigation measures are given in Chapter IV.

In this chapter all the required details of Environment Management Plan and its implementation is given for identified impacts. Similarly, various systems and their functionsare also given.

OBJECTIVES OF EMP

- To control the pollution by implementing environment management plan allenvironment aspects such as air, water, noise and soil.
- To ensure health & safety of human beings, plant and machinery by adequate risk & hazard management to protect the environment in general. To comply with all regulations stipulated by Central /State Pollution Control Boards so that environmentis protected from the adverse impact of various plant activities.
- Contribute to sustainable development.

ENVIRONMENT MANAGEMENT PLAN FOR CONSTRUCTION PHASE

Anticipated environmental impact due to proposed project during construction phase has been discussed in chapter IV along with mitigation measures. To implement the identified mitigation measures effectively, following environmental management plan is prepared and presented below to mitigate adverse impact.

- Minor vegetation clearance will be required at site along with soil excavation.
  However, identified impacts would be of temporary type and within the plant boundary. Excavated soil will be covered with tarpaulin sheet or shall be kept in such way that dust emission will be avoided.
- During transportation of Machine and Materials, care shall be taken to avoidspread of particular matter into the air.
- Regular sprinkling of water around vulnerable areas of the construction sites tocontrol the dust

spread or emission into the atmosphere

- Green belt area shall be developed to reduce air and noise pollution impacts
- All Equipment and Machinery to be used for the construction activities shall be in good condition and need to operated and maintained properly to avoid the emission of pollutants
- All Vehicles to be used on the site shall be PUC certified and well maintained
- No idling of Machine shall be allowed during construction activities
- Night time construction activities and vehicular movement shall not be allowed
- Personal Protective Equipment like ear muffs or ear plugs, masks etc. will beprovided to workers who will be exposed to high noise.
- First Aid facilities shall be made available during construction.
- All necessary infrastructural services like water, drainage facilities and electrificationwill be provided as per requirement
- Drainage network will be properly channelized. Storm water drainage will bedeveloped properly. This network will be checked & maintained regularly.

ENVIRONMENT MANAGEMENT PLAN FOR OPERATION PHASE

Factory proposes comprehensive environment management plan to combat pollution arising from the project activities. Detailed EMP is described below for various environmental parameters.

AIR POLLUTION MANAGEMENT

- It is observed that the concentrations of PM_{10}, $PM_{2.5}$, SO_2 and NOx are well within the prescribed limits as per the National Ambient Air Quality
- Standards. The major sources of air emissions from the proposed projects include non-point and point source emissions.
- The major sources of air pollution from the proposed projects will be from flue gas emission, process emission and vehicular emissions.
- To control the vehicular pollution, control measures will be implemented such as periodical check of Vehicle for its fitness and PUC certificates. Observance of periodical maintenance schedule and its proper implementation

NOISE POLLUTION MANAGEMENT

- Construction work shall be carried out during day time only.
- The workers working near noise producing machineries or noisy areas shall beprovided with ear plugs / muffs.

- Construction equipment and vehicles shall be maintained in good running condition.
- Noise producing machinery shall have acoustic enclosures / acoustic rooms toreduce the noise levels. Roads need to be maintained in good condition to reduce the noise as well as dust emission due to traffic.
- Green belt shall be developed in and around the project site which will help to reducethe noise pollution.

LAND ENVIRONMENT / SOLID HAZARDOUS WASTE MANAGEMENT

- The zero-discharge system will be implemented for proposed project

Greenbelt development

Development of greenbelt in and around the industrial complex is an effective way to attenuate air pollution. The degree of pollution attenuation depends upon height, width, foliage, surface area of leaf and density of planted trees.

THE OBJECTIVES OF THE PROPOSED GREENBELT DEVELOPMENT WILL BE:

- Mitigate impact due to dust emissions
- Control and assist to mitigate odor and air pollution impacts
- Create an aesthetic environment
- Enhance the bio-diversity of the vicinity
- Prevent soil erosion and surface run-off
- Spatial-visual separation of larger parts of the premises
- Entrance and roadside greenery help in separating the main industrial structures
- Provision of greenery along all interior pedestrian network

SELECTION OF PLANT SPECIES WILL BE BASED ON THE FOLLOWING CHARACTERISTICS

- Fast growing
- Thick canopy cover
- Perennial and ever green
- Large leaf area
- Preferably Indigenous
- Resistant to pollutants and should maintain ecological balance for soil and geohydrological conditions of the region.

Approximately more than 1000 Trees shall be planted around the proposed site. The plant species will be selected according to EPA Punjab guidelines and pollutant tolerance capacity of specific Tree. Large trees will be planted along the boundary of the project and planted in the initial phase of construction. Shrub and medium growing Trees will be planted along the road side. Plantation inside the project boundary will be done after completion of inside construction.

TABLE 10.1: ***TREE PLANTATION***

Sr.	Location	Type	Tree density	Trees interspacing
1.	Boundaries of small units, landscape area	Shrubs, small andmedium Trees	20-25	3 x 3 m
2.	Boundaries of units/internal roadside	medium to large sizeTrees	7-10	5 x 5 m
3	Around theindustry	Large trees /Largecanopy trees	1	1.5 m X 1.5 m or 2.5 m X 2.5 m
4.	Road sides	Large size Trees	5-6	20-25 m

Table 10.2: Type of Tree recommended for Greenbelt Development

Sr.	Botanical Name	Local name	Type	Location
1.	*Terminalia arjuna*	Arjuna	T	Around the industry orAvenue plantation
2.	*Terminalia elliptica*	Ain	T	Around the industry or Avenue plantation
3.	*Millingtonia hortensis*	Pakistan Cork		Around the industry
4.	*Tamarindus indica*	Chinch	T	Around the industry
5.	*Azadiracta indica*	Neem	T	Around the industry or Avenue plantation
6.	*Bauhinia purpurea*	Kanchan	T	Around the industry
7.	*Bauhinia variegata*	-	T	Around the industry or Avenue plantation
8.	*Emblica officinalis*	Avala	T	Avenue plantation / around the units
9.	*Erythrina*	Pakistani CoralTree	T	Around the industry orAvenue plantation
10.	*Ficus glomerata*	Cluster fig Tree	T	Around the industry or Avenue plantation
11.	*Ficus religiosa*	Peeple	T	Around the industry or

				Avenue plantation
12.	*Ficus benjamina*	Weeping fig		Around the industry or Avenue plantation
13.	*Michelia champaca*	Champak	T	Internal road of industrial complex/ ETP
14.	*Polyalthia longifolia*	Ashoka	T	Around the industry orAvenue plantation
15.	*Aegle marmelos*	Bel Tree	T	Around the industry
16.	*Butea monosperma*	Palash	T	Around the industry /ETP/ Avenue plantation
17.	*Ravenala madagascariensis*	Travellers palm	T	Around the industry /Avenue plantation/industrial units
18.	*Pongamia pinnata*	Karanj	T	Around the industry /Avenue plantation/industrial units/ETP
19.	*Dalbergia sissoo*	Sisoo Bahava	T	Around the industry /Avenue plantation Avenue plantation, around
20.	*Cassia fistula*	Amaltash	T	the units, ETP and openplots
21.	*Caesalpinia pulcherrima*	Shankasur	T	Avenue plantation, around the units and open plots
22.	*Alstonia scholaris*	Saptaparni	T	Avenue plantation, aroundthe units/ETP and open plots

Table 10.3: Flowering and foliage shrubs recommended for greenbelt

Sr. No	Flowering plant (Shrubs)	Location
1.	*Palm spp.*	Potted plants/ Internal roads/open plots
2.	*Ixora Spp.*	Internal roads/open plots/ around the units
3.	*Tabernaemontana divaricata (Tagar)*	Avenue plantation, around the units, ETP and open plots
4.	*Cassia biflora*	Avenue plantation, around the units, ETP andopen plots
5.	*Calliandra haematocephala (Powder puff)*	Avenue plantation, around the units, ETP and open plots
6.	*Nerium oleander (Nerium)*	Avenue plantation, around the units, ETP andopen plots
7.	*Allamanda cathartica(Alamanda)*	Avenue plantation, around the units, ETP andopen plots
8.	*Plumbago zeylanica(Plumbago)*	Avenue plantation, around the units, ETP andopen plots
9.	*Hemalia petans*	Avenue plantation, around the units, ETP andopen plots
10.	*Vinca rosea*	Avenue plantation, around the units, ETP andopen plots
11.	*Cestrum nocturnum (NightJasmin)*	Avenue plantation, around the units, ETP andopen plots
12.	*Canna indica*	Avenue plantation, around the units, ETP andopen plots

13.	*Chrysanthemum indicum*	Avenue plantation, around the units, ETP andopen plots
14.	*Muscanda spp.*	Avenue plantation, around the units, ETP andopen plots
15.	*Hibiscus spp.*	Avenue plantation, around the units, ETP andopen plots
16.	*Jasmin Spp.*	Avenue plantation, around the units, ETP andopen plots
17.	*Powder puff spp.*	Avenue plantation, around the units, ETP andopen plots

Tree Plantation Planning

The plantation programs have to be implemented in phase wise manner. To ensure the effective plantation of various kinds of trees, a four-year plantation programs with numberof Tree/ shrubs to be planted is given below

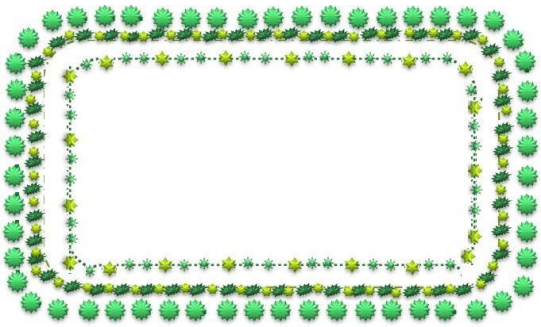


TABLE 10.4: TREE PLANTATION PROGRAM

Sr.	Year	Greenbelt area (acres)	Total plants	Location
1	2020	1	1000	Around the industry in firsttier
2	2021	0.5	500	Around the industry in second and third tier
3	2022	0.3	400	Around the units and internal road side

More than 1000 plants shall be planted in the span of three-year plantation program. Required nutrients / water/ manure and protection shall be provided. Plantation is suggested in three tier system around the factory. Anticipated total length of three tier will be 8-10 m. Schematic of Three plantation is shown in below mentioned figure

Odor Management Plan

Following control measures shall be implemented to avoid the odor in the atmosphere:

- Better house-keeping
- Steaming of major pipelines

- Proper operating condition will be maintained.
- Proper cleaning of drains.
- Greenbelt will be developed in and around the plant premises to suppress the odor.

Management of traffics

- The site is adjacent to Sheikhupura road and connected to it.
- There will be enough space for movements of vehicles and parking.
- The traffic management on the project site will be easily and smoothly monitored without any hindranceto the regular flow of traffic on the main road.
- Flow of traffic is eased out by providing adequate entries and exits from parking areas

RAIN WATER HARVESTING OBJECTIVES:

- To arrest ground water depletion and to augment ground water table
- To improve the water quality of Aquifers
- Rain water harvesting will be an important activity to conserve the rainwater for reuse and thus reducing the overall raw water consumption for the plant. Rain water harvesting aids in meeting the non-potable water usage like
- Water for gardening
- Water for sprinklers to suppress the dust

OCCUPATIONAL HEALTH AND SAFETY (OHS)

The main aim of occupational health and Safety will be to take care of Employees and plant and machinery to avoid any type of harm to human beings and environment. It will also be to provide safe workplace to the employees and workers working in the plant. It is the responsibility of the management to provide safe workplace so as to avoid any type of incidence or accident at the workplace due to malfunctioning of any type of equipment or units. By having safe and healthy work environment, the employees will provide work safely so that their family members, employers, customers, and others will be protected from the indirect adverse effects.

Following control measures will be taken for the employees and workers engaged in work:

- Personal protective equipment's will be provided to all concern staffs and workers.
- All safety signs will be placed at proper location
- First aid kits will be made available at every department
- Medical checkup at regular intervals for monitoring of health status of all workers

- Work permit system will be introduced to avoid un-authorized person ‘s entry
- Fire hydrant system, fire extinguishers will be provided at specific locations
- All staff and workers will be trained to fight the emergency situation
- Good housekeeping also plays important role in avoiding the undesirable incidences.

Therefore, good housekeeping practices will be employed.

Facilities such as provision of good quality water, sanitation and clean room for eating and resting shall be provided. It is evident from the project details that the risk or accidental spillage of chemicals may cause ill effects on the health of employees involved. In view of the effect on the health of workers from various activities and exposure during the work, required mitigation / control measures shall be implemented to reduce the associated risk and hazards.

SOCIOECONOMIC DEVELOPMENT

Proponent is planning to implement the CSR activities for the nearby areas like infrastructure facility development, to make the provision of health and sanitation facilities in the required areas after talking to the Numberdar or local people. The time bound action plan for implementation of CSR activities.

Proposed CSR activities:

- Tree plantation with tree guards and maintenance as per green belt development guideline
- Construction village roads in the locality
- Renovation of school building
- Furniture facility for Schools
- Implementation of Different schemes for women empowerment in the study area
- Scholarships for students
- Arrangement of Books for School Children
- Computers for school so as to improve the educational level
- Lighting by CFL bulb / solar street lamps in villages.
- Construction village roads in the locality
- Free health camp
- Drinking water facilities

ENVIRONMENT MANAGEMENT CELL (EMC)

The EMC will be developed to co-ordinate the project activities in an environmentally friendly manner without harming human health or the environment. The main aim of EMC shall be the effective implementation of environment management system during construction and operation phase. In the

EMC, all HODs will be included so that they can co- ordinate the activities in effective way or as per the standard laid down norms. The EMC will monitor the general and preventive maintenance of pollution control system / equipment undertaken by the maintenance department to achieve optimum efficiency. The EMC will co-ordinate all the activities of the plant and process in an environment friendly manner to avoid any type of adverse effect on the human health or the environment.

Responsibilities of Environmental Management Cell

The EMC has the responsibility to supervise all the activities in the plant to ensure that those are being carried out as per the standard operating procedure to avoid any type harm to the environment. The EMC also undertake periodical monitoring or survey of various environmental parameters including monitoring and analysis of effluent, air, water and noise to ensure that these parameters are maintained within the prescribed limits. If any deviation observed, they will inform to initiate corrective action by the concern department or they will do themselves if required.

They also undertake the physical survey of the green belt to ensure required growth and survival rate of the plant. They will also inform the concern department for corrective actionif any to have proper growth of the plants.

- **Environmental monitoring:** EMC will ensure that pollution is well below the prescribed limits or there is no much difference between the present concentrations and baseline data. If wide difference is observed then they will need to initiate required corrective action either by optimizing the treatment process or by providing equipment or improving the performance of existing pollution controls equipment. In case the results indicate parameters exceeding the prescribed limits, remedial actions will be taken through the concerned plant people. The actual operation and maintenance of pollution control equipment will be the responsibility of respective department head or a plant in charge.
- **Legal and statutory compliance:** EMC will also supervise the work of other department pertaining to the activities of preparation of environment statement report, environment audit, Water Cuss return and consent application as per the requirement under various Rules and regulations. They will also guide the HODs of individual department to fulfill the statutory requirements under various acts and applicable rules. Following Rules shall be applicable to the facility:

1. The Punjab Environmental (Protection) Act, 1997 (Amended 2012-2017)
2. The Environmental Samples Rules,2001
3. Environmental Tribunal Rules, 2012
4. Punjab Environmental Quality Standard for Ambient Air

5. Punjab Environmental Quality Standard for Noise
6. The Punjab Environmental Quality Standard for Industrial Gases

- **Documentation**: The cell will also be responsible for maintaining the records of data, documents and information in line with the legislative requirement and will regularly furnish the same to the concern statutory authorities.

Schedule of implementation

The proponent is waiting for the environmental approval from environmental protection department. No Construction work has been initiated so far as the company is waiting for the Environmental Approval from the Department. After the approval, the project construction work would be carried out within 6-8 months.

Sr. #	Activities	2.5 Months			2.5 Months			2.5 Months			2.5 Months		
		4W	4W	2W	4W	4W	2W	4W	4W	2W	4W	4W	2W
1	Detailed Designing												
2	Mobilization of Contractors												
3	Lean Development Period												
4	Peak installation Period												
5	Plantation at Site												
6	Commissioning												*
W=Weeks													

Environmental Practitioners and Experts

Name	Post	Qualification
Salman Azmat	HSE Manager	MPhil Environmental Sciences (NEBOSH)
Ali Malik	HSE Officer	MPhil Environmental Sciences
M Abuzar	Senior Environmentalist	BS Environmental Sciences
Iqra Zahid	Senior Environmental Officer	MPhil Environmental Sciences

Mubeen Sohail	HSE Officer	BS Environmental Sciences
Ramsha Shakeel	Environmentalist	BS Environmental Sciences
Ahsan Mushtaq	Environmentalist	BS Environmental Sciences

Following functionaries will be involved in the implementation of EMMP:

- The project Proponent as owners of the EMMP.
- Project contractor(s) as executors of the EMMP during installation and operational phase of the project.
- Operational & Maintenance (O&M) and the Health, Safety and Environment team of the project as an executor of the EMMP during the installation and operational phase of the project.

Designation	Responsibilities
Manager	• Direct operations at the site. • He will act as team lead. • Interact with other executives, mine staff and community residents. • Effectively motivate staff to follow protocols and to work productively. • Look after the Health and Safety Related issues. • Responsible for scheduling staff and ensuring that supplies are stocked. • He will play a direct role in developing business goals for the mine they run, and he will help to produce a business plan to ensure that those goals are met.

Accountant	• Proper management of the funds for the CSR. • Development of fund proposal for environment related expenses. • Ensuring the smooth transaction of funds for environmental related projects/activities. • He will prepare the yearly budget. • Taking minutes in meetings and other administrative duties. • During his shift timings, he will be responsible to look into smooth functioning of the process in environmentally sustainable way. • He will be responsible to rectify any problem regarding environmental matter in collaboration with concerned authorities. • Prepare reports on different events and incidents. • He will report all matters regarding E.M. to the manager.

Responsibilities of Functionaries

- Responsibilities of Management of Project

Management of the project will be responsible for the environmental management and supervisory affairs during the project activities. Environmental personnel designated by the management of the project will look after the environmental related issues during the project activities. The responsibilities of environmental personnel are as follows:

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

Proposed Environmental Management and Monitoring Plan (EMMP)

The Environmental Management and Monitoring Plan (EMMP) will be used as a management and monitoring tool for implementation of the mitigation measures identified in the EIA report.
The EMMP matrix lists down:

- The required mitigation measures recommended in the EIA report.
- The person/organization directly responsible for adhering to or executing the required mitigation measures and monitoring adherence to the mitigation measures.
- The parameters, which will be monitored to ensure compliance with the mitigation measures.
- The timing at which the mitigation or monitoring has to be carried out.
- Budget allocated for management practices (cost of EMMP)
- Project Proponent will hold primary and overall responsibility for ensuring full implementation of the EMMP.

EMP Review and Revision

The EMP shall specify the procedures for the review and revision of the EMP during Project implementation and have a version control procedure. At a minimum, the site-specific EMP shall be reviewed by the Contractor to determine if an amendment or a major revision is warranted:

- At least once every six (6) months or on a seasonal basis;
- As a result of changes in the project or changes in the anticipated environmental effects of the project;
- After corrective actions have been taken in response to an environmental incident;
- after an adaptive management measure has been proposed
- A material revision is one which would be relevant to the question of whether an adverse environmental effect is more likely to occur, or become more adverse, and be significant;
- After a material revision of the EMP is proposed that changes a commitment such as:
    - a reduction or increase of monitoring or reporting requirements; or

making a specification less stringent or more stringent

POST CLEARANCE MONITORING PROTOCOL

After grant of environmental clearance by the EPA Punjab. All such compliance reports submitted will be the public documents. Copies of the same will be made available to the stakeholder upon the request.

ENVIRONMENT MANAGEMENT COST

- Estimated cost of EMP will be Rs. 8 million PKR

Sr. No	Description	Capital Cost (Rs. in lakhs)	Recurring Cost (Rs. in lakhs)
1.	Air Pollution Control	100	10
2.	Water Pollution Control	75	5
3.	Solid waste Management	8	3
4.	Environmental Monitoring and Management	_	7
5.	Rainwater Harvesting	20	3
6.	Occupational Health	10	5
7.	Greenbelt development	10	3
	Total	**223**	**36**

Table 10.5: EMP cost bifurcation

CONCLUSION

Major potential environmental impacts from proposed project will be from solid waste generation, wastewater generation, ground water exploitation and flue gas emission. However, an effective environment management plan reduces level of significant impact on the environment. Factory will implement effective occupational health and safety measures. Hence, proposed project will be environment friendly and safe

EIA REPORT

M/S Nimir Industrial Chemicals Ltd. 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura, Pakistan.

CHAPTER XI

STAKEHOLDER CONSULTATION

INVOLVEMENT OF STAKEHOLDER/ PUBLIC CONSULTATION

EIA and Public Consultation Process

Stakeholder participation in planning and management of the social and environmental issues assists in reducing the concerns of stakeholders and hence increases public acceptance towards development programs. Consultation process entitles the stakeholders with opportunities to participate in key decisions that will affect their lives. Therefore, detailed public consultation meetings were arranged at different levels of the planning process. For this purpose, periodic consultation meetings were held with various project stakeholders. Different aspects and impacts of the proposed project were highlighted regarding their impacts on the physical, biological, and socio-economic environment of the project area. Stakeholders' trepidations regarding various aspects like existing environment, and impacts of the project on the surrounding environment were emphasized and have been added to this EIA report.

Objectives of the Public/Stakeholders Consultation

Public consultation plays a vital role in studying stakeholders, perspectives regarding the project and henceforth the successful implementation and execution of the proposed project. Public involvement is a compulsory feature of Environmental Impact Assessment, which leads to improved and acceptable decision-making. The primary objective of the stakeholders, consultations was to learn and know the apprehensions, concerns, and opinions of the key stakeholders over environmental implications of the project activities from public perception. The consultation sessions also served as a source of firsthand information about the users and the beneficiaries, expectations from the project. Dialogue with the stakeholders and recording their concerns at appropriate stages of the project would help to tailor the project in line with stakeholders, aspirations and so increases the likelihood for public acceptance of the project and its subcomponents. It also helps to develop and maintain communication links between the project proponents and stakeholders, providing opportunities to the public to influence the project design in a positive manner. This ensures that the views and concerns of the stakeholders are incorporated into the project design and implementation with the objectives of reducing or offsetting negative impacts and enhancing benefits of the proposed project.

Methodology

Responsible Authority

The consultation process began with the identification of the most pertinent stakeholders. Identification of the stakeholders for the proposed project plays a crucial role in development and also assists in quantifying the role of different stakeholders involved. Impacts identified by the stakeholders are

measured through matrix method and mitigation measures are proposed according to the intensity of the identified impacts. Efforts were made to identify the relevant stakeholders through a systematic process based on the nature and degree of their actual and perceived stakes related to the project.

Issues Discussed with the stakeholders

Following issues were discussed during the stakeholder consultation meetings:

- Concerns, apprehensions, and views of the community and the stakeholders over the project activities relating to design, construction and operational aspects.
- Probable adverse impacts of the project activities on various components of the environment i.e., physical, biological, and social components
- Possible remedies for the concerns and apprehensions, how the concerns can be effectively addressed?

Identification of any specific personal or site related concerns

- How the project operations can happen in accordance with user/beneficiaries' expectations?
- Beneficial factors and involvement opportunities of the local people in the set of activities of project during construction and operational phases.
- Material's transport management during construction and operational phase of the project.
- Management of water, wastewater and solid waste during construction and operational phase of the project.
- Natural hazards, associated risks and precautionary measures.
- Traffic issues subjected to activities during different phases of the project.

Environmental Practitioners and Expert

According to the EIA rules and regulations this report will be compiled and submitted to the Environment Protection Department (EPD) and after the review on the report this report will be disseminated to the public. This dissemination and information sharing exercise will then be followed by public participation through print media in which the public will be requested for their reviews. The copies of the report will be placed in the EPA for comments from the public which will be incorporated in the report. As per rules and regulations, Environment Protection Department will hold a public hearing at the proposed project site.

The proposed Project does not have direct impacts on any individual; therefore, no primary stakeholders are identified. Secondary stakeholders are institutional stakeholders, which includes Project Proponent, local Government representatives, and Government officials of the relevant departments, NGO, general public, local residents, shop keepers, vendors, hospital owners/staff, teachers, pedestrians, and

businessmen/traders of the city. The categories of the stakeholders who provided useful feedback, included:

- Project Proponent
- Government officials
- Environmental practitioners and experts
- Teachers/students
- Shopkeepers

All those stakeholders have different types of stakes according to their involvements in various aspects of the Project. The consultant tried to contact all the stakeholders and shared their views and concerns and also interacted with the community-based organizations that can support the community.

Meetings With Stakeholders/ Environmental Practitioners and experts

A series of consultation was carried out with stakeholders and general public in nearby areas.

The purpose of this survey was to achieve the objectives of the consultation, highlight the main issues in the implementation of the proposed Project and finally propose mitigation measures. Open and close ended questionnaire was used to collect the views concerning the assessment survey. Scoping sessions and informal group discussions were also carried out with local residents and local government representatives regarding the proposed Project. The outcome of whole consultation process was very encouraging. The following issues were

discussed during Informal Meetings with local representatives:

i. Brief Description of the Project
ii. Current economic condition in the area
iii. Suggestions for improvement in the current industrial system and all activities related to industry
iv. Perceptions about the proposed Project
v. Perceived impacts of the proposed Project

The local poor people predominantly requested for unskilled and semi-skilled jobs during implementation of the Project. On the basis of the consultations so far, it appears that the Project will have no insurmountable environmental and social impact. The community generally supported the proposed Project. They have opinion that the Project will not only provide livelihood during construction stage, but also will help to eradicate the burning issue of regarding import of materials.

Other Departments and agencies

Proponent applied for other department NOC and will be provided in an operational phase of the project

Responsible Authority

HSE manager will be responsible for all the operational activities

Environmental Practitioners and Experts

Name	Post	Qualification
Talha Abid	HSE Manager	MPhil Environmental Sciences (NEBOSH)
Ali Malik	HSE Officer	MPhil Environmental Sciences
M Abuzar	Senior Environmentalist	BS Environmental Sciences
Iqra Zahid	Senior Environmental Officer	MPhil Environmental Sciences
Mubeen Sohail	HSE Officer	BS Environmental Sciences
Ramsha Shakeel	Environmentalist	BS Environmental Sciences
Ahsan Mushtaq	Environmentalist	BS Environmental Sciences

Proponent Environment Management Team

Talha Abid	HSE Manager
Ali Malik	HSE Officer
M Abuzar	Senior Environmentalist

Affected and Wider Community

There is no population present in the safe radius of the site that's why community will not be disturbed due to project operation. Although the opportunity of employment will increase if the project will approve.

Summary Of Issues Raised by Stakeholders

A summary of the key issues raised by stakeholders and how these are being addressed by Project Proponent is provided in Table below.

Issue	Aspect/Concern raised by Stakeholders	Project Proponent Commitments
Employment Opportunities	Expectations of employment are very high. Job opportunities are less for herders as they generally have less skills and training.	Employment is the main priority of the industry. Mostly locally skill and unskilled labor will be prioritized and also there will be job in executive level. Around 100 people will be employed by the industry.
Training Opportunities	People are keen to consult with subject industry if the Project offers training and upgrading opportunities to enhance their trade or professional skills.	Development of the Training Strategy, including commitment of allocation of budget investment for training infrastructure, delivery and design. Installation of training facilities in for worker of the company and students will also be accommodating. The internship program will offer to the students to develop professional skills.
Health & safety	Truck traffic is a main concern because the road used by the Project passes through a number of small communities and different industries and there will be a high volume of trucks transporting concentrate.	Development of Transport Management Plan including traffic safety training. Traffic advisory signs will be installed along project site and all nearby specific areas.
Local economy and business development	Local service providers are keen to participate in providing services to provide raw material and expect to receive in order to adjust their businesses to meet specific needs. Local/regional companies and entrepreneurs have limited understanding about meeting the high volumes required by the Project and the quality standard, but are keen to know these requirements so they can become suppliers.	Proponent has main focus that they will all the material regarding construction and plant operation to buy from the local market. This will help the local and small business and to people who are keen interested to become suppliers.
Environmental Issues	Dust and noise impacts, particularly from the construction activities and in operation of mechanically unfit machines, are of concern to herders and other residents. Environmental degradation during road construction and use. Loss and change of vegetation due to soil degradation.	Implementation of controls under the Environmental Management Plans, including on and off-site dust and noise monitoring. A Participatory Environmental Monitoring Program will be launched to spread awareness.

Water quantity and quality	Water quality and quantity, and impacts from the wastewater disposal are all key concerns for nearby herders.	Implementation of consultation in relation to water use and development of the Participatory Environmental Monitoring Program. Water treatment will be done by the proponent that will help to safe disposal of the water.

EIA REPORT

M/S Nimir Industrial Chemicals Ltd. 14.8 km, Sheikhupura-Faisalabad Road, Bhikhi, Dist. Sheikhupura, Pakistan.

CHAPTER XI

SUMMARY AND CONCLUSION

SUMMARY AND CONCLUSION

INTRODUCTION

This chapter executes summary of whole EIA report which includes project description in brief, environmental setting in 10 km radius, impact identification and mitigation measures and environmental management plan. Moreover, brief information of Post mentoring program and risk assessment is also furnished in this chapter. An EIA report for proposed project has been prepared as per the TOR issued on dated January 2022 by and as per generic structure as per EIA notification of EPA Punjab 1997 (Amended 2012-2017) and amendment thereof. EIA report prepared by IES Environmental Solutions Pvt Ltd Consultant

SCOPE OF THE STUDY

EIA study has been conducted prior to commissioning of proposed project and in accordance with the standard TOR issued by EPA Punjab. The EIA study of proposed project is limited to the project site and study area of 10 km surrounding the project site. Baseline data collection and environmental monitoring of study area was carried out for the period of November 2021 to January 2022.

DESCRIPTION OF THE ENVIRONMENT

Environmental monitoring is carried out for air, noise, water, biological and socioeconomic. The baseline environmental study has been conducted for the study area for the period of November 2021 to January 2022. Frequency of sampling with location and parameters are mentioned in Table 11.3.

Sr.	Attribute	Parameter	Location	Frequency
1.	Ambient Air Quality	$PM_{2.5}$, PM_{10}, SO_2 & NOx,	10 locations	24 hourly, twice a day week during study period
2.	Noise	Noise Levels in dB(A)	10 locations	Once in Study Period
3.	Ground Water	pH, Electric Conductivity (EC) TDS, TSS, Total hardness, Total alkalinity, DO,Chlorides, sulphates,Phosphate, nitrate, Fluorides, Potassium, Most probablenumber (MPN) coliform	Grab samples of11 Locations	Once in Study Period
4.	Surface water	pH, Conductivity TDS, TSS, Total hardness, Totalalkalinity, DO, Chlorides, sulphates, Phosphate,nitrate, Fluorides, Potassium, Most probable number (MPN) and total coliform	Grab samples of 4 Locations	Once in Study Period
5.	Soil	Texture, pH, EC, metals,Sodium Absorption Ratio (SAR), Permeability, Waterholding, capacity, bulkdensity, Porosity, Nitrogen, Phosphorus, Potassium,Moisture, organic content	10 locations	Once in Study Period

6.	Ecological Data	Existing flora & fauna	10 km study area	Once in Study Period
7.	Socioeconomic Data	Demographic Structure,Education, Infrastructure,Economic, Health status and specific area information	Within 10Km radiusof study area	Once in Study Period

Ambient Air Quality

It has been observed that all ambient air results are within prescribed limits as per ISO 14001-2015. Detailed ambient air samples results are mentioned in chapter III. Major highlights of the results are mentioned below,

11.6.1.1 Maximum concentration of PM 10 found at 47.8 to 89.2 µg/m^3

11.6.1.2 Maximum concentration of PM 2.5 found **at** 25.00 to 45.0 µg/m^3

11.6.1.3 Maximum concentration of SO_2 found at 4.0 to 10.1 µg/m^3

11.6.1.4 Maximum concentration of oxides of nitrogen 4.8 to 18.5 µg/m^3

From the results, it can be concluded that the ambient air quality of the study region is good as all the results are well within the limit.

WATER QUALITY

Ground water and surface water sample result summary of some major parameter is descried as below,

11.6.2.1 It has been observed that pH range was between 7.0 to 7.36

11.6.2.2 Average total dissolved solids were in the range of 220 to 598 mg/l

11.6.2.3 Chlorides was in the range of 15.0 to 76.1 mg/l.

11.6.2.4 As microbiological parameters MPN and total coliform analysis was also carried out and it was found that *E. Coli* are detected in river water sample as well as some well water samples.

Moreover, MPN count was also found high as per ISO-14001 specifications.

The above chemical analysis reveals that water from all sources is suitable for drinking purposes after disinfection, as E-Coli is present in all the surface water and some ground water samples collected. All other constituents are within the limits prescribed for drinking water standards of Pakistani Standards (14001: 2015).

SOIL QUALITY

Soil sample result summary is described below,

11.6.1.5 Results of pH were varying between 6.98 to 7.46

11.6.1.6 Organic matter in the soil samples was found in the range of 3.5 to 4.26%.

11.6.1.7 Total Phosphorous content was found in the range of 5.2 to 9.2 mg/kg.

11.6.1.8 Potassium ranges from 20.6 to 32.7 mg/kg.

NOISE QUALITY

Noise level was monitored in **9** locations. Average noise level found in between **40 to 45** dB (A) during day time and it is within the prescribed limits.

11.1 PROPOSED IMPACTS & MITIGATION MEASURES

Summary of probable impacts due to proposed project and its control measures are briefed in Table

Activity	Impact identification	Mitigation measures
Site preparation/ Excavation/ foundation	• Loss of fertile soil • Loss of vegetation • Temporary impacts because of air contamination due to dusting & emissions from machineries. Health effects like allergic sickness, breathing problems etc., due to dust emission. • Noise generation due to excavation machineries created hearingproblems	• Excavated soil will be used for greenbelt development. • There will be minor vegetation clearance and earth excavation required. However,no major impact is anticipated. • Personal protective (PPs) equipment like masks, ear muffs will be provided toworker. • All construction machineries/equipment's and vehicles will be turned off, when not in use.
Transportation of construction material, equipment and machineries	• Air emissions created occupational health hazardslike allergic sickness, breathing problems etc. • Noise generation	• During the transportation of dusty materials, loaded trucks will be coveredto avoid PM dispersion level in air. • Regular spraying of water for dust suppression. • Electrically operated machineries shall be preferred
Handling of raw material /loadingand unloading ofmaterial	• Health effect on labor due to dust emission whilehandling of construction material. • Occupational health issues due to frequentexposure of dust, chemicals etc.	• Personal protective (PPs) equipment like masks, ear muffs will be providedto worker.
Civil work	• Disposal of construction waste on land changes the soil physical and chemical properties • During construction, occupational health hazards due to frequent exposure of dust. Labor may suffer from respiratory and allergic disease. • Air pollution due to emission of dust. • Noise pollution due to machineries and equipment. Frequent exposure of high exposureof high decibel noise causes hearing problems in construction labors. • During construction occupational health hazards due to frequent exposure of dust. Labor may sufferfrom respiratory and allergic diseases. • Air pollution due to emission of dust.	• Construction waste dispose will be done safely in accordance withstatutory norms. • Personal protective (PPs) equipment like masks, ear muffs will be providedto worker to avoid the heath effect.

	• Noise pollution due to machineries and equipment. Frequent exposure of high decibelnoise causes hearing problems in construction labors.	
Domestic activities	• Sewage generation causes water pollution, if water is dumped in the water body or soil pollution if it disposed on the soil. • Soil pollution occurs if solid waste disposed on the soil.	
Manufacturingprocess	**Resources consumption** Ground water extractioncauses exploitation of ground water. **Air emissions** Boiler stack releases air pollutant like PM (10, 2.5),So_X and NO_X may cause loss of vegetation, health effect on community residing nearby like respiratory, allergic diseases, • Asthma, lung disease etc. Waste water from unit. Groundwater and soil pollution if directly disposed of on the land. Surface water pollution if it disposed of into water body. Disposal of untreated wastewater causes health effects on community, change in physical and chemical properties of soil and water which ultimately affects organism present. **Noise generation** • Noise due to Boiler operation and during operation of other machineries equipment. Occupational health	• Treated water will be recycled back into the process. • Noise will be concise inthe working area only. • PPEs will be provided tooperators/ workers to avoid the occupational health hazards proponent

	hazardous can be faced by operators and other staff whoever working in that area **Social environment** • Employment generation • Development of road due to proposed project No rehabilitation and resettlement required, hence nonegative impacts No change in land use hence no negative impacts resettlement required, hence no negative impacts • No change in land use • hence no negative impacts	
Transportation of raw material and product	• Major pollutant during transportation is dust and other fugitive emissions, which causes health effect and loss of vegetation of nearby area due to deposition of dust on the leaves of trees.	• Use of vehicles meetingthe statutory norms related to emission. • Use of vehicles withPUC certificates • Proper traffic management plan will be developed hence, no major dust emission is anticipated.
Handling and storageof raw material	• Risk of accident due to leakage/explosion of chemicals whichdirectly affect health of working staff. • Risk associated with fire due to storage of fuel and Alcohol. If accident arises, factory staff gets trapped in the fire.	• PPEs will be provided tooperators/ workers to avoid the occupational health hazards. • Firefighting facility asper norms. All safety measures will be undertaken to avoid accidents

Impact Assessment

Overall impacts from various activities on different environmental parameters are negligible if EMP properly implemented. Hence, no adverse negative impacts are predicted and project is ecofriendly.

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

CONSTRUCTION PHASE

Environment management plan will be adopted properly to mitigate the adverse impact asbelow,

- Loss of vegetation during excavation will not be major; moreover 33% of totalland is allotted for greenbelt development.
- During the transportation, trucks will be covered to avoid dust dispersion in the air.

- Dust emission from construction machineries as well as vehicles on the road will be minimized by regular water spraying of for suppression.

Regular maintenance of vehicles/ machineries and use of vehicles with PUC certificates to avoid the vehicular pollution.

- construction machineries/ equipment's and vehicles will be turned off,when not in use. from the vehicular movement and operation of equipment's/ machineries will be managed by restricting the same during night time.
- Personal Protective Equipment's like ear muffs or ear plugs will be provided to workers who will have exposure to high noise.

OPERATION PHASE

Air emissions

Flue gas emissions

Particulate matter (PM), SO_2 & NOx are main pollutants being/to be emitted from stacks attached with steam Boilers of capacity 30 TPH. Two D.G sets of capacity 500 kVA each will be used in case of power failure. Air pollution equipment's like Electrostatic precipitator (ESP) and dust collectors will be installed. Stack height will be 62 m.

Process Emissions

CO_2 and VOC's will be generated during the process. The CO_2 will be scrubbed in water. VOC emissions are very minor as process in closed.

WASTE WATER GENERATION

Waste water will be generated from process are treated in wastewater treatment plant

GREENBELT DEVELOPMENT

Greenbelt will be developed in 2.0 acres of total plot area, which is 10 % of total land of Plant equipment's. Details of trees and shrubs to be planted are given in Chapter X. Localand native trees will preferably plant. Broad leaves trees will be planted around the industrial area. Avenue plantation will be done along the road sides.

POST PROJECT ENVIRONMENTAL MONITORING PROGRAM

Post project monitoring helps to identify the adverse environmental impacts of the proposed project. It also recognizes the efficiency of the pollution control equipment's which are placed for pollution abatement. Environmental monitoring program prepared for proposed project is given in Table 11.6.

Sr.	Particulate	Parameters	Number of Locations	Frequency
1.	Ambient air quality	PM10, PM2.5, SO2, NOx, CO, etc.	Ambient air quality at minimum 3-5 locations. 1 location within the plant premises, 1 location in up wind, 1 location in downwind direction 1 location in cross wind direction.	Monthly
2.	Stack gas	PM, SO2 and NOx	Number of stacks	Monthly
3.	Work place	PM2.5, SO2, NOx, VOCs, CO2	Process emission in workplace area/plants (for each area/plant minimum 2 locations and 1 location outside plant area near vent)	Monthly
4.	Waste water	pH, EC, SS, TDS, O&G, Ammoniacal Nitrogen, COD, BOD, Chloride, Sulphide etc.	Wastewater from all sources. Inlet & outlet of ETP Process condensate treatment plant Inlet and outlet	Monthly
5	Surface water and ground water	pH, Salinity, Conductivity, TDS, Turbidity, DO, BOD Phosphate, titrates, Sulphates, Chlorides, Total Coliforms (TC) &E.coli	-5 location Ground as well as Surface water Ground water preferably Near to spent wash storage lagoon	Half yearly
6.	Solid waste	Ash	• Process dust generated sludge and ash. Before used as manure if used manure	Monthly
7.	Noise	Equivalent noise level - dB (A) at min. Noise Levels measurement at high noise generating places as well as sensitive receptors in the vicinity	5 locations At allsource and outside the Plant area.	Monthly
8.	Green belt	Number of plantation (units), number of survived plants/ trees, number of poor plant/ trees.	In and around the plant site	Monthly
9.	Soil	Texture, pH, electrical conductivity, cation exchange capacity, alkali metals, Sodium Absorption Ratio (SAR),	2-3Near Solid/ hazardous waste storage. At least five locations from Greenbelt and area where manure of biological waste is applied.	Quarterly

		permeability, porosity.		
10.	Occupational health	Health and fitness checkup of employees getting exposed to various hazards and all other staff	All worker	Yearly/ twice a year

ADDITIONAL STUDY

Additional studies have been included in chapter VII are as below,

- Risk Assessment in which risks arising from
  - Storage and Handling of Alcohol, Molasses.
  - Operation of DG sets, Boiler, Storage and Handling of hazardous chemicals
- Disaster Management Plan
- Occupational Health and Safety Management System

PROJECT BENEFITS

Project contributes many direct and indirect benefits to the local people in terms of financial, social welfare and other tangible benefits and these are,

- Direct and indirect employment generation for local community of surrounding area during construction phase and operation phase. Around 70- 100 No. skilled manpower will be required during the project execution.
- Major part of these labors will be mainly from local villagers who are expected to engage themselves both in agriculture and project activities. This will enhance their income and lead to overall economic growth of the area.

CONCLUSION

- Proposed project does not attract rehabilitation and resettlement of people,since the proposed site in open and vacant.
- Proposed project does not anticipate any adverse impacts on environment.
- Air emissions through stack will be controlled by EPA Punjab.
- Loss of vegetation and habitat will not be attributed.
- Workplace/ operation hazards, which will be minimized by providing personal protective

equipment's, safety precautions, emergency plan & disaster management plan.

Consequently, impacts on air, water, land and ecological environments are insignificant and the socio-economic benefits are predominantly positive.

Thus, overall project features, process, potential of pollution, pollution prevention measures and environmental management plan proposed by proponent illustrates that proposed project will not have any considerable impacts on environment as well as on socio-economic & ecological conditions of the project area. Therefore, proposed project is environmentally safe.

ANNEXURES

Term of References for Environmental Impact Analysis

1.0 Introduction

IES Environmental Solutions has been asked to submit the technical proposal for this project to fulfill the legal requirements under Pakistan Environmental Protection Act 1997 (amended 2012).

Part A- Completion of EIA

2. Environmental Impact Analysis

The proponent is required to prepare an environmental assessment study and get approval from EPA prior to commencement of the project.

3. Responsibility of Consultant

The consultant would undertake surveys, conduct studies, consult with the community and compile the EIA report. The EIA should cover all likely construction and operation activities and will include, but not to be limited to, an assessment of the environmental and social impacts relating to the land.

The following tasks shall be conducted for the completion of work.

1) Procedure of Environmental Assessment

After the award of work of Environmental Assessment study, consultant will carry out following activities:

a. Kick of meeting with client to collect the requisite information regarding project i.e. Design reports, drawings, feasibility study, topographic survey etc. Site topographical surveys and underground reservoir survey reports will be shared by client.
b. Site survey and environmental monitoring of groundwater, noise, wastewater and ambient air quality.
c. Socioeconomic survey of the area.
d. Secondary data collection from district department (Forest, drainage, meteorological)
e. Assessment of environmental and socioeconomic project and mitigation measures
f. Preparation of environmental management and monitoring plan.
g. Environmental assessment report preparation and submission to client for review and comments if any.

h. Follow up of case in EPA till its final Environmental Approval Responsibilities of the Client

Responsibilities of the Client

I. Provision of necessary documents and studies about the features and description of the project.
II. Provision of copy of the geotechnical study including seismic study.
III. Site topographical surveys and underground reservoir survey reports.
IV. Basic data for quantification of solid waste, water use, wastewater and its safe disposal.
V. Detail of each commercial activity and its expected magnitude.
VI. Provision of review fee for EPD.
VII. Health and safety plan.

B) Securing NOC and Approval from Govt. Departments

a. Consultant will prepare and submit a complete final Environmental Assessment report to the client along with requisite documents provided by the proponent for onward submission to EPA Punjab securing NOC.
b. Consultant, as required by environmental law, will submit the report along with bank draft of review fee in the name DG EPA, application, affidavit and undertaking provided by the client.
c. EPA Punjab raises queries on EIA report and sends to the client. At this stage, consultant will reply all the queries raised by EPA. Client/Consultant will submit the reply to EPA.
d. After the approval of Environmental report, a notice for the committee of experts for the proposed project will be issued by EPA Punjab. Consultant will prepare and deliver presentation before committee of experts. All the questions raised by committee of experts will be responded by the consultant.
e. After committee of experts, NOC is issued to the client.
f. Consultant will facilitate the client till the issuance of NOC by concerned Government Department from EPA Punjab.

Glossary

- **Ambient:** relating to the immediate surroundings of something
- **Base line:** Conditions prevailing at the time of study or before initiation of any project
- **Baseline:** Conditions prevailing at the time of study or before initiation of any project
- **Discharge:** means spilling, leaking, pumping, depositing, seeping, releasing, flowing out, pouring, emitting, emptying or dumping
- **Effluent:** means any material in solid, liquid or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapor
- **Environment budget**: Monitory assets reserve for environmental activity.
- **Environment:** means air, water and land; all layers of the atmosphere; all organic and inorganic matter and living organisms; the ecosystem and ecological relationships; buildings, structures, roads, facilities and works; all social and economic conditions affecting community life; and the inter-relationships between any of the factors mentioned
- **Environmental Impact Assessment:** means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, migratory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed
- **Fauna:** Animal life occurring in particular region or time.
- **Flora:** plant life occurring in particular region or time.
- **Initial Environmental Examination:** means a preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an environmental effect for requiring preparation of an environmental impact assessment
- **National Environmental Quality Standards:** means the permissible standards for emission of air pollutants and noise and for discharge of effluent and waste
- **Nuisance:** A person, thing or circumstances causing inconvenience or annoyance.
- **pH:** negative log of hydrogen concentration:
- **Proponent:** the person who intends to carry-out a proposed project.

- **Sustainability:** means such developments that meet the needs of the present generation without compromising the ability of future generations to meet their needs
- **Waste:** means any material, substance, or by-product eliminated or discarded as no longer useful or required after the completion of a process

List of Abbreviation

BOD	Biochemical Oxygen Demand
C&I	Commerce and Investment
CEPTP	Common Effluent Pretreatment Plant
COD	Chemical Oxygen Demand
DCP	Dry Chemical Powder
EIA	Environmental Impact Assessment
EMP	Environmental Management Plant
EMMP	Environmental Mitigation & Monitoring Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
EPO	Environmental Protection Ordinance
GOP	Government of Pakistan
GOPb	Government of Punjab
HSE	Health, Safety & Environment
HC	Horticulture Committee
IEE	Initial Environmental Examination
Kmp/h	Kilo Meter Per Hour
Km	Kilo Meter
PEQS	Pakistan Environmental Quality Standards
NOC	No Objection Certificate
NWFP	North West Frontier Province
OSHA	Occupation Health and Safety
PEPA -97	Pakistan Environmental Protection Act, 1997
PCGIP	Punjab Cities of Governance Improvement Project
PM	Particulate Matters
PEPO-83	Pakistan Environmental Protection Ordinance, 1983
TDS	Total Dissolved Solids
TMA	Tehsil Municipal Administration

UC	Union Council
WAPDA	Water and Power Development Authority
WWTF	Waste Water Treatment Facility
WHO	World Health Organization
API	American Petroleum Institute
CO_2	Carbon dioxide
°C	Degree Celsius
M/S	Masses
INR	International normalized ratio
FY	Fiscal Year

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List of Team Members

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01	Mr. Waqas Ahmad Khan	M.Phil. Environmental Sciences
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02	Mahwish	PhD Environmental sciences, GIS Expert
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