



**LANDUSE STATEMENT**

S.NO	LAND-USE	AREA (ACRES)	%AGE	QUANTITY
1	1- ACRE PLOTS	34.10	42.12	32
2	1/2- ACRE PLOTS	14.51	17.92	26
3	COTTAGE INDUSTRY	5.11	6.31	24
4	CONST. FACTORY	1.91	2.36	01
5	COMMERCIAL	3.72	4.60	06
6	AMENITIES	1.46	1.80	02
7	PARKS	2.44	3.01	--
8	ROADS/PARKING	17.49	21.62	--
9	OT/SUB STATION	0.09	0.11	--
	EXISTING NULLAH	0.12	0.15	--
	<b>TOTAL</b>	<b>80.95</b>	<b>100.00</b>	<b>91</b>

**LEGEND**

S.NO	LAND-USE	EMBLEM
1	1-ACRE PLOTS	
2	1/2-ACRE PLOTS	
3	COTTAGE INDUSTRY	
4	AMENITIES	
5	COMMERCIAL	
6	CONSTRUCTED FACTORY	
7	PARKS	
8	WATER TANK	
9	SUB STATION	
10	H.T. LINE	
11	BOUNDARY LINE	
12	Trees	

## NAUSHAHRO FEROZE INDUSTRIAL PARK (NFIP)

**A PROJECT OF PAKISTAN INDUSTRIAL DEVELOPMENT COPORATION (PIDC)**



## ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

Decrmbler 2022

**Submitted To:**

**Sindh Environmental Protection Agency  
Government of Sindh**

**Prepared by:**

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**NAUSHAHRO FEROZE INDUSTRIAL PARK (NFIP)**  
**ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT**

<b>Prepared for:</b>	<b>Prepared by:</b>
Sindh Environmental Protection Agency, Government of Sindh	<b>INDUS ENVIRONMENTAL ENGINEERING CONSULTANTS</b>

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**Revision History:**

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0.1	Sameen Khokhar-Environmental Expert, Tasneem Maqbool Bhatt-Social Expert, Naeem Ali-A.M Environment/ GIS	Sameen Khokhar	AHM	IEEC	12-12-2022

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<b>Environmental Impact Assessment (EIA)</b>		
<b>Naushahro Feroze Industrial Park (NFIP)</b>		
Doc. No	IEEC/2022/02/EIA	

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## LIST OF ABBREVIATIONS & ACRONYMS

<b>Abbreviation</b>	<b>Stands For</b>
ASP	Activated Sludge Process
BOD	Biochemical Oxygen Demand
CBO	Community Based Organization
CETP	Combined Effluent Treatment Plant
Cm	centimeter
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
COD	Chemical Oxygen Demand
dBA	Decibel
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
GOP	Government of Pakistan
H <sub>2</sub> S	Hydrogen Sulfide
HSP	Health and Safety Plan
IEE	Initial Environmental Examination
IPP	Independent Power Producer
Kg/d	kilogram per day
km/h	kilometer per hour
m <sup>3</sup> /d	cubic meter per day
m <sup>3</sup> /h	cubic meter per hour
mg/l	milligram per liter
mm	millimeter
MW	Mega Watt
NCS	National Conservation Startagy
NFIP	Naushahro Feroze Industrial Park
NEP	National Environmental Policy
NEQS	National Environmental Quality Standards
NGO	Non-government Organization
NIP	National Industrial Park
NOC	No Objection Certificate
O&M	Operation & Maintenance
OHS	Occupational Health and Safety

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PEPA	Pakistan Environmental Protection Agency
PEPA-97	Pakistan Environmental Protection Act 1997
PIDC	Pakistan Industrial Development Corporation
pH	Power of Hydrogen Ion Concentration
PM	Particulate Matter
PPE	Personal Protection Equipment
SEPA	Sindh Environmental Protection Agency
SOx	Oxides of Sulfur
SS	Suspended Solids
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
UNESCO	United Nations Educational, Scientific and Cultural Organization
USE-PA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
WAPDA	Water and Power Development Authority
WHO	World Health Organization
WTO	World Trade Organization



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## Executive Summary

National Industrial Parks Development & Management Company (NIP) [now merged into Pakistan Industrial Development Corporation (PIDC)] was established as a special initiative of the Ministry of Industries & Production and was wholly owned by the Government of Pakistan. NIP was entrusted with the task to develop focused industrial growth in Pakistan by setting up world-class industrial parks all over the country.

Naushahro Feroze Industrial Park (NFIP) is one of the projects of NIP which has the status of a Special Economic Zone under SEZ Act 2012. The purpose of the development of NFIP is to provide a platform for organized and systematic industrial growth in the area and to excel the agro-based industrialization in the province of Sindh. The proposed project shall generate employment opportunities for the youth and benefit the area in the value addition of agricultural production.

The Naushahro Feroze Industrial Park (NFIP) is located on N-5 National Highway between Moro City & Naushahro Feroze city in Naushahro Feroze District, NFIP is spread over 80 Acres of land. The proposed project area activities will be carried out proposed project site which is located in Deh Wagan, Taluka and District Naushahro Feroze. The proposed land is affected from salinity & fertile land, interspersed with interlunar flats "pat", are the dominant topographic feature of the project area.

This EIA has been prepared in accordance with the requirements set-forth in Sindh Environmental Protection Act 2014 (SEPA 2014), the Sindh Environmental Protection Act (Review of IEE and EIA) Regulations 2021 and the guidelines provided in the Pakistan Environmental Assessment Procedures, 2004. Section-17 of SEPA 2014 states that: "No proponent of a project shall commence construction or operation unless he has filed with the Agency, an Initial Environmental Examination or Environmental impact Assessment, and has obtained from the agency approval in this respect thereof. In this document consultant Indus Environmental Engineering Consultants (IEEC) conducted & revised the EIA study. The project has been categorized according to the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021 the proposed project fall under the Schedule III. Category 'C' of Manufacturing and processing, 6. Establishment of Industrial estates & Export processing zones. The NFIP a blend of different industrial clusters, which will produce air emissions (of varying Intensities) relative to their respective processes. All these industries (as planned to be installed in NFIP) will be required to have their own EIA's /IEE as per their category mentioned in IEE/EIA regulations 2021 prior to construction in the NFIP and get their approvals from SEPA.

The NFIP will comprise a number of industrial sectors such as Fruit and vegetable Packaging, Flour Mills, Dairy products, Livestock feeds, Poultry feeds, Dates processing and dehydration, Farm equipment.

The purpose of this industrial park is to create new jobs, reduce poverty, encourage industrialization in Sindh and resultantly increase the GDP of the country.

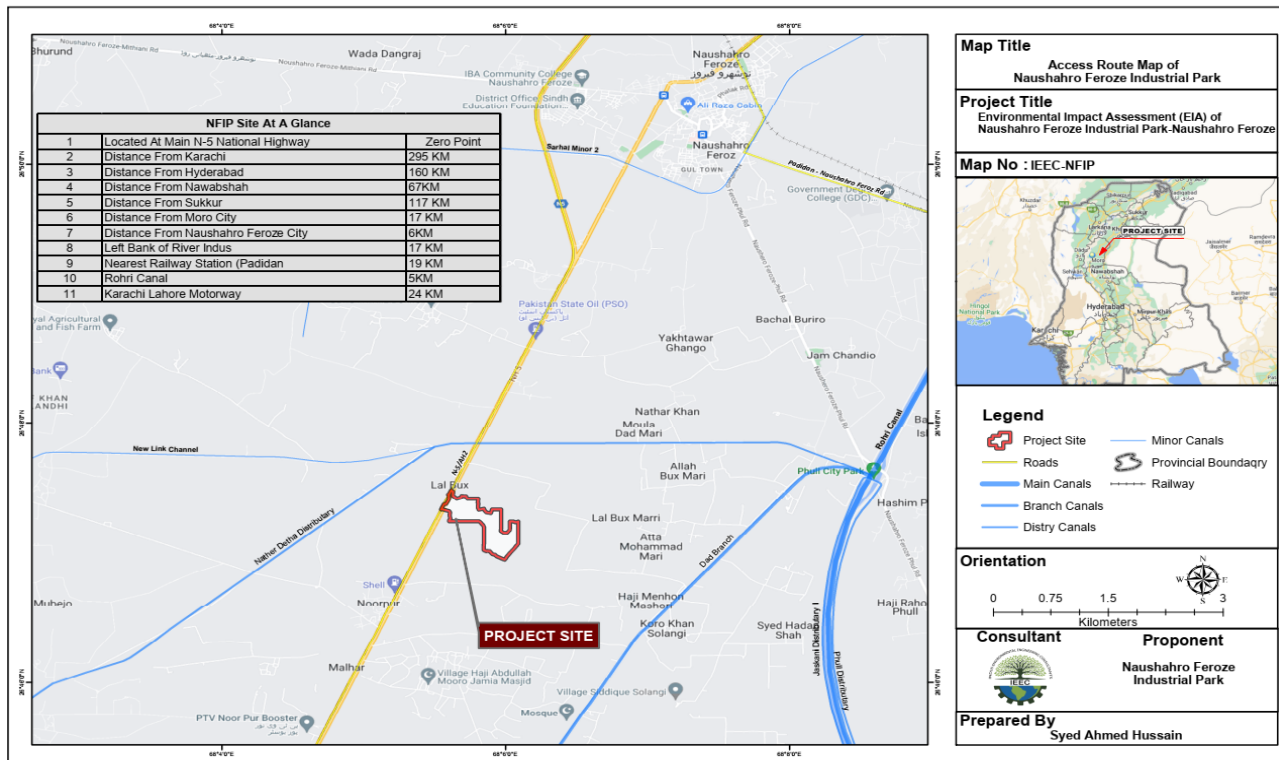
## Environmental Impact Assessment (EIA)



### Naushahro Feroze Industrial Park (NFIP)

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S. No.	Items	Description
01	No. of Plots / Plot size	01 Acre Plot = 32 nos. 0.5 Acre Plot = 27 nos. Cottage Industry up to 0.2 acres = 24 nos. Total Industrial = 56.37 acres Commercial = 3.97 Acres area
02	Water Supply & Distribution	From Tube Well/ Ground Water
03	Waste Water Discharge & Disposal	Nearby source available
04	Internal Road Network	Flexible Asphalt Road Network
05	Power Distribution Networks	For 04 MW of Electricity, Payment was made in July 2021.
06	Gas Supply and Distribution	For 2.5 mmcf/d Gas, a Demand Notice has been issued from SSGC
07	Protection against Natural Calamity and external intrusion	Boundary Wall & Watch Towers
08	Green Area	In order to promote the natural environment sufficient area of the industrial park is assigned as Green Area
09	Weighing Bridge	Will be available
10	Fire Station	Provision of Fire Station are available to effectively meet incidents of fire
11.	Solid Waste Management	Arrangements with District Management for Door to Door Collection from Industry.
12.	Wastewater Treatment	Primary Treatment by (Generating Industry) Secondary Treatment by Combined Effluent Treatment Plant



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The methodology adopted for conducting EIA study includes orientation session, development of the data acquisition plan, review of the existing data, sources and tools of data collection, primary data collection surveys (reconnaissance survey, socioeconomic survey), sources of secondary information and impact assessment matrices.

The area around the project site is flat. The project area is predominantly a uncultivated area. The agricultural land is found only in the southwest of the project site. The seismic factor for the project area falls between minor negligible. The climate of the area is subtropical experiencing 300 mm to 500 mm rainfall annually. The quality of drinking water at shallow depth is unpalatable. The quality of wastewater of the NFIP would be treating within the NFIP boundary through container base CETP (or depends on load of factories), and sufficient area has been allocated in the layout plan.

The Ambient Air quality data show that the atmosphere of the area is contaminated with particulate matter only, the ambient noise levels vary at different locations at different timings by N-5 vehicle load.


No forests are found in the project area but there are few scattered perennial trees namely Eucalyptus Terrestrial fauna are found in the project area but there are no endangered/rare species and protected areas.

According to seismic zones of Pakistan developed by Geological Center Quetta, the project area falls under category 2A of minor to moderate damage seismic activity. As per last year seismicity report issued by Pakistan Meteorological Department frequency of earthquake in project area and its surrounding is very low.

There is no natural surface water resource near the project area. The Rohri Canal, located at 5 km south-east of the proposed project area, brings water from the Indus River and irrigates parts of the agriculture land located in the western portion. Other nearest surface water resources includes LBOD Nullah and irrigation network which comprise of starts Shaheed Banizeerabad District located at a distance of approx. 50-60km in the south-west direction of the project area. The availability of irrigation water is ensured at the tail end and cultivation of farms in the area is consequently erratic.

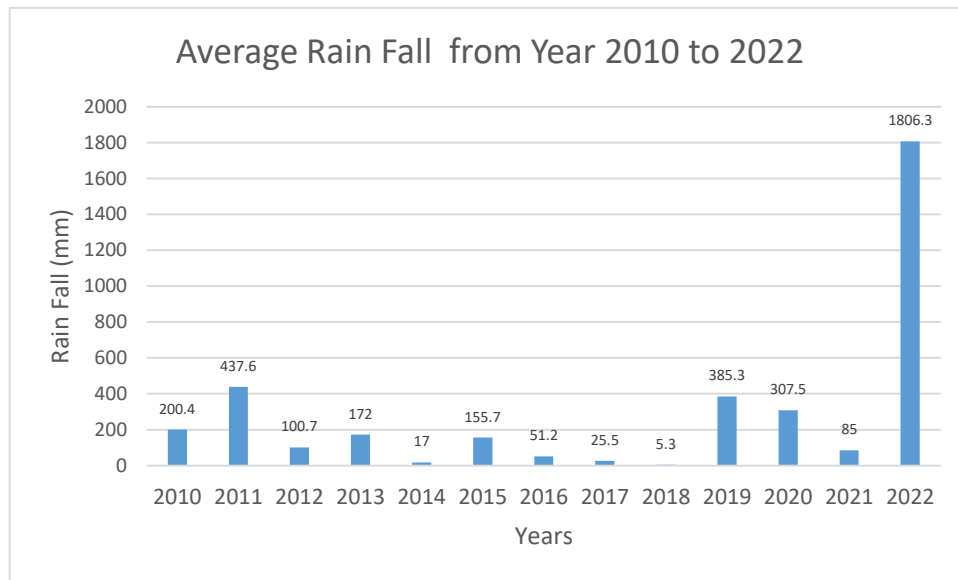
The water within LBOD Nullah (which is a drainage channel) is highly saline. The water table of project area lies at a depth of about 8 to 10 feet. The only source of water for human beings and livestock is Rohri canal & derived from bored subsurface water, in which the water is stored during monsoon season. Project Area is characterized by high moderates wind velocity, high diurnal variation of temperature; scanty rainfall; extreme solar radiation and high rate of evapo•transpiration.

The climate of project area is typically of the upper Sindh region. There are two well defined seasons, hot and cold. The former begins at the end of March and extends till October. May, June and July are the hottest months. The mean maximum and minimum temperatures during this period are about 42°C and 27 °C, respectively, December, January and February are the coldest months. The mean maximum and minimum temperatures during this period are about

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25°C and 7°C, respectively. The generally estimated average annual rainfall in the area is 5.47 inches (139 mm).

Around 900, 000 cusecs floodwater has entered Naushero Feroze, submerging 90 percent kacha areas with water. So far, more than 160 villages and 1300 houses have been devastated by the flood. About 5000 people are stranded in the flooded areas of Naushero Feroze.



Water quality analysis was carried out in the project area; 2 water samples were taken from, ground water and surface water. Samples were analyzed & compared with SEQS. Due to the absence of acute industrial units and mobile vehicular traffic, there is no brown pollution exists in the project corridor. The air quality in the area is generally good, with negligible sources of pollution.

Around 46 species of plants were reported from vicinity with almost all known for ethno botanic use and the vegetation pattern. Whereas; out of 46 reported species current checklist identified the presence of some 21 species in study area.

During the field visit, 27 species of birds were recorded from study area. Neither Houbara Bustard nor migratory water birds were recorded in project area. Among birds the common species included the Black Crowned Finch Lark, Black Drongo, Bank Myna, Little Brown Dove, Ring Dove, Common Myna, Crested Lark, Green Bee-eater, House Crow, House Sparrow, Purple Sunbird, Red wattled Lap wing, Sindh Sparrow and White Cheeked Bulbul. The less common species recorded were Black Kite, Black Winged Kite, Bay backed shrike, Blue Rock Pigeon, Common Babbler, Common Kestrel, Desert Lark, Southern Grey Shrike, Grey Partridge, Indian Robin, Indian Roller, Long tailed Grass Warbler and Bush cat.

Around 14 species of mammals were recorded from the sampling localities in the study area. These include large colonies of little Indian field mouse. Five-striped Squirrels were recorded from areas with tree cover in the areas. Hare was recorded close to bushy vegetation. House

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Mouse and House Rat were present close to human settlements. Among large and medium sized Mammals, Asiatic Jackal, Red Fox, Crested Porcupine, India Fox, Indian Desert Cat and Small Indian Mongoose were recorded, while in small mammals, Indian Gerbil, Baluchistan Gerbil, Long eared Desert Hedgehog, Indian Hare, House Rat, House Mouse, Indian Desert Jird and Northern Palm Squirrel were recorded.

A total of 12 reptiles species, have been recorded from the study area. The favorable habitat for many reptile species such as Indian Sand Swimmer, Indian Fringe Toed Sand Lizard, Desert Monitor and Indian Spiny Tailed Lizard. The important snakes recorded from the Project area are Saw-Scaled viper, Glossy Bellied Racer, Indian Sand Boa and Pakistan Ribbon Snake. Out of Total 12 recorded species, the Monitor is protected under the Sindh Wildlife Protection Ordinance, whereas none is on IUCN Red List.


During the field visit of project area population data for 10 villages/Goth was collected. In the project area, more than 35% of the Goths belong to the Jatio, Lashari, Arain, Mari, tribe followed by 30% of the Goths belong to the Baloch tribe.

There are two major occupations in the area - agriculture and livestock keeping. A small number of people are also engaged in service providing sectors such as artisan work, trade, business and jobs in formal and informal sectors. People also rent tractors and agricultural machinery to supplement their income. The main N-5 national highway crossing the whole District Naushahro Feroze & in-front of NFIP site is ideal for industrial activities, the local peoples use transportation by means through motorcycles and pickup on a daily basis and provide old four-wheel trucks on rent to locals. During off-season tenants also work in towns as laborers.

Agriculture is the most dominant economic activity in the area which is supported by the Rohri canal running along the entire length of the game reserve. Major crops in the area are wheat, sugar cane and cotton; however, barley, oil seed, fodder, sugar cane, pulses, banana and vegetables are also grown. Fodder crops are grown in order to meet the feed requirement of livestock farmed by locals especially the pastoralists in the area.

Cultivations of fodder crops are suitable to local climate and water availability. There are five market places at Moro, Naushahro Feroze, Bhria, Kandiyaro & Mahrabpur were famous. Here different shops have businesses ranging from grocery, restaurants, grain selling, tailoring, barber shop, mechanical and electric workshops, fertilizer shops, flour mill, saw mill, diesel shops & sugar mill etc. There are more than 55 shops and cabins were in surroundings of NFIP, which serves the entire villages around it, more than 15 shops of different commodities including a private medical clinic and a medical store.

There are total of 18 government health facilities in the Taluka, out of them 02 are RHCs, 05 BHUs, 01 FMC, 01 MCH center, 05 government dispensaries and 04 district council dispensaries. They are sufficient to provide health facilities to the community but due to rural area and remotely located communities, trained staff avoids going there and the supply of medicines is also a problem. Community suggested that a community medical center 24/7 will

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propose to establish by NFIP which is equipped with basic facilities such as one medical officer for Rescue Centre, EMR, OPD and dispenser.

The major environmental impacts of the proposed project will be due to the construction and the operation activities. The construction phase impacts are generation of dust due to transportation of construction materials in uncovered form, open storage of construction materials, earthwork operations, preparation of concrete at batching plants, movement of construction machinery and construction materials transport vehicles, exhausts of the construction machinery, and construction materials transport vehicles mostly using diesel as fuel, noise and vibration due to movement of construction materials transport vehicles and construction and erection of electrical and mechanical equipment, generation of domestic wastewater and solid waste, job opportunities, public health and safety of local population, and impacts on local social order. The operational impacts are wastewater generation, solid and liquid wastes generation, air pollution, noise phase and vibration, and the OHS issues.

During the operational phase, it is estimated that project shall require approximately 4,600 to 5,500 gallons of water per day during operation phase which will be fulfilled from ground water. The wastewater will be generated from the municipal and industrial sources. The solid wastes will mainly comprise empty containers of used lube oil, and chemicals, metal scrap, discarded mechanical parts, and domestic solid waste from all the industries in the NFIP. Solid waste will also be produced from commercial and institutional activities in the NFIP. The liquid waste stream includes used lube oil improper disposal of liquid waste can cause soil, water and air pollution. The air pollution sources will be mainly generators, boilers, and vehicles. The plant noise and the vehicular noise are the two major sources. The plant noise is normally generated from the moving and rotating parts of the machinery (such as conveyor belts), boilers and generators. Generally, well maintained vehicles have noise within the SEQs level of 80 dBA. The OHS issues mainly concern with the use of the OHS equipment by the plant workers.

The mitigation measures for the construction phase Issues include disposal of domestic wastewater, domestic solid waste management, dust dispersion, noise and vibration control. To mitigate impacts during the operational phase, the management of the NFIP should stick to the proposed measures to run the NFIP in an environment-friendly manner. For solid waste management, monitoring of the solid waste with respect to its source, type and generation rate is essential. The municipal and industrial wastewater will be treated at the CETP within site area and the sludge will be disposed of at the designated landfill site assigned by District Administration. In the NFIP for liquid wastes, there can be a mutual agreement with the major suppliers of lube oil to take them back after use.

The noise control measures should be implemented both for the plant noise and the vehicles for the plan, the management should take different measures such as noise measurement, audiometric testing, record keeping of medical tests and follow up, engineering controls, administrative controls, and training of employees. For vehicular noise mitigation, the vehicles maintenance program will be implemented for carrying out their regular maintenance.

The management shall develop environmental management plan to implement the mitigation measures proposed for the environmental impacts during the construction and the operation

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phases. The plan will include institutional measures, disaster/hazard management plan (comprising hazards identification, engineering and administrative controls, and occupational health and safety planning), and establishment of environmental monitoring department to carry out water quality monitoring of the CETP, solid waste monitoring (NFIP in general and land fill site in particular), air quality monitoring (NFIP in general and the land fill site in particular), and noise monitoring.

Vehicular movement is not a continuous activity that's why it could not cause continuous impacts on wildlife and local community. As the project facilities will maintain appropriate distances from human settlements, disturbance to local community due to dust, noise and accident because of vehicular movement will be insignificant.

The impacts on community due to proposed project are negligible as compared to the potential improvement of social status of the community as a result of generation of new employment opportunities. There will be positive impact on sanitation, transportation, communication and community health due to development in the project area.

In addition to the impact assessment and mitigation measures suggested, the implementation of Environmental Management Plan (EMP) will be sufficient to mitigate potential environmental impacts therefore, an EMP has been produced and compiled for the assistance of NFIP which shall supervise and monitor all the mitigation measures and their effectiveness. The overall responsibility for compliance with the environmental guidelines and mitigation measures will rest with the management of NFIP.

Based on the environmental baseline and assessment of potential impacts, it has been concluded that if the activities are undertaken as per suggested mitigation measures and Environmental Management & Monitoring Plan is effectively implemented, the project activity will not cause any significant impact on the natural environment, wildlife and local community of the Project area.

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## 1. INTRODUCTION

### 1.1 General

An industrial estate (consider as Industrial park) is a place where the required facilities and factory accommodations are provided by the government to the entrepreneurs to establish their industries. In Pakistan, industrial estates have been utilized as an effective tool for the promotion and growth of small-scale industries. They have also been used as an effective tool to decentralize industrial activity to rural and backward areas. Industrial estates are also known by different names, e.g., industrial regions, industrial parks, industrial areas, industrial zone, etc.

Historically, industrial estates have been established to facilitate and promote industrial and economic development. Such regrouping of industrial facilities onto a narrowly defined location offers additional opportunities. These include the chance to improve the facilities' environmental performance cost-effectively by allowing facilities to share common waste-treatment facilities. Furthermore, such regrouping allows companies to exploit opportunities where one company's waste becomes another's input. More recently, industrial estates have also been promoted for the explicit purpose of facilitating the relocation of industrial facilities from densely urbanized areas where high land prices may not justify the industrial use of such space, and where populations living in close proximity to industrial firms may be more directly exposed to adverse environmental effects.

National Industrial Parks Development & Management Company (NIP) [now merged into Pakistan Industrial Development Corporation (PIDC)] was established as a special initiative of the Ministry of Industries & Production and was wholly owned by the Government of Pakistan. NIP was entrusted with the task to develop focused industrial growth in Pakistan by setting up world-class industrial parks all over the country.

Naushahro Feroze Industrial Park (NFIP) is one of the projects of NIP which has the status of a Special Economic Zone under SEZ Act 2012. The purpose of the development of NFIP is to provide a platform for organized and systematic industrial growth in the area and to excel the agro-based industrialization in the province of Sindh. The proposed project shall generate employment opportunities for the youth and benefit the area in the value addition of agricultural production.

### 1.2 Need of the Proposed Project

The idea of setting land aside through this type of zoning is aimed at concentrating dedicated infrastructure in a surrounding area, in order to reduce the per-business expense of that infrastructure. Such infrastructure includes roadways, high-power electric supplies, high-end communications cables, large-volume water supplies, high-volume gas lines and allied infrastructure facilities. It attracts new business by providing an integrated infrastructure in one location coupled with eligibility for fiscal/tax benefits.



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### 1.3 Objectives of the Project

The objective of this industrial park is to provide a platform for organized and systematic industrial growth in the area and to excel the agro-based industrialization in the province. The facilitation envisioned through the establishment of this project will help the local processing industry to produce on a competitive basis. This in turn creates immense export opportunities for the industries working in this park.

Added to this, the proposed project shall generate employment opportunities for the youth and benefit the area in the value addition of agricultural production. The purpose is to provide a skilled workforce to the industry in collaboration with provincial technical training bodies. With the establishment of Naushahro Feroze Industrial Park, 3,000 new direct jobs and 15,000 indirect jobs are expected to be created. The objectives of setting up an industrial park at Naushahro Feroze may be summarized as under:

- Planned and organized industrial growth.
- Support services can be provided at one location.
- Availability of skilled manpower.
- Relatively secure environment for the upcoming investment.
- To create an investor-friendly environment to develop industry clusters with basic business themes.
- To support rapid industrialization in the country in general and Sindh in particular.
- To promote interaction between the industrialists and the government to create an overall industrial environment.
- To provide a platform and act as a catalyst for industries to increase their productivity.
- To promote the creation of jobs.

### 1.4 An Overview of the Project

The NFIP is located at a distance of 18 km west of Moro on the N-5 National Highway it encompasses an area of 80 acres. The area around the project site is flat. The project area is predominantly a cultivated/uncultivated area. The agricultural land is found only in the southwest of the proposed project site.

The existing NFIP land area of the project is about 80 acres, which will be housed in different industrial units. The essential components & facilities of a modern industrial estate (consider as Industrial park) such as the sewerage system, Combine Effluent Treatment Plant (CETP), electricity, carpet roads, solid waste collection, vocational centers & disposal station & other components will be available to meet the demands of the area & industrialist.

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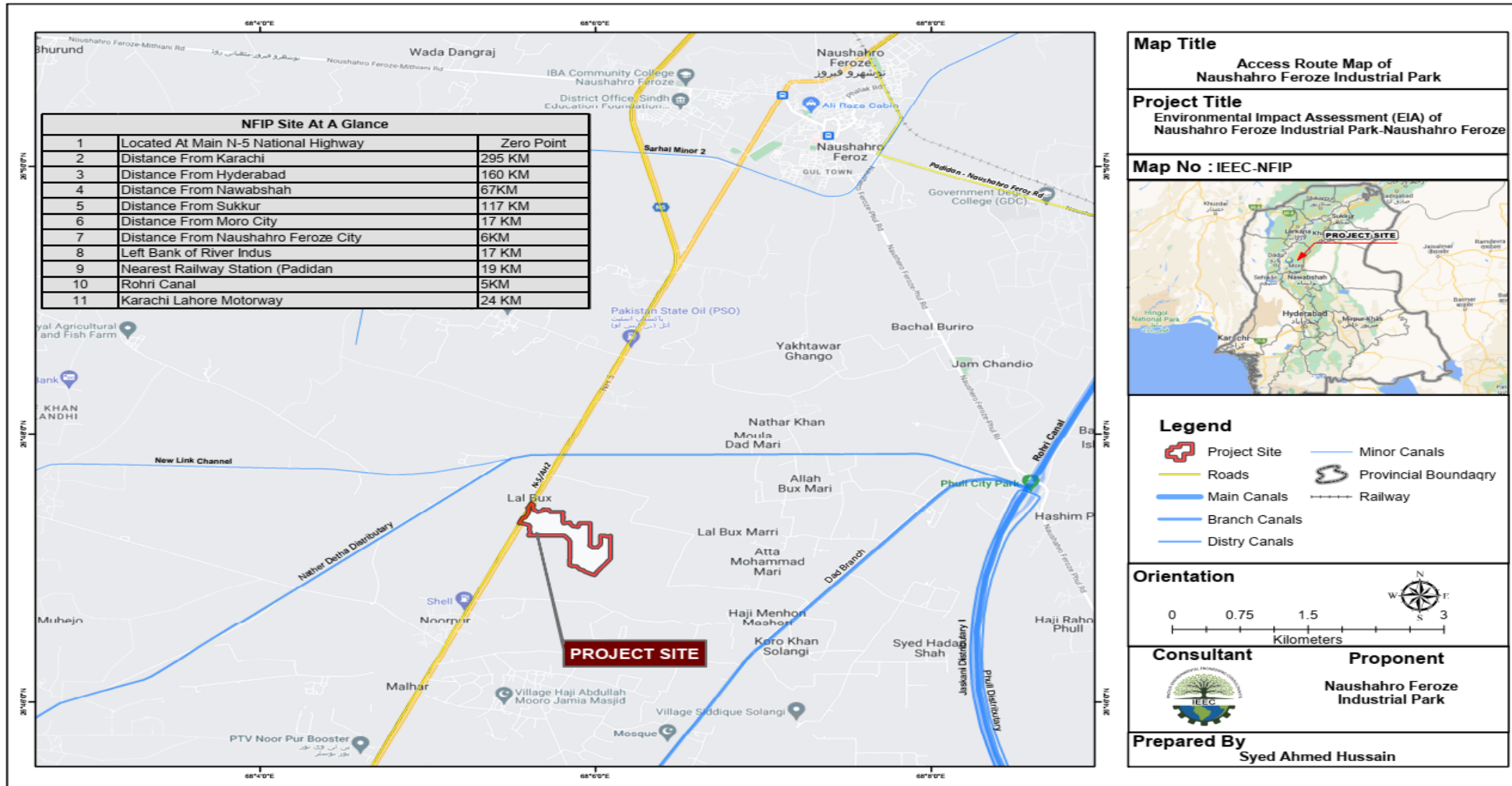


Figure - 1.1: Project Foot Print Area

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#### 1.4.1 The Proponent

National Industrial Parks Development & Management Company (NIP) [now merged into Pakistan Industrial Development Corporation - PIDC] was established as a special initiative of the Ministry of Industries & Production, and was wholly owned by Government of Pakistan. NIP was entrusted with the task to develop focused industrial growth in Pakistan by setting up world-class industrial parks all over the country.

As per the the Cabinet decision, National Industrial Parks Development & Management Company (NIP-D&MC) has been merged into Pakistan Industrial Development Corporation (PIDC) with effect from 31st October, 2021. Consequently, all the assets, liabilities, properties, rights, powers, duties & responsibilities of NIP stand transferred to PIDC with effect from the date cited above. Acknowledgement of said amalgamation has been issued by SECP. Therefore, all references made in the PC-I to NIP, shall henceforth be read as PIDC.

Naushahro Feroze Industrial Park (NFIP) is one of the projects of NIP which has the status of a Special Economic Zone under SEZ Act 2012. The purpose for the development of NFIP is to provide platform for organized and systematic industrial growth in the area and to excel the agro based industrialization in the province of Sindh. The zone shall generate employment opportunities to the youth and benefits the area in the value addition of the agricultural production.

The project owner(s) are responsible for the proposed project and its related activities including construction, operations, and handling of all matters including obtaining NOCs from all departments related to amenities and other legal requirements.

#### 1.4.2 Name of the Organization Preparing the Report

M/s Indus Environmental Engineering Consultants have been appointed to prepare/ update an Environmental Impact Assessment of the proposed project:

#### 1.4.3 Details of Project Study Team

The following Team of experts has been engaged for the proposed project to conduct/ update the EIA study.

**Table - 1.1: List of EIA Study Team Members**

No.	Name	Expertise / Role
1.	Sameen Khokhar	Environmental Expert / Team Leader
2.	Tasneem Maqbool Bhatt	Social Expert
3.	Engr. Farooq Ahmed Memon	Sr. Environment Expert
4.	Ms. Pirah Panah	Water/ Wastewater Expert
5.	Engr. Suresh Kumar	Environmental Expert / Deputy Manager
6.	Amin	Air Quality Expert
7.	Engr. Naeem Ali	Assistant Manager Environment
8.	Syed Ahmed Hussain	GIS Expert
9.	Engr. Nimra Ishtiaque	Environment Engineer
10.	Zahid Ali Abbasi	Environment Officer

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#### 1.4.4 Contact Persons

In case of further details or clarifications regarding this EIA, please contact the proponent's representative or the consultant at the addresses provided in Table - 1.2.

**Table - 1.2: Contact Details of Project Proponent & Consultants**

Project Proponent	Environment Consultant
Manager Technical as Focal Person Pakistan Industrial Development Corporation (PIDC) 2 <sup>nd</sup> Floor PIDC House, Dr. Ziauddin Road, Karachi, Pakistan Phone: 021-3568-5041-9 Web: www.pidc.com.pk	Indus Environmental Engineering Consultants Address: Office No. 303 – A, 3rd Floor, AI – Rehman Center, Cell: (+92)333 – 7045597; Tel: 021 – 34387770 Email: <a href="mailto:info@induseec.com">info@induseec.com</a> ; <a href="mailto:dir@induseec.com">dir@induseec.com</a>

#### 1.5 Details of NOC Obtained.

##### 1.5.1 Sale Deed for Proposed Land

The proposed project has acquired the land from the revenue department Govt of Sindh. The Copy of the documents are attached as Annexure - I. The NFIP is a government supported project for industrial installation at the project Site, NOC is required from the District Administration, which has already been obtained there is no lease required by the project. The project is self-funded. The seed money has been provided by Government of Pakistan.

##### 1.5.2 Sukkur Electric Power Company (SEPCO)

The proposed project acquired a no objection certificate (NOC) for electricity from Sukkur Electric Power Company (SEPCO). The Copy of the letter of SEPCO to the NFIP, letter no. CEO/SEPCO/SUK/M (P&D)/NFIP/372-58 dated 21.06.2021, is attached as Annexure - II.

##### 1.5.3 Sui Southern Gas Company (SSGC)


The Sui Southern Gas Company (SSGC) has issued NOC to the proposed project natural gas facility in project. The Copy of the letter of SSGC letter no. sales/IND/MIANS-21 -dated 27.08.2021, is attached as Annexure - III.

##### 1.5.4 Irrigation Department Nausheraferoz

NOC from the Sindh Irrigation and Drainage Authority for discharging treated excess wastewater into drainage canal will be obtained after completion of construction and before operation of the Combined Effluent Treatment Plant (CETP). The department will issue NOC if the treated wastewater has concentration of pollutants within the SEQs. The Copy of the letter is attached as Annexure – IV.

#### 1.6 Need for the Environmental Study

The apex Pakistani law governing the subject of the environment is the Pakistan Environmental Protection Act – 1997 (PEPA-97). Under Section 12 of the Act, the proponents of the projects must execute the IEE and/or EIA (where warranted) and get approval from a

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federal agency (i.e. Pak-EPA). This function has been delegated under Section 26 to provincial EPAs.

After the 18<sup>th</sup> amendment to the constitution of Pakistan, the environment became a provincial subject, and the environmental law governing the establishment of Naushahro Feroze Industrial Park (NFIP) is now the Sindh Environmental Protection Act, 2014. In terms of its contents, the provincial act is the same as the national act. Under section 17 of the Act, the proponents of the project must execute the Initial Environmental Examination (IEE) and/ or EIA, where warranted and get approval from the concerned Environmental Protection Agency (EPA), which is Sindh - EPA for this project.

### 1.6.1 Justification for EIA

The Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021 provides screening categories of projects for which IEE or EIA needs to be conducted. The proposed project falls under Category ‘C’ of Manufacturing and processing, 6. Establishment of Industrial estates & Export processing zones.” of Schedule III. This category requires an EIA to be conducted. (Screening checklist as Annexure – V). The NFIP a blend of different industrial clusters, which will produce air emissions (of varying Intensities) relative to their respective processes. All these industries (as planned to be installed in NFIP) will be required to have their own EIA's /IEE as per their category mentioned in IEE/EIA regulations prior to construction in the NFIP and get their approvals from SEPA.

### 1.7 The objective of the EIA Study

The overall objective of the EIA study is to assess the interaction of project components among each other & the environment and to analyze the anticipated environmental impacts to propose necessary mitigation measures against adverse impacts. To achieve this objective, an assessment of the existing environmental status of the project site is a prerequisite and, therefore, included in this study by collecting and reviewing the baseline data of various environmental and social attributes.

This EIA is being prepared to ensure adequate environmental and social management during the development and implementation of the proposed project. It will provide mechanisms for ensuring that potential environmental and social impacts of the current program are identified, assessed and mitigated as appropriate, through an environmental and social screening process. The EIA report will therefore comply with the National and provincial EIA procedures for meeting the environmental and social management requirements, as outlined in EIA Guidelines.

### 1.8 Scope of the EIA Study

These include:

- Meet the statutory requirements set forth by the Sindh Environmental Protection Act 2014.
- Comply with donor agencies’ guidelines and policies of safeguards for environmental and social management of the project.

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- Establish a baseline of existing environmental and social status at the project site before project initiation by collecting secondary and primary data/information on the physical, biological and socio-economic environment of the project area.
- Help the project proponents to incorporate necessary measures for the legally compliant and socially acceptable environmental performance of their project.
- Identify significant environmental and social impacts (both positive and negative) during all stages of the project implementation and propose mitigation measures for negative impacts.

### 1.9 Approach Adopted for EIA Study

The Consultants carried out the EIA study of the project area in a systematic manner. This included the collection of secondary data, maps and related literature, field surveys for primary data collection, public consultation, and desk studies. These are summarized below:

#### 1.9.1 Reconnaissance Survey of Project Area

A reconnaissance visit of the area was made. During this visit, experts in various disciplines including environmental and social fields visited the project site. During this visit, the experts were acquainted with the project area of proposed project in consideration of various alternative scenarios and collected information from the locals about contact persons/notable of the area to facilitate the consultants for environmental and social surveys. During the visit, contacts were made with local notables, local administration, and public representatives during scoping sessions. The visit was also aimed at familiarizing with the physical and socio-economic environment of the project area as well as surrounding areas and identifying the critical areas of environmental and social concerns.


#### 1.9.2 Delineation of Area of Influence

In the proposed Project EIA, the AOI has been divided into several specific sub-areas, because not all sub-AOIs need to be studied. The following are the main parts of the AOI:

- Construction Site: including laying of sewerage lines, construction of roads in the industrial park, additional structures, and immediate surroundings (construction camps, borrow and disposal areas, etc.);
- Project Foot Print Area: this is the area directly related to the boundary of the proposed industrial park. As all construction activities will be conducted within, the confined boundary hence there is no direct impact has been envisaged.

#### 1.9.3 Secondary Data Collection

Secondary data about meteorology, land use, ecological aspects, flora and fauna, geology, demographic information, etc. were collected from secondary sources, in addition to collecting survey maps from the Survey of Pakistan; satellite imageries of the area have also been acquired by using different GIS software.

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#### 1.9.4 Field Surveys & Report Writing

Surveys were carried out to investigate the physical, biological, and socioeconomic conditions of the area. Primary data collection included the following:

**Environmental Survey:** In compliance with EPA guidelines, the consultants have carried out an environmental survey/field investigation of various parameters, particularly with reference to the aspects described below:

- Ambient air quality monitoring was carried out for continuous 24 hours in respect of parameters like CO, NO<sub>x</sub>, SO<sub>x</sub>, O<sub>3</sub>, and PM<sub>10</sub> & PM<sub>2.5</sub>.
- Similarly ambient noise level monitoring was carried out along with the sensitive receptors.
- Water samples from various sources, including canal and groundwater sources, and a nearby area, were collected and analyzed for parameters as specified in SEQS 2016 from Sindh EPA certified Laboratory.

**Socioeconomic Survey** Socio-Economic field surveys were organized at the project site's adjacent communities. The following aspects have been covered in these field surveys:


- Socio-economic data of the project area have also been collected.

**Environmental Laboratory Analysis.** The environmental laboratory analysis has been conducted at different locations in the Project area.

**Public Consultations** Besides consultation with knowledgeable people during the reconnaissance visit of the project area, consultation with local communities through scoping sessions was carried out during the field surveys. The purpose of the scoping sessions was to disseminate information on the scope of the project, assess stakeholders' views and about the project and get first-hand information on the concerns of the affected population in relation to environmental and social impacts and likely mitigation options.

**Identification of Impacts:** The identification of impacts is a key activity in the environmental assessment process, which is based on the professional judgment of our experienced team supported by national and international guidelines. The impacts have been identified for the methodical consideration of likely or possible significant impacts on the environment because of the proposed Project. This task aimed to assess the associated risks with these impacts.

**Evaluation of Impacts:** Each impact identified has been evaluated against its significance in terms of its severity and likelihood of its occurrence. The impact evaluation process prioritized each potential impact and screened out inconsequential impacts. The significance of the impacts has been assessed in terms of the effects on the natural ecosystem, level of public concern and conformity with legislative or statutory requirements. The assessment of the severity was to consider the nature, magnitude, extent and location, timing and duration and reversibility of the potential impact. The evaluation of the significant impacts will form the basis for the development of the Environmental Management Plan.

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**Identification of Mitigation Measures:** The objective of identification of mitigation measures is to identify practices, technologies, or activities that would prevent or minimize all significant environmental impacts and propose physical and procedural controls to ensure that mitigation is effective. Based on the impact evaluation performed, changes or improved practices have been suggested, where practical, in the planned activities, to prevent and control unacceptable adverse impacts resulting from normal or extreme events. Monitoring requirements will be defined and institutional arrangements for monitoring will be suggested.

**Development of Environmental Management Plan (EMP):** An Environmental Management Plan (EMP) has been developed for the effective implementation of the recommended mitigation measures. The EMP includes controls to minimize the identified impacts and a monitoring program to monitor residual impacts, if any, during the operation. The EMP also lays down procedures to be followed during the operation of the project and identifies the roles and responsibilities of all concerned personnel, including reporting in the operational phase.

#### 1.10 Structure of the Report.

This Environmental Impact Assessment (EIA) Report comprises ten chapters and an Executive summary. The chapters are as follows:

**Chapter 1, Introduction**, gives an introduction to the Project, the Consultants' scope of services for EIA studies and the approach adopted by the Consultants for reaching compliance with guidelines.

**Chapter 2, Legal and Regulatory Framework** describes national laws applicable during the implementation of the Project. Federal and provincial guidelines are required to be complied with during the preparation of the EIA report as well as followed during the implementation of the Project.

**Chapter 3, Description of the Project**, gives a rather detailed account of the Project, particularly emphasizing those project components, which are of importance in relation to environmental and social aspects.

**Chapter 4, Project Alternatives Considered**, provides a brief account of the country's need for industrial parks discusses various alternatives to curb the crisis in the country, and discusses the role of the present project in this context. The chapter also deals with various alternatives considered for project layout in consideration of technical, economic and environmental aspects.

**Chapter 5, Information Disclosure, Consultation, and Participation**, deals with the outcome of the consultation/scoping sessions carried out with the local communities, stakeholders such as Government departments, NGOs, knowledgeable people, public representatives, etc. It discusses the concern of various tiers of the people and provides an outline of how these have been addressed within the framework of the project.

**Chapter 6, Environmental and Social Baseline Conditions** this chapter discusses various environmental and social entities i.e. Biodiversity, Fauna and Flora, Water, and human environment, etc. before the project.



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**Chapter 7, Project Impacts and Mitigation Actions** provides an analysis of the environmental and social impacts of the project and discusses measures to mitigate adverse impacts and enhance the environment of the project-affected areas.

**Chapter 8, Environmental Management and Monitoring Plan** and Institutional Requirements, provides plans and costs for the implementation of environmental management and monitoring. It proposes an organizational setup required for the implementation of mitigation actions and in light of this identifies strengthening needs institutional arrangement presently existing within and allied departments.

**Chapter 9, Estimated Environmental Cost** This chapter estimates an environmental cost, which comprises environmental mitigation costs during the construction and operation of the proposed project.

**Chapter 10, Conclusions & Recommendations**, sums up the report and the conclusions resulting from the study as well as recommendations for making the project environmentally sustainable.

### 1.11 Assumptions and Limitations

As the project is at the planning stage, i.e., Master Plan has been developed for the Project and a detailed design is still being carried out after due approval of the Master Plan from the concerned authorities. So only outlines of the proposed developmental works are available and due efforts have been made to visualize the impacts due to the implementation of the Project. For this purpose, detailed discussions were made with PIDC as well as design staff. In absence of the detailed design of some of the components of the Project, estimation/assumptions have been made and it has been considered in the preparation of this EIA Report.

It should be recognized that the passage of time affects the information given in this report; the environmental conditions of a site can change. Opinions relating to the specific conditions are based on information that existed at the time the conclusions were formulated. The mitigation measures and other recommendations put forth in this report are of the level of conceptual design and implementation framework.

This EIA document has been prepared drawing extrapolations from site visits, primary data and secondary information collected and provided by the client. The study has been conducted by the consultants in a manner consistent with the level of care and skill exercised by environmental scientists, engineers and socioeconomic experts. The consultants have tried to cover all important aspects and relevant impacts of NFIP.

The conclusions in this study are based on primary and secondary data, results derived from earlier studies, and a subjective evaluation of the possible environmental aspects during the construction and operations of the proposed project. In evaluating the proposed project, the consulting team has relied on information provided by the management of NFIP. The consultants assume that the information provided is factual and accurate. In addition, the consultants accept no responsibility for any deficiency, misstatement, or inaccuracies contained in this report because of omission or misrepresentation by any person interviewed or contacted.

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## 2. LEGAL AND ADMINISTRATIVE FRAMEWORKS

### 2.1 General

This Chapter provides an overview of the legal frameworks and environmental assessment process in Pakistan as well as a list of key environmental legislation and guidelines applicable to the proposed project. It also provides an overview of Sindh Environmental Protection Act (SEPA).

### 2.2 National/ Provincial Legislation

#### 2.2.1 Sindh Environmental Protection Act, 2014

The Sindh Environmental Protection Act, 2014) is a comprehensive legislation and provides the legislative framework for the protection, conservation, rehabilitation and improvement of the environment. The 'environment' has been defined in the Act as (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the interrelationships between any of the factors specified in sub-clauses 'a' to 'f'. The notable points of the law are:

- No proponent of a project shall commence construction or operation unless he has filed.  
an EIA with the Provincial Agency designated by the Provincial EPAs an EIA, and has obtained approval;
- Establishment and formation of the Environmental Protection Council;
- Prohibition of certain discharges or emissions;
- Sindh Environmental Quality Standards 2016 (SEQS) for wastewater, air emissions and noise; and
- Provincial Government can issue notices and enforce them to protect the environment.

#### 2.2.2 Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021

The categories are defined in the Sindh Environmental Protection Agency (SEPA) IEE and EIA Regulations, 2021. Hereafter according to the Sindh Environmental Protection Agency (Environmental Assessment) Regulations, 2021 the proposed project fall under the

Schedule III.

Category 'C' of Manufacturing and processing,

6. Establishment of Industrial estates & Export processing zones.”.

#### 2.2.3 Sindh Environmental Quality Standards (SEQS)

In exercise of the powers conferred by section 37 of the Sindh Environmental Protection Act, 2014, the Sindh Environmental Protection Agency, with the approval of the Government,

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presented the Sindh Environmental Quality Standard 2016 which outlines different types of contaminants in the air, water and noise, and their acceptable limits. The SEQs 2016 promulgated under the SEPA 2014 specifies standards for industrial and municipal effluents, gaseous emissions, vehicular emissions, and noise levels.

During the whole project span, SEQs will apply to all types of effluents, emissions and noise levels from the construction camp, commissioning and operation of the proposed project and associated facilities.

### 2.3 Other Applicable Cross-Sectoral Laws in Sindh

The scope of cross-sectoral law implied by the legal definition of environment given in SEPA 2014 results in numerous laws enacted since the nineteenth century being classified as environmental laws. These include laws about forests, water resources, wildlife, land, agriculture, health and town planning. Laws that may have relevance to the environment with the brief scope of the law and their applicability are listed in Table – 2.1.

**Table - 2.1: Key Applicable Cross-Sectoral Legislation in Sindh**

Legal Instrument	Scope and Applicability	Relevance
Land Acquisition Act 1894	Empowers the government to acquire private land for a project of national importance and lays down the acquisition procedure.	The land has been purchased from a private party, payment has been made already refer to Annexure –I
The Sindh Forest (Amendment) Act, 2012	Regulates forest resources. Empowers the government to declare any forest area reserved or protected.	No relevance as there is no reserve or protected forest impacted in the proposed project area.
The Sindh Wildlife Protection Ordinance 1972 (Amendment 2001, 2010) Act, 2007, 2020	In addition to empowering the provincial wildlife department to establish game reserves, parks, and wildlife sanctuaries, the act regulates the hunting and disturbance of wildlife. This ordinance provides for the preservation, protection, and conservation of wildlife by the formation and management of protected areas and the prohibition of hunting of wildlife species declared protected under the ordinance. The ordinance also specifies three broad classifications of the protected areas:- a). <b>National Parks</b> - Hunting and breaking of land for mining are prohibited in national parks, as are removing vegetation or polluting water flowing through the park b). <b>Wildlife Sanctuaries</b> - Wildlife Sanctuaries are areas that are left as undisturbed breeding grounds for wildlife. Cultivation, grazing and	No interventions will be carried out near wild habitats. The minimum distance to the protected area is about more than 30 km.

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	<p>residing are prohibited in the demarcated areas. Special permission is required for the entrance of the public. However, in exceptional circumstances, these restrictions are relaxed able for scientific purposes or the betterment of the respective area at the discretion of the authority.</p> <p>c). <b>Game Reserves</b> - Game reserves are designated as areas where hunting or shooting is not allowed except under special permits.</p>	
Employment of Child Act, 1991	In accordance with this Article, the Employment of Child Act (ECA) 1991 disallows child labour in the country. The ECA states that no child shall be employed or permitted to work in any of the occupations outlined in the ECA (such as transport sector, railways, construction, and ports) or in any workshop wherein any of the processes defined in the Act is carried out.	The contractor will be bound by this Act to disallow any child labour at the project sites.
The Sindh Occupational Safety and Health Act, 2017	The clauses relevant to the project are those, that concern health, safety and welfare of workers, disposal of solid wastes and effluents, and damage to private and public property. The Act also provides regulations for Compulsory vaccination, inoculation, and Precautions against contagious or infectious diseases at workplaces.	All these regulations will apply to the project's construction & operation phases.
The Antiquities Act 1975	Preservation and protection of antiquities (any object more than 75 years old). Empowers the government to declare any antiquity as protected.	There is no protected antiquity within the Study Area. Only apply to any chance find.
Sindh Cultural Heritage (Preservation) Act - 1994	The Act 1994 provides rules and regulations to preserve and protect ancient places and objects of agricultural, historical, archaeological, artistic, ethnological, anthropological and national interest in the province of Sindh.	This act may be applicable in specific situations. Only apply to any chance find
Canal and Drainage Act amended 2016	The canal and Drainage Act amended 2016, prohibits fouling of water in canals (defined to include channels, tube wells, reservoirs and watercourses), or obstruction of the drainage.	All these regulations will apply to the project construction as well as the operation phases. Rhori canal is the nearby water body which is about 5 km eastern side from the proposed NFIP.
Sindh Solid Waste Management Board Act, 2014	Sindh Solid Waste Management Board (SSWMB) was formed under the SSWM Act of 2014. The SSWMB is responsible for the collection and disposal of solid waste.	All these regulations will apply to the project construction & operations and respective industries will make contract with SSEMB for waste disposal.

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## **2.4 Administrative Arrangements for Industrial Estates - Federal Level Arrangements**

### **2.4.1 Ministry of Industries**

At the federal level, the Ministry of Industries placed the majority of its efforts on the development of Export Processing Zones (EPZs), and industrial Estates. The first EPZ was opened in Karachi in 1984 and zones were subsequently developed in Risalpur, Saindak, and Sialkot. In these zones the value proposition for investors is that machinery, equipment, and materials can be imported duty-free; the land is provided at low rates; labor laws are relaxed; and foreign exchange restrictions do not apply.

### **2.4.2 National Industrial Estates Development and Management**

National Industrial Estates Development & Management Company (NIP) has been established as a special initiative of the Ministry of Industries, Production and Special Initiatives, Government of Pakistan. NIP, a subsidiary of Pakistan Industrial Development Corporation (PIDC), is a public-private partnership established to develop focused industrial growth in Pakistan by developing world class Industrial Estates in the country. The company is incorporated under Section 42 of the Companies Ordinance 1984 and is limited by a guarantee of having a share capital.

## **2.5 Administrative Arrangements for IE - Provincial Level Arrangements**

At the provincial level, Industrial Estates (IE) are usually developed by the provincial Mol. (Ministry of Industries), the primary developers of zones in that province. Other departments such as the Small Industries Corporation, Ministry of Textiles, and Ministry of IT are also involved in setting up zones specific to their areas of focus.

### **2.5.1 Sindh Industrial Estates Development and Management**

The Ministry of Industries of the Sindh government to develop Industrial Estates throughout the province incorporated NIP [now merged into Pakistan Industrial Development Corporation – PIDC] in 2003. The organization is set up as a Public Private Partnership (PPP) where the Board of Directors consists of 12 private sector directors and 4 public sector directors. The organization's mission is to develop the infrastructure of Industrial Estates, bring in investors and then eventually transfer management to a management board.

### **2.5.2 Regulations for the Establishment of Industrial Estates**

Regulations for setting up industrial estates and parks are minimal in Pakistan. When a provincial government wishes to develop a new zone, there are few requirements from the federal government outside of the bureaucratic aspects of getting land, utilities, and transportation set up. Managers from NFIP and SITE all confirm that they have very little need to go through the federal government when planning new projects.

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Within the zones, the management companies tend to develop their bylaws regulating investor approval processes and building codes. For the establishment of industrial estate investors must submit a feasibility analysis and planning documents to NFIP for approval.

### 2.5.3 World Bank Environmental, Health and Safety Guidelines

World Bank Group's Environmental, Health, and Safety (EHS) Guidelines are applicable to the proposed project. In particular, contractors will be required to implement the General EHS Guidelines (April 2007)<sup>1</sup>.

### 2.5.4 Guidance Note regarding the influx of Labor

The project may face an influx of non-local labor and working conditions issues as skilled laborers might not be available in some of the proposed project sites. The project will take concrete measures to mitigate potential labor influx-related risks.<sup>2</sup> These risks require careful consideration to improve social and environmental sustainability, resilience and social cohesion. Therefore, the project will include mitigation measures such as:

- (a) Assessing living conditions of workers' camps and ensuring appropriate living conditions;
- (b) Establishing and enforcing a mandatory Code of Conduct for the workers,
- (c) Ensuring appropriate location for these camps;
- (d) Taking counter-measures as indicated in the EIA to reduce the impact of the labor influx on the public services and,
- (e) Devising and implementing a strategy for maximizing employment opportunities for the local population, including women.

### 2.5.5 World Bank Group Gender Strategy (2016-2023)

The World Bank Group's Gender Strategy (the fiscal year 2016–23) presents gender equality as integral to smart development policy and posits that successful implementation of the strategy will help achieve the Bank Group's Goals. The strategy focuses on four objectives: human endowments, jobs, asset control and ownership, and voice and agency. To implement the strategy, capacity building for local law enforcement, Information, and awareness-raising campaigns for community members, specifically women and girls have been proposed in the EIA. Mobilizing rural communities to maximize the benefits of the project.

<sup>1</sup> World Bank Group EHS Guidelines are available at:  
<http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

<sup>2</sup> <https://pubdocs.worldbank.org/en/497851495202591233/Managing-Risk-of-Adverse-impact-from-project-labor-influx.pdf>

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## 2.6 International Finance Corporation (IFC) Performance Standards (PS)

The Performance Standards (PS) established by IFC stipulates that the project shall meet certain requirements throughout the life cycle of investment by the IFC or other relevant financial institutions, that are signatories to the Equator Principles, 2006. (Table- 2.2).

**Table - 2.2: Summary of the IFC's Performance Standards and Their Triggering**

Specific Areas	Performance Standards	Description	Triggered = ✓, Not Triggered = x
Social and Environmental Assessment and Management System	PS 1	<p>The main elements of PS - 1 include:</p> <ul style="list-style-type: none"> <li>• A Social and Environmental Assessment to understand the social and environmental impacts and risks;</li> <li>• A Management Program for mitigating the impacts and minimizing the risks identified in the assessment;</li> <li>• Establishing and ensuring organizational capacity and requisite training to the staff to implement the Management Programme;</li> <li>• Engagement with the community to ensure free prior informed consultation (FPIC), community grievance redress constructive relationships all through the project life cycle; and</li> <li>• Adequate monitoring and reporting systems to measure and report the effectiveness of the Management Programs.</li> </ul>	✓
Labour and Working Conditions	PS 2	<p>The PS 2 is guided by the various conventions of the International Labour Organization (ILO) and outlines the minimum requirements of working conditions, protection of the workforce (including issues of child and forced labour) and ensuring occupational health and safety of both its 'employees' as well as 'nonemployees' working through contractors. The PS requires:</p> <ul style="list-style-type: none"> <li>• Establishment of a sound worker-management relationship;</li> <li>• Encouraging equal opportunity and fair treatment of workers;</li> <li>• Promoting compliance with national labour and employment laws; and</li> <li>• Promoting healthy and safe working conditions for workers.</li> </ul>	✓
Pollution Prevention and Abatement	PS 3	<p>The PS 3 requires a project to avoid, minimize, or reduce adverse impacts on human health and the environment by adopting pollution prevention and control technologies throughout the project life cycle.</p>	✓
Community, Health, Safety and Security	PS 4	<p>The PS 4 concentrates on the responsibility that must be undertaken by the client to avoid or minimize the risks and impacts to the community's health, safety and security that may arise from project activities. The PS 4 requires a project to evaluate risks and impacts on the health and safety of the affected community during the Project life cycle and establish measures to avoid minimize and reduce risks and impacts from the Project.</p>	✓
Land Acquisition and Involuntary Resettlement	PS 5:	<p>The objectives of this PS are to:</p> <ul style="list-style-type: none"> <li>• Avoid or at least minimize the involuntary resettlement wherever feasible by exploring alternative project designs;</li> </ul>	x

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Specific Areas	Performance Standards	Description	Triggered = ✓, Not Triggered = x
		<ul style="list-style-type: none"> <li>Mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of land by:</li> <li>Providing compensation for loss of assets at replacement cost; and</li> <li>Ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.</li> <li>Improve or at least restore the livelihoods and standards of living of displaced persons;</li> </ul>	
Biodiversity Conservation & Sustainable Natural Resource Management	PS 6	This PS addresses how clients can avoid or mitigate threats to biodiversity arising from their operations as well as incorporate sustainable management of renewable natural resources. It reflects the objectives of the Convention on Biological Diversity to conserve biological diversity and promote the use of renewable natural resources in a sustainable manner.	x
Indigenous Peoples	PS 7	The PS underlines the requirement of avoiding/minimizing adverse impacts on indigenous people in the project area, respecting the local culture and customs, fostering good relationships and ensuring that development benefits are provided to improve their standard of living and livelihoods.	x
Cultural Heritage	PS 8	PS 8 aims to protect the irreplaceable cultural heritage and to guide clients on protecting cultural heritage in the course of their business operations. PS 8 recognizes the importance of cultural heritage with an objective: <ul style="list-style-type: none"> <li>Protect cultural heritage from the adverse impacts of project activities;</li> <li>Support its preservation; and</li> <li>Promote the equitable sharing of benefits from the use of cultural heritage in business activities.</li> </ul>	x

### 2.6.1 IFC EHS Guidelines

The General EHS<sup>3</sup> Guidelines contain information on crosscutting environmental, health, and safety issues potentially applicable to all industry sectors. It should be used together with the relevant industry sector guideline(s).

The Environmental, Health, and Safety (EHS) General Guidelines will be applicable to this Project. (Table- 2.3).

**Table - 2.3: General EHS Guidelines**

1. Environmental	2. Occupational Health and Safety	3. Community Health and Safety	4. Construction and Decommissioning
1.1 Air Emissions and Ambient Air Quality	2.1 General Facility Design and Operation	3.1 Water Quality and Availability	4.1 Environment

<sup>3</sup>([www.ifc.org/ehsguidelines](http://www.ifc.org/ehsguidelines))



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<b>1. Environmental</b>	<b>2. Occupational Health and Safety</b>	<b>3. Community Health and Safety</b>	<b>4. Construction and Decommissioning</b>
1.2 Energy Conservation	2.2 Communication and Training	3.2 Structural Safety of Project Infrastructure	4.2 Occupational Health and Safety
1.3 Wastewater and Ambient Water Quality	2.3 Physical Hazards	3.3 Life and Fire Safety (L&FS)	4.3 Community Health and Safety
1.4 Water Conservation	2.4 Chemical Hazards	3.4 Traffic Safety	
1.5 Hazardous Materials Management	2.5 Biological Hazards	3.5 Transport of Hazardous Materials	
1.6 Waste Management	2.6 Radiological Hazards	3.6 Disease Prevention	
1.7 Noise	2.7 Personal Protective Equipment (PPE)	3.7 Emergency Preparedness and Response	
1.8 Contaminated Land	2.8 Special Hazard Environments		
	2.9 Monitoring		

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### **3. PROJECT DESCRIPTION**

#### **3.1 Project Background and Overview**

The Government of Sindh (GOS) showed deep concern towards the difficulties faced by the Industrialists and announced a proactive policy to promote Industrial growth and remove unnecessary delays and hindrances. The GOS chalked out growth strategies and resultantly established the NIP [now merged into Pakistan Industrial Development Corporation – PIDC] in September 2013 to ensure an overall enhancement of Industrial growth. In Pakistan to achieve orderly, planned and rapid Industrialization of the Sindh province, it will develop a chain of Industrial parks in a dynamic and innovative manner by capitalizing on the existing industrial and agricultural strengths of each region.

The purpose of this modular Industrial park is to create new Jobs, reduce poverty, encourage Industrialization in Sindh and resultantly Increase the GDP of the country is being built on a similar concept to International Industrial parks of Singapore, China and Thailand where developed industrial plots are sold or leased. The funds generated will be utilized for the establishment of new industrial Sites.

The land for the NFIP was selected on the basis of easy accessibility to main highways. With its approach to N5 and Karachi Lahore Motorway, the Site is connected to the major landmarks and the Motorway. The NFIP is being built as a state-of-the-art infrastructure project with services based on a need assessment survey from the existing Industrialists. More than 300 Industrialists have provided relevant data and information regarding their respective proposed ventures, including capital cost, the number of skilled and unskilled laborers to be employed, electricity, water, gas consumption and the source of availability of raw material, etc.

#### **3.2 General**

The proposed project involves the establishment of a state-of-art modern industrial park facilitated for commercial purposes along with the basic and advanced necessities required for proving standardization commodities to the region by curtailing the impacts on the environment. To achieve the goal of sustainable development the proposed project envisages the construction of industrial units along with the development of infrastructures like Roads, Sewerage Systems, Electricity, Sui Gas, Telecommunication and Water supply systems.

#### **3.3 Project Location and Accessibility**

The proposed project is located at 26°47'25.9"N 68°05'38.0" E Syed Nango Shah, Naushahro Feroze, Sindh. The project site is directly accessible from NH-5. The project area is conveniently accessible from Naushahro Feroze. Naushahro Feroze is the capital city of Naushahro Feroze District in Sindh province of Pakistan.

The project location and major roads in the project area are shown in Figure - 3.1

# Environmental Impact Assessment (EIA)

## Naushahro Feroze Industrial Park (NFIP)



Doc. No

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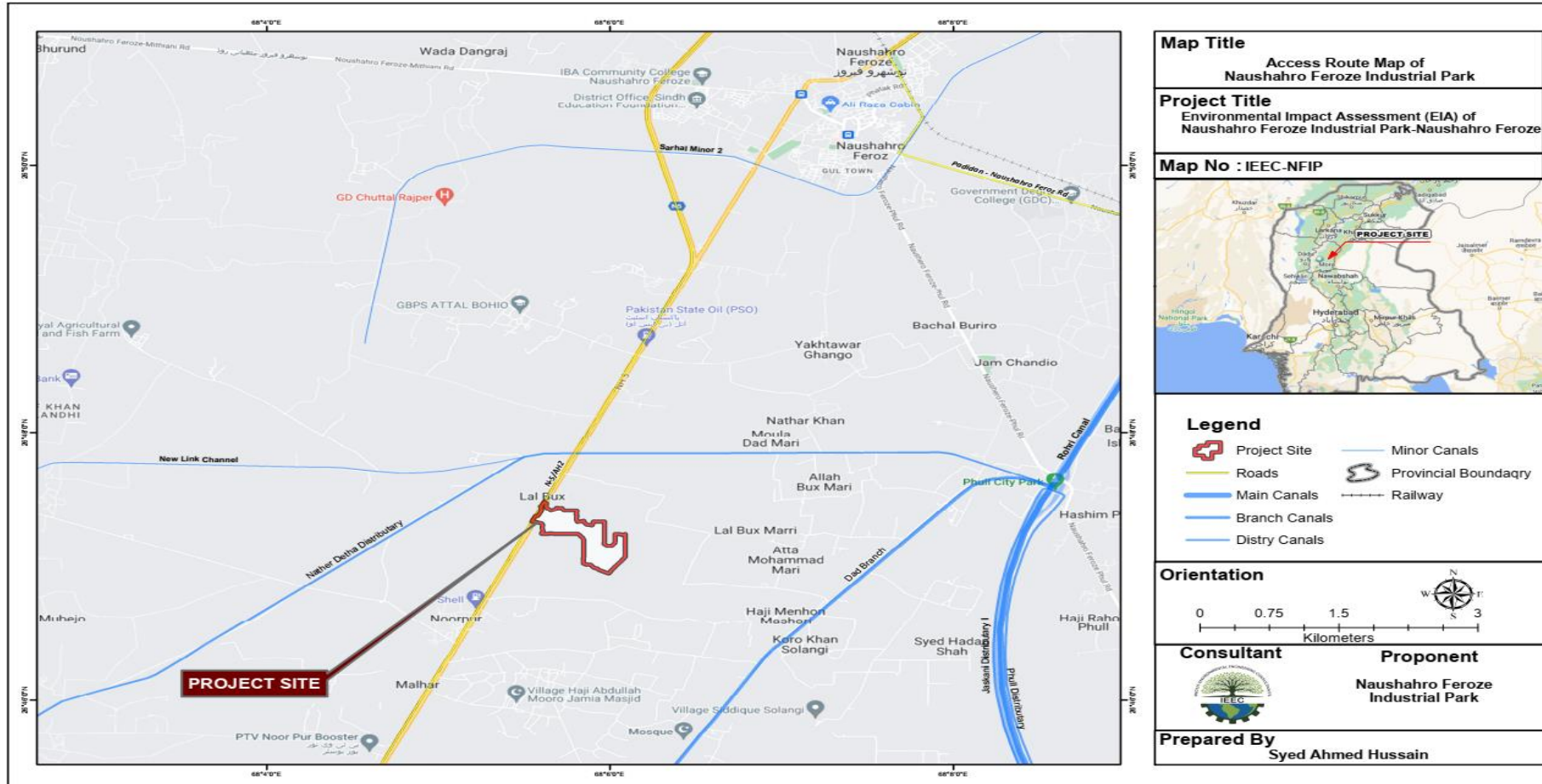


Figure - 3.1: Project Location Map

<b>Environmental Impact Assessment (EIA)</b>		
<b>Naushahro Feroze Industrial Park (NFIP)</b>		
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### 3.4 Project Layout

The master plan of NFIP spread over 80 acres of land is prepared according to bylaws. The Schedule of land use is tabularized and given hereunder. To make the project successful and sustainable, during planning the consultant considered all features of the industrial park operating worldwide. The length of the road is reduced as may be possible. All facilities are proposed to meet the international standard and quality works. 1 acre and 1/2 acre plots are for industries and warehousing. If investors desire to have a bigger plot, the existing plot may be amalgamated to meet their requirements. Apart from this, the space for cottage industries, commercial, fuel dispensing stations, admin office, training center, display hall, wastewater treatment plant, water supply well and Masjid are earmarked. The spacious roads of 75 ft. and 60 ft. are given to meet the requirement of industries. The main road is connected by a ramp from the lower side to N-5 which is 6-1/2 ft. higher than the main internal road.

Two high-tension lines are passing on the NFIP site. Since empty plots do not look good but the planner firm of the project beautifully utilized for green areas and service corridors.

The plot's space for car parking, shops, banks, health care centers, technical schools, etc. will be sold out to potential buyers. These public facilities are at a corner site along the roundabout so that the conjunction can be minimized. Three (03) proposals for the gate and security room were designed and submitted to PIDC for finalizing and the final selected drawing is enclosed hereafter. Project Layout Plan in Figure – 3.2.

### 3.5 Scope of Works

The existing NFIP Land area of the project is about 80 acres, which will be housed in different industrial units. The essential components & facilities of a modern industrial estate (consider as Industrial park) such as the sewerage system, Combine Effluent Treatment Plant (CETP), electricity, carpet roads, solid waste collection, vocational centers & disposal station & other components will be available to meet the demands of the area & industrialist. The proposed activities at the proposed site will include the following:

- Demarcation of the project unit areas.
- Designing & distribution of the project area.
- Civil Work.
- Provision of Basic Facilities.
- Operational Activities.

The ultimate goal is to provide well plan infrastructures, which will facilitate the concerned people for the entire industrial paraphernalia under one roof. The project envisages the provision of the following facilities:

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## Naushahro Feroze Industrial Park (NFIP)



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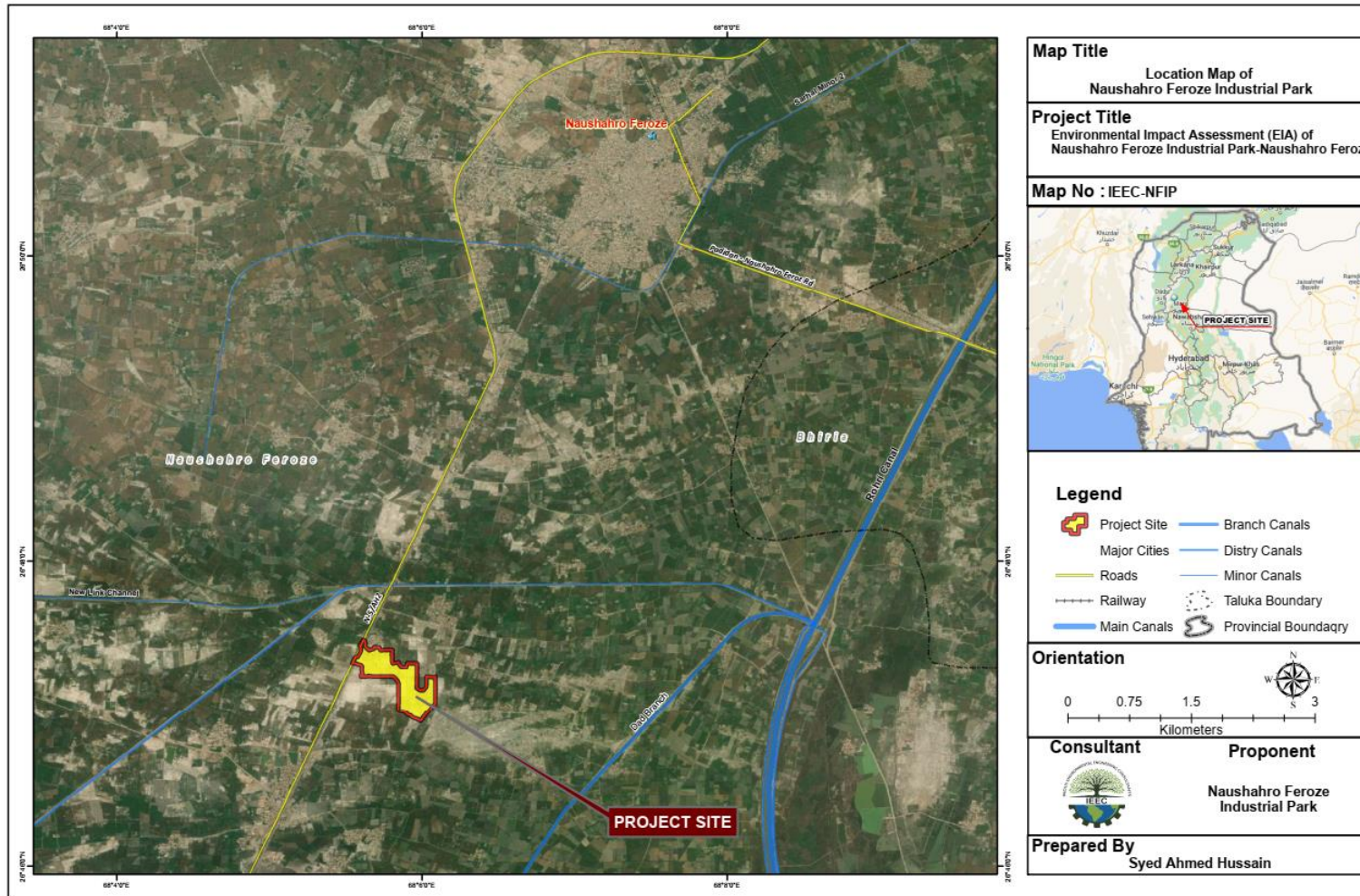


Figure - 3.2: Project Foot Print area Map

# Environmental Impact Assessment (EIA)

## Naushahro Feroze Industrial Park (NFIP)



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PROJECT TITLE:  
**NAUSHAHRO FEROEZ INDUSTRIAL PARK, NAUSHAHRO FEROEZ**

DRAWING TITLE:  
**MASTER PLAN**


DATE	BY	CHECKED BY	DATE
01/11/2022	UPDIPAT KHAN/PLN	ASAD KHAN	01/11/2022

DRAWING NO.:

CLIENT:  
**NIP** NATIONAL INDUSTRIAL PARKS  
STATE DEVELOPMENT CORPORATION  
GOVERNMENT OF PUNJAB, NAUSHAHRO FEROEZ INDUSTRIAL PARK, NAUSHAHRO FEROEZ

CONSULTANT:  
**ASIAN CONSULTING ENGINEERS** PVT. LTD.  
207-A, JALAN ALAMAKA, SINGAPORE 110598  
TELEPHONE: +65 63398448 FAX: 65 63397189  
WWW.ACEENGINEERS.COM

Figure - 3.3: Project Layout Plan

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**Table - 3.1: Salient Features of the Project**


S. No.	Items	Description
01	No. of Plots / Plot size (Land use plan is attached in Annexure – A of PC-I)	01 Acre Plot = 32 nos. 0.5 Acre Plot = 27 nos. Cottage Industry up to 0.2 acres = 24 nos. <b>Total Industrial = 56.37 acres</b> Commercial = 3.97 Acres area
02	Water Supply & Distribution	From Tube Well/ Ground Water
03	Waste Water Discharge & Disposal	Nearby source available
04	Internal Road Network	Flexible Asphalt Road Network
05	Power Distribution Networks	For 04 MW of Electricity, Payment was made in July 2021. Structural Poles installation is in progress
06	Gas Supply and Distribution	For 2.5 mmcf/d Gas, a Demand Notice has been issued from SSGC
07	Protection against Natural Calamity and external intrusion	Boundary Wall & Watch Towers
08	Green Area	In order to promote the natural environment sufficient area of the industrial park is assigned as Green Area
09	Weighing Bridge	Will be available
10	Fire Station	Provision of Fire Station are available to effectively meet incidents of fire
11.	Solid Waste Management	Arrangements with District Management for Door to Door Collection from Industry.
12.	Wastewater Treatment	Primary Treatment by (Generating Industry) Secondary Treatment by Combined Effluent Treatment Plant

### 3.6 Proposed Industries

For the smooth functioning of the project, linkages would be developed with trade bodies, export promotion agencies/departments as well as foreign marketing institutions for bilateral exchange of information on food processing and its byproducts, particularly new ideas, technologies and disciplines which could be beneficial for the stakeholders in enhancing their vision and usefulness for the commercial operations.

Following are the proposed industries that would be set up in NFIP;

- Fruit and vegetable Packaging
- Flour Mills
- Dairy products
- Livestock feeds
- Poultry feeds

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- Dates processing and dehydration
- Farm equipment

### 3.7 Size of the Project

It is in the category of an average-size project. The total electricity demand of the NFIP will be 12 MW, the proposed project covers a total land area of 80 acres. Detailed distribution of plot sizes in the NFIP is given In Table – 3.2, the human resources required during the construction phase will be about 2,000 personnel (labor) during the operation phase, and the total staff will be about 12 to 15.

**Table - 3.2: Land Use Distribution of the NFIP**


Sr. #	Category	Size	Area (Syd.)	Qty	Total Area	Acre	%age	
1	1.00 Acre	Varies	4,840	32	173,225	35.79		
	1/2 Acre		2,420	24	67,151	13.32		
	Cottage Ind.		1,000	17	18,124	3.74		
	Total Area			73	258,499	52.85		66.08
	SB-Comm.	Varies	400 to 600	2	19,015	3.94		
	ST-Comm.			1	10,874	2.24		
	Parks			1	6,563	1.35		
2	Total Commercial Area			4	36,425	7.53	9.41	
3	Total Amenities Area			4	19,360	4.00	5	
4	Total Roads Area				75,557	15.61	19.51	
5	Total Plot Area				387,200	80.00	100	

### 3.8 Specifications & Design considerations

#### 3.8.1 Road works

- Long-life Roads to be provided.
- Based on Traffic Forecast, Asphaltic Binder Course, Aggregate Base Course, Granular Sub-Base and Asphaltic Carpet are to be provided.
- Pipe Sleeves are to be provided at regular distances to minimize future road-cutting requirements for utility lines.
- Proper Storm Water drainage system/Surface drainage to be provided.
- CC Road Curbs, Pavement markings, Road Signs and properly designed Traffic Signals are to be provided.
- Beautification proposals will be made wherever possible.



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### 3.8.2 Water Supply works

- Use of PVC or GRP or DI Pipes to be assessed for maintenance-free Operations.
- Storage /Tanks are to be provided at strategic points to ensure equitable water distribution.
- Pumping is to be minimized by using gravity flow as much as possible.

### 3.8.3 Sewerage Effluent Disposal works

- Use of RCC Pipes and/or FC Pipes to be made.
- Sewage/Effluent Drainage flow to be optimized by providing gravity flow as much as possible and minimizing pumping.
- Environmental Considerations regarding Effluent Treatment will be assessed.
- The Client will frame environmental Control Strategy viz-a-viz SEQS and Pre-treatment policy for enforcement.

### 3.8.4 Storm Water drainage

- Adequate-sized RCC pipes and/or RCC Covered drains are to be provided;
- Gravity flow to be maximized; and
- Disposal Points are to be properly assessed and storm water disposal is to be divided into multiple disposal points to avoid choking.

## 3.9 Design Wastewater Flows and Characteristics

The process design of the treatment facilities shall be carried out at maximum day flows and pollution loads, whereas the hydraulic design of all the wastewater conveyance and transfer components shall be carried out at peak hour flows. This section presents the determination of the design values of all these parameters.

It is proposed that the CETP-NFIP shall not be designed for the removal of any toxic metals or compounds present in the wastewater. These pollutants, originating from any Individual Industry and exceeding the SEQS values, shall be removed by that Industry, by providing a specific in-house treatment system, before the discharge of the wastewater into the sewerage system of the NFIP.

The CETP-NFIP shall be designed primarily to bring the BOD, COD, and TSS values of the wastewater within the SEQS limits. The analysis, therefore, in this section is limited to these quality parameters.

In general, the design concentrations, for each pertinent quality parameter, shall be determined by dividing the respective design pollution load values by the respective design wastewater flows. The specific nature of individual industries, which have been allotted plots In the NFIP and information on their production, is not known at this stage. The only available pertinent data, which can be used for establishing design wastewater flows and characteristics for the CETP-NFIP at

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this stage, is the plot-area-based composition of the NFIP with respect to different broad categories of the design wastewater flows and pollution loads for the CETP-NFIP industries. Keeping this in view, the following criteria are established based on the.

- a) Using plot area-based unit wastewater flows and pollution loads for different categories of Industries on the basis of international literature and local data.
- b) An analysis based on comparison with the measured values of the other industrial Park.
- c) Wastewater flow values used in the design of sewerage system.

### 3.9.1 Plot Area-Based Unit Wastewater Flows and Pollution Loads


The plot area-based unit wastewater flows and pollution loads for different categories of Industries are determined by employing the following general relationship.

$$[\text{Wastewater Flow or Pollution Load per Production}] \times [\text{Production per Plot Area}]$$

Representative unit wastewater flows and pollution loads per production, for different categories of Industries, are taken from the following International and local sources. The data on the typical daily production rate per plot area is derived from the local sources and data available. Inside the NEC. Table 3 presents the representative plot-area-based unit wastewater flows and pollution loads, for BOD, COD and SS. for different types of Industries, derived by corroborative analysis of data obtained from the aforementioned sources.

**Table - 3.3: Summary of Waste Generation and Disposal**

Sr. No.	Waste Description	Waste Generated From			Disposal Method
		Construction	Installation	Operation	
1	Recyclable waste: Paper, plastic, textiles, wood, glass, tin cans, metal scrap, Aluminum cans, ferrous /nonferrous materials, batteries, etc	Yes	Yes	Yes	Burial in burry pit/composting
2	Industrial Waste:	Yes	Yes	Yes	Recycling, Incineration
3	Syringes, glass bottles, used bandages and expired drugs, etc	Yes	Yes	Yes	Incinerate at an appropriate facility SEPA Certified
4	Grey Water: Waste water from kitchen laundry and showers	Yes	Yes	Yes	To be disposed of in soak pits. In case soak pits get filled then grey water& can be sprinkled on loose soil within the project area

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### 3.10 Noise Specifications & Design Considerations

#### 3.10.1 Construction & Installation Phase

During construction & installation activities works of the access road, foundation and installation the source of noise from the Movement of heavy and light vehicles, heavy machinery, equipment and earthmoving equipment will be minimized by regular maintenance.

#### 3.10.2 Operation

The hybrid power plant is the option, which does not create noise during operation.

### 3.11 Wastes and Effluents

During operation of plant, small volume of wastewater would be daily generated from an activity of washing dust from surface. This wastewater contains only suspended solids and will be drained into the storm drainage basin. Further staff employed for (Approx. 30) operation and maintenance such as surface cleaning, plant operations, security and catering will produce domestic wastes (i.e. food waste, industrial waste and sewerage water). The waste generated by this small number of people could be readily handled by a septic tank system.

Further Categories of wastes generated during construction, installation and operation and their proposed methods of disposal are discussed below:

**Industrial wastes** - These will be stored separately from other wastes and will be handed over to approve waste contractor for safe disposal.

**Combustible wastes** - Combustible wastes will include kitchen wastes, paper, packaging material etc. It will be stored separately. All combustible wastes will be provided to waste contractor for appropriate disposal.

**Food wastes** - All kind of food waste will be buried properly.

**Recyclable or re-usable wastes** - These will include used glass, tin, metals, workshop wastes etc. It will also be stored separately. Waste contractor for recycling or re-use will collect all recyclable wastes. The Health Safety Environmental Officer will approve the waste contractor.

**Sewage and grey wastewater** - Black water and grey water will be disposed off through septic tanks and soak pits. Black water will be treated after passing through septic tanks and thereafter conveyed to soak pits whereas grey water will be disposed off directly into soak pits.

The wastewater and solid waste generation is expected to be low because of the project activities. Table -3.3 lists the types of wastes that are expected to be produced during the construction, installation and operation phase and their planned disposal options.

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### 3.12 Emissions

The industrial plants create gaseous emissions during their operation whereas emissions during construction and installation activity will include:

- Dust emissions during construction & installation - These will be controlled by proper water sprinkling and good construction management;
- Dust emissions during road travel - These will be controlled by avoiding off-road travel, observing speed limits and track maintenance;
- Exhaust emissions from vehicles, heavy equipment machinery and generators during construction & installation - These will be controlled by proper maintenance (exhaust emissions from generators at the construction base camp, will generally meet the SEQS.

### 3.13 Resource Usage and Requirement

#### ○ Recruitment

It is expected that overall project activities generate around 200 vacancies for technical, security and unskilled workers during the construction and installation phase. Local people will be given preference for unskilled jobs. Details of the staff requirement for major phases of the project are as under:

**Table - 3.4: Workforce Required Proposed**

Type of Work Force	Construction Phase	Installation Phase	Operational Phase
NFIP Employees	25	25	25
Contractor	175	175	175
Security Guards	25	25	25

### 3.14 Water Requirement

Environmental Impact Assessment (EIA) Naushahro Feroze Industrial Park, Naushahro Feroze During construction work of laying of the foundation and other related activities either water will be obtained from a tube well or appropriate source. The estimated water consumption is mentioned below:

**Table - 3.5: Water Requirements during Project Activities**

Phases	Water Requirement (Gallons/Day)
Domestic usage during project Activities	165 Liters per capita/day
Construction Activities	4,600 to 5,500 Gallons/day

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### **3.15 Fuel Requirements**

The fuel requirement will be only for vehicular movement during construction installation and operations activities

### **3.16 Vehicle Requirements**

Project personnel will travel mostly in small cars and through single and double cabin pick up. Vehicles are used for the following purposes;

- Water transport vehicles;
- Heavy trucks for material transportation;
- Vehicles for staff mobilization;
- Earthmoving and construction machinery/equipment

### **3.17 Fire and Emergency Preparedness Plan**

NFIP has a clearly defined, well-structured and dynamic Emergency Response Plan. This plan is prepared to handle level 1, level 2 and level 3 emergencies defined by NFIP. The design of the proposed development incorporates firefighting equipment and exits to be installed in all the project components as per the recommendations. Detail design has been appended as Annexure – VI.

### **3.18 Health, Safety and Environmental Management**

The construction and installation contractors will be required to abide by the standard requirements of NFIP's Health, Safety and Environmental (HSE) Management System. NFIP's HSE Officer will be deployed at the project site to monitor HSE compliance. Further, the contractor will be bound to depute an HSE representative at the site. The Health, Safety and Environment Policy of NFIP, underscores its commitment to prioritizing the health and safety of all its employees, contractors and visitors involved in its activities and confers overriding commitment towards minimizing the impact of its activities on the natural environment.

### **3.19 Soft and Hard Landscaping**

In order to enhance the aesthetic value of the area as well as for providing a healthy environment and, the entire layout shall be given proper Landscape Treatment. Keeping in view, the topographical features of the area earthwork like major/minor cutting/filling, leveling/grading by deploying earthmoving machinery as well as manual labor is to be carried out before taking up planting and turfing in the area. For beautification of median strips of carriageways, flowering shrubs, seasonal flowers, etc. are to be added after completion of the earthwork.

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**Hard landscaping** involves the provision of pacca paths, flower boxes, concrete benches and umbrellas provision of playing equipment, etc. whereas **soft landscaping** includes the development of lawns raising of hedges, planting of flowering shrubs, shady trees, and seasonal/perennial flowerbeds.

### 3.20 Sustainable Design Elements of the Proposed Project

The proponent will assist the plot owners regarding the preparation of environment-friendly design of houses; provide full support regarding the solar panel installation and procurement and rain harvesting technique.

The design considers the following:

- i. Align policies with the industrial ecology concept - incorporate environment and economics into organizational, national and international policies; internalize the externalities; use economic instruments to encourage a move towards industrial ecology; use a more appropriate discount rate; use a more comprehensive index to measure a nation's wealth rather than GNP
- ii. The plot setting for the NFIP depicted its maximization of open space design, enabling more uses on a smaller footprint and creating spaces that allow for more than one function. The planning & design of the plot cutting has been carried out, keeping in mind the natural topography, sun and wind direction.
- iii. Structured Parking: The proposed parking slots are aimed at providing compact and structured parking, thus replacing most of the existing surface parking in order to open up land for more green space. These open areas will also serve as sites for groundwater recharge.
- iv. Soft landscaping will be introduced in the few areas where surface parking is still in use. These changes are intended to reduce the heat island effect, achieve cleaner air quality through the planting of shade trees promote efficient management of storm water runoff, and improve visual aesthetics. Proposed locations of tree plantation are given in Figure – 3.4.
- v. Create industrial ecosystems - close the loop; view waste as a resource; create partnerships with other industries to trade by-products, which are used as inputs to other processes.
- vi. Improve the efficiency of industrial processes - redesign products, processes, equipment; reuse materials to conserve resources.
- vii. Industrial ecology is best implemented, as NFIP has been proposed at best geopolitical location within a reasonable transport distance between industries.

### 3.21 Time Schedule

The development of NFIP will be completed in 24 months.

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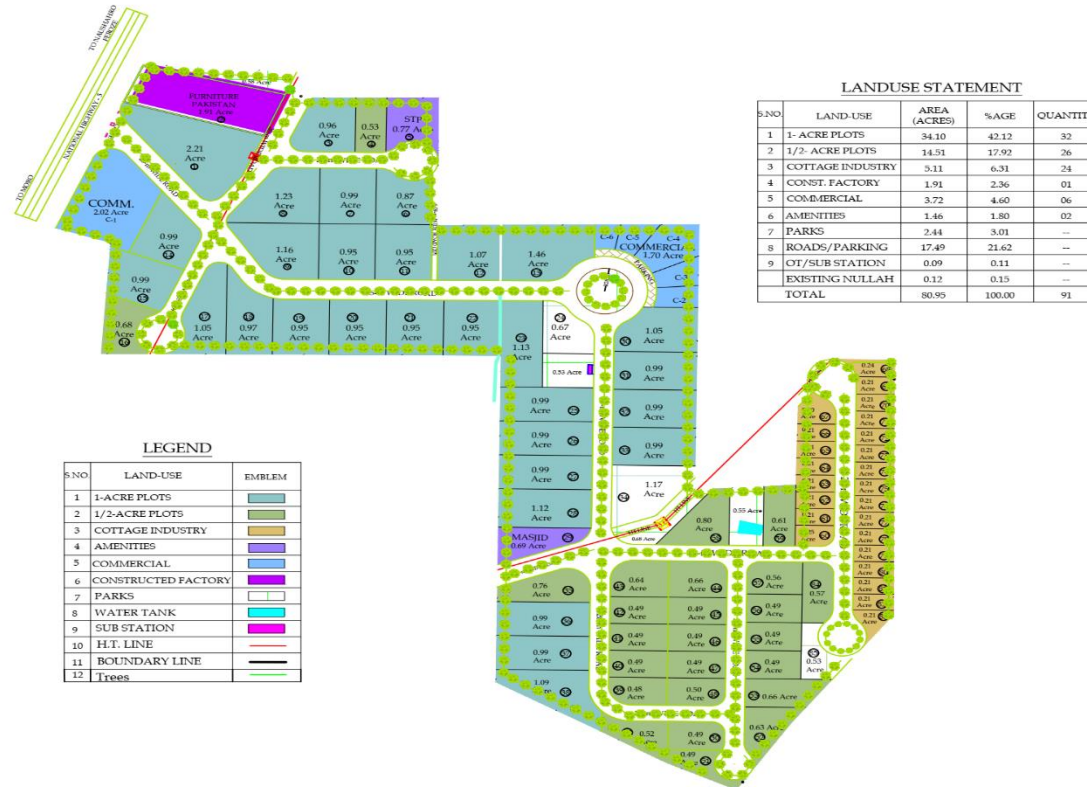


Figure - 3.4: Tree Plantation Plan for Proposed NFIP

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## 4. ANALYSIS OF ALTERNATIVE

### 4.1 General

The EIA guidelines define alternatives as “different means of meeting the general purpose and requirements of the activity, which may include alternatives to the: Site (location of property), Type of activity to be undertaken; Design or Layout; Technology to be used”

It is a specific requirement of EIA process that includes the identification and consideration of feasible alternatives in the early stage or during scoping stage of environmental assessment. The value of this requirement is that alternatives are a form of mitigation, in that certain options may avoid or reduce the nature, extent or duration of one or more impacts, on one or more aspects of the receiving environment. The following section presents an outline of the alternatives which were considered for the project.

### 4.2 No Project Option (NPO)

This is a standard requirement of the EIA process and considers the situation where if the proposed development elements do not take place The No Project Option for this project is feasible because:

- Land is under control of Pakistan Industrial Development Corporation (PIDC).
- Location is prime, which has direct and closest connectivity with the National Highway.
- The Naushahroferoz and surrounding Districts are rich in the Agriculture products, due to availability of raw materials, location is prime and close to raw material.
- Based on the strengths of the connected districts and resource pool, this Industrial Park has predominant investment feasibility for industries.
- The proposed project also very feasible for local investors of this region to start new production units with special connectivity and other advantages.

### 4.3 Alternative Sites


No alternative site is proposed for assessment on the basis that the proposed site: -

- Is under control of PIDC.
- Is in the China Pakistan Economic Corridor.
- Is easily accessible through National Highway.
- Is easily assessable via Karachi Lahore Motorway

### 4.4 Alternative Type of Activity

The selection of these land-uses is in response to emerging industrial market demand, availability of raw material and resource root planning for industrial production and zoning of



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this area under CPEC. Therefore, this is the only appropriate land use type for Industrial Park Development and the economic development of the area.

#### **4.4.1 Electricity Alternatives**

The main supply of electricity is from SEPCO. The nearest grid is located at 03 kilometer away from project site.

#### **4.4.2 Water Alternatives**

The Water is necessary to carry out daily routine work activities and water is also necessary during construction activities. The canal water is under irrigation department and it is measured water for the use of agriculture activities in the area therefore it cannot be used for construction and operational activities. Therefore, the only option is to use ground water for both operational as well as developmental activities. For this purpose, turbines well will be installed. For water usage in the operational phase, the water will be provided by the NFIP management and will be charged accordingly, however most of the industries will be dry process.

#### **4.4.3 Design And Layout Alternatives**

The overall function of NFIP is composite commercial and trading, processing, manufacturing, warehousing logistics with corresponding production and living support facilities, and according to the current land use conditions and the corresponding industrial orientation, design and layout is planned with the functional structure.

The design and layout alternatives of NFIP are presented as follow.

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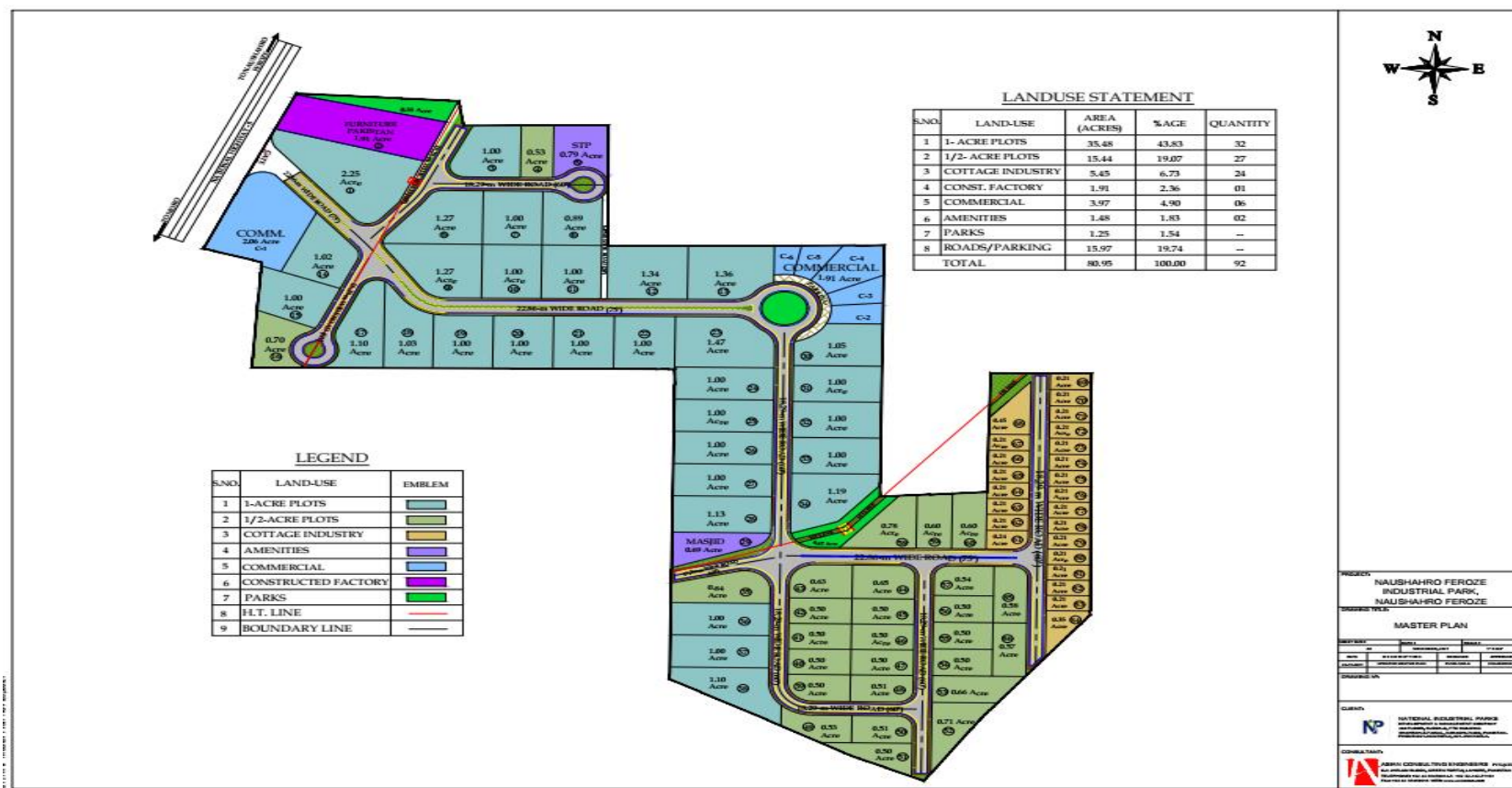


Figure - 4.1: Design and Layout Alternatives – 1

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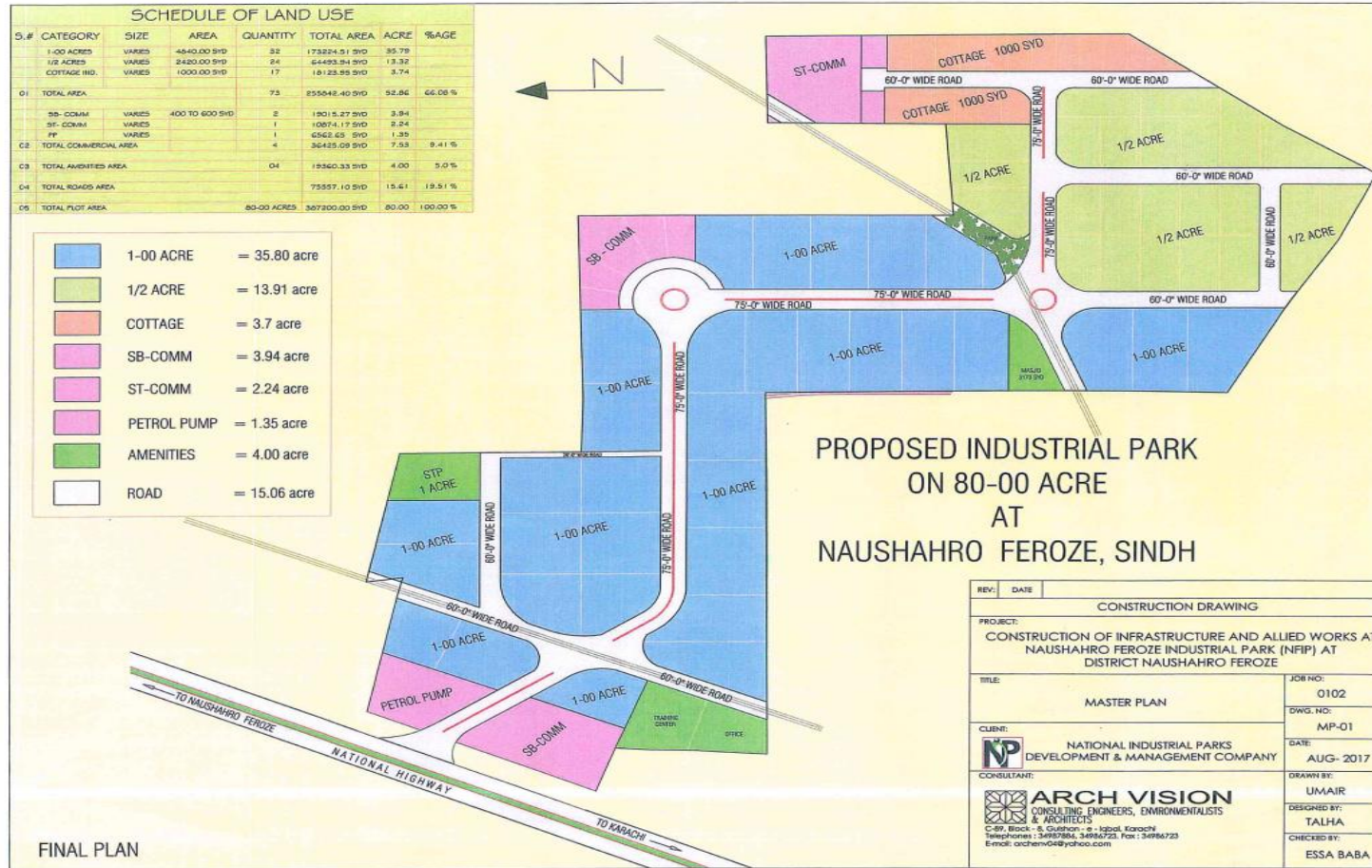


Figure - 4.2: Design and Layout Alternatives – 2

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Figure - 4.3: Design and Layout Alternatives – 3



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## **5. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION**

### **5.1 General**

Public participation is a mandatory requirement of the Environmental Impact Assessment (EIA) exercise under the Sindh Environmental Protection Act 2014 and the rules and regulations framed there. The public consultation and participation process provides an opportunity for those directly and indirectly affected by the project to express their concerns during the feasibility phase before the finalization of the project design. It aims to ensure that the EIA process is transparent and robust and enables sustainability in the design, implementation, operation, and management of projects.

The key objectives of public involvement are, to

- Obtain local knowledge about the microenvironment (project neighborhood) that may be useful for decisions regarding the project design and identification of potential impacts;
- Facilitate consideration of alternatives, mitigation, and compensatory measures;
- Ensure that important impacts are not overlooked and benefits are maximized

### **5.2 Project Background**

The NFIP is located on N-5 National Highway between Moro city and Naushahro Feroze city in Naushahro Feroze District, The proposed project area activities will be carried out within the District Naushahro Feroze proposed NFIP site located in Deh Izat Wagan, Taluka, and District Naushahro Feroze. The proposed project land is affected by salinity and fertile land, especially the land is flooded due to the recent disaster in August 2022 (torrential rainfalls).

The purpose of this industrial pa is to create new jobs, reduce poverty, encourage industrialization in Sindh and resultantly increase the country's GDP. Under the Sindh Environment Protection Agency section 17, it is required that the proponent of any development project will have to submit an EIA report to the Sindh Environment Protection Agency (SEPA) to obtain approval prior to starting construction or operation of the project.

The major infrastructure facilities to be provided in the project are

- a. Internal roads
- b. Drainage (storm water and sewerage disposal)
- c. Water supply
- d. Electrification
- e. Technical Training Center
- f. Overhead water tank
- g. Septic tank / CETP

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- h. Gas supply
- i. Common facility center
- j. Commercial services like banks, petrol pumps, weighbridge

#### **Other Facilities included:**

The infrastructural requirements for the project would mainly include:

- Boundary wall
- Utilities (Supply, Drainage, and Sewerage)
- Training Center
- Mosque
- Weighbridge
- Commercial area
- First aid / Healthcare facility

There is a need to strictly follow the procedures laid down under the environmental regulations and building control bylaws of the relevant provincial government departments and the required local authority. In the radius of 5 kms, the project has the following places:

- Shrine of Nango Shah Mori
- Sohu Hotel
- Nago Shah Graveyard
- Wapda Colony Park
- Ahmed Khan Mashoori School
- Mohammad English Grammar School
- Center for Development Innovative (CDI)
- Mehran Park

### **5.3 Objective Of The Public Consultation**

Objectives of consultation Public involvement is a feature of environmental assessment and can lead to better and more acceptable decision-making. It can be time-consuming and demanding, yet without it, proposals are seldom sound, and there is a likelihood of from affected people. Public involvement, undertaken in a positive manner and supported by an honest desire to use the information gained to improve the proposal, will lead to better outcomes and lay the basis for ongoing positive relationships between the participants.

The objectives of public involvement include:

- Informing the stakeholders about what is proposed;
- Providing an opportunity for those otherwise unrepresented to present their views and values, therefore allowing more sensitive consideration of mitigation measures and tradeoffs;
- Providing those involved with planning the proposal with an opportunity to ensure that the benefits of the proposal are maximized and that no major impacts have been overlooked;

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- Providing an opportunity for the public to influence project design in a positive manner;
- Obtaining local and traditional knowledge (corrective and creative), before decision making;
- Increasing public confidence in the proponent, reviewers, and decision-makers;
- Providing better transparency and accountability in decision making;
- Reducing conflict through the early identification of contentious issues, and working through these to find acceptable solutions;

Creating a sense of ownership of the proposal in the minds of the stakeholders; and developing proposals which are truly sustainable.

More intangible benefits flow from public involvement as participants see that their ideas can help to improve project. People gain confidence and self-esteem through taking part in the process, and perceptions are expanded by meeting and exchanging views with people who have different values and ideas.


#### **5.4 Techniques And Principles for Public Consultation**

Principles: There are a number of basic principles that can be followed to help to achieve a successful outcome when using public involvement techniques:

- Sufficient relevant information must be provided in a form that is easily understood by non-experts (without being simplistic or insulting);
- sufficient time must be given to stakeholders to read, discuss, and consider the information and its implications;
- sufficient time must be given to stakeholders to present their views;
- Responses should be provided to issues and problems raised or comments made by stakeholders. This builds public confidence in public involvement and provides the conditions for the consultation process to be maintained, and
- The selection of venues and the timing of events should encourage maximum attendance and a free exchange of views by all stakeholders (including those who may feel less confident about expressing their views).

#### **5.5 Stakeholder Consultation**

People who may be directly or indirectly affected by a proposal will clearly be the focus of public involvement. Those who are directly affected may be project beneficiaries, those likely to be adversely affected, or other stakeholders. The identification of those indirectly affected is more difficult, and to some extent, it will be a subjective judgment. For this reason, it is good practice to have a very wide definition of who should be involved and to include any person or

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group who thinks that they have an interest. Sometimes it may be necessary to consult with a representative from a particular interest group. In such cases, the choice of representative should be left to the group itself. Consultation should include not only those likely to be affected, positively or negatively, by the outcome of a proposal, but should also include those who can affect the outcome of a proposal. The range of stakeholders typically includes.

**Local people / Neighborhood:** Individuals or groups in the local community would want to know what is proposed; what the likely impacts are; that their values are known, understood, and taken into account; and that the suggestions they may offer will be carefully considered on their merits. They would want proponents to listen to their concerns and address them. They will also have local knowledge, which can be tapped. The consultation exercise provides the opportunity to appraise the stakeholders regarding the consultation process. It is important to foresee project impacts and concerns and to mitigate them. Further, intensive consultation during the planning stage of the project provides a basis for reducing the trust deficit and encourages confidence building.

**b. Other affected communities:** If you foresee that a proposal is likely to have indirect impacts (for example flash flood due to heavy rainfalls) the communities, then should also be involved.

**c. Proponents:** Many proponents would share some of the objectives with the general public when initiating the project. Proponents will wish to shape the proposal to give it the best chance of success. This often involves achieving increased public understanding and acceptance of the proposal through the open provision of information. The design can also be improved through the use of local knowledge and an understanding of local values. The main aim of the project proponent is to accomplish the objectives of the project through cost-effective and sustainable activities. To this end, the project proponent has to recognize that strong association and responsive relations with stakeholders would go a long way to achieving the project objectives. Therefore, the proponent has to engage stakeholders at all levels from the outset; inform them regarding project goals, designs, and alternatives. Moreover, they have to keep trying to create public understanding and acceptance of the proposal through a commitment to implement the promised objectives. They have to accomplish the project through general acceptance of the design and keep improving through the use of public input on alternative and mitigation measures.

**d. Government Agencies / Other Line Departments:** The government agencies and other line departments involved in the EIA process are mandated to have their policy and regulatory responsibilities addressed in the impact analysis and mitigation consideration. For the competent authority, an effective public involvement program will ensure a project proposal that effectively corporates environmental and social concerns. Moreover, in line with international standards, SEPA invites the proponent for evidence of Corporate Social Responsibility (CSR) activities in the past and plans for CSR activities in the project vicinity. During the EIA review, the most important concern for SEPA is a transparent public consultation process and a strong stakeholder engagement plan that can address the concerns and suggestions of all the stakeholders.



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Further, the interests of relevant government agencies, utility service providers, and local councils can be best achieved if they are included in the consultation process. Not only will their requirements become known, but they will better understand the needs and concerns of all other stakeholders if they are involved in the consultation program. For administrators and decision-makers, an effective public involvement program can mean that the project is less likely to become controversial in the later stages of the process.

**e. Non-Government Organizations (NGOs):** Involvement of NGOs can often provide a useful broader public perspective on a project. Their views can also be very helpful when there are difficulties with involving local people. Care must be taken to clearly define the role of an NGO. Normally NGOs act as an advocate for the environment, but at times, they also act in other capacities. For instance, they may facilitate to portray the ground realities of the project area and they may become active in striving to command resources directly. In such cases they may have, or be perceived to have, a conflict of interest, which may mitigate their effectiveness in the eyes of other stakeholders. Comments from NGOs and specific interest groups often provide a useful policy perspective on the project's methodology and implementation mechanism. For example. Due to the vast exposure of certain NGOs and interest groups, alternative measures for reaching the project goals may be advised that are more environment-friendly and socially acceptable. Their views are also helpful when developing CSR programs and later on for the monitoring and evaluation of these programs.

**f. Influential people:** Communication with influential people, such as big landholders, community leaders, local Members of Parliament, and Mayors of local councils, is very important. If such people are not briefed well at an early stage, they may get second or third hand information and obtain a distorted impression of the project. An early informative briefing to such people by the proponent will minimize the opportunity of them being misinformed, and becoming opponents of the proposal.

**g. Other Groups:** Other can also make a significant contribution. Care is required to ensure that fair and balanced representation of views is sought and that the views of the poor or minority groups are not overwhelmed by those of the more articulate, influential or wealthy. On a specific study, a good way to identify appropriate stakeholders is to start by asking questions, such as the ones below:

- ✓ Who might be affected (positively or negatively) by the development?
- ✓ Who are the "voiceless" for whom special efforts should be made?
- ✓ Who are the representatives of those who are likely to be affected?
- ✓ Who is responsible for what is intended?
- ✓ Who is likely to mobilize for or against what is intended?
- ✓ Who can make what is intended more effective through their participation, or less effective by their non-participation or outright opposition?

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- ✓ Who can contribute financial and technical resources?
- ✓ Whose behavior has to change for the effort to succeed?

Other interest groups comprise those who are experts in their fields and can make a significant contribution to the EIA study. The advice and knowledge of the relevant institutions most directly concerned with the proposal are often sought. More often than not, a range of experts from these groups are consulted and their input is solicited based on the project requirement.

**Table - 5.1: The main stakeholders for Naushahro Feroze Industrial Park**

S. No	Names
1.	Local Community
2.	Neighborhood
3.	Influential people
4.	Local Businessman
5.	Commercial
6.	NGO
7.	Fire Brigade
8.	Board of Revenue, District Office
9.	Health Department
10.	Education Department
11.	Taluka Municipal Office
12.	Agriculture Department
13.	SEPA Regional Office Shaheed Benazirabad / (Nawabshah)
14.	Forest Department District Office Naushahroferoz
15.	Sindh Wildlife Department Regional Office Shaheed Benazirabad / (Nawabshah)

## 5.6 Consultation Approach And Methodology


The sampling process started in the surrounding of the project, which was located at the National Highway N-5. A random number was selected for picking up the count in the radius square of households/ businesses/ hospitals/ heritage buildings, for collecting data and filling out the survey forms. A set of sample questionnaire was used to collect the data, which is compiled in the report with extra care to affirm getting all stakeholders in the survey.

There are several people consulted and interviewed. Additionally, wherever found feasible, the public was also consulted to know their views and concerns over the project activities. The majority of these consultations were either one-on-one meetings or focused group discussions.

## 5.7 CONSULTATION WITH PRIMARY STAKEHOLDERS

### 5.7.1 Local Community/ Neighbourhood

During the project inception & planning phase two rounds of consultation have been conducted one was conducted in June 2017 by M/S Arch Vision Consultants, other round of consultation is conducted by M/S Indus Environment Engineering Consultants in November 2022.

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The first public consultation was detailed survey the purpose of the consultation was to make bond with community to build sense of ownership and affiliation of the local people with proposed project. For that purpose a questionnaire base socioeconomic survey had been arranged and the relevant information on NFIP from the local people had been gathered. The following villages (Goths) around the project were selected randomly:

- a) Syed Nango Shah Goth
- b) Allah Bux Marri Goth
- c) Lal Bux Marri Goth
- d) Atta Mohd Marri Goth
- e) Jagan Khan Chandio Goth
- f) Haji Menhan Mashori Goth
- g) Nahi Khan Wagan Goth
- h) Molvi Dhani Bux Goth
- i) Lal Bux Chnadio Goth

The men and women were selected in the survey. The consultation process was conceived to interact meaningfully with all stakeholders. It gave better understanding of local area with respect to various sets of issues and concerns, and integrate into the project design and other relevant changes as per law.

Some other secondary stakeholders are also consulted :

- a) Sindh Environment protection Agency (SEPA)
- b) Provincial Health Development Institute (PDHI) Jamshoro
- c) Sindhi Irrigation and Drainage Authority (SIDA)
- d) Sindh Development Society, Hyderabad (SDS) NGO

The stakeholders have some concerns and also shared suggestions/recommendations given as under:

- NFIP should fulfill the regulatory requirement of conducting environment & social assessment of all its projects

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- The project proponent should develop organizational capability for the implementation of EMP, and to handle environmental / social issues during the project implementation as well as routine operation of the organization
- The issues relation to land acquisition and compensation should be appropriately addressed during the propose project.
- The construction related issues – such as waste disposal, soil erosion and hazards for the nearby communities – should be adequately addressed during the proposed project.
- The potential environment issues during the operation and maintenance of the proposed project – such as soil and water contamination caused by the leakage/spilling of the toxic chemicals in proposed industrial units, should be adequately mitigated
- NFIP should be critically testing arrangements at its site.
- Community participation should be ensured to the extent practical during a;; phases of the project
- Lesson learned during the similar projects in the past should be utilized

The second round of consultation was held on November 16, 2022. In the second round, met with the local community/neighborhood, and other representatives while the remaining half was designated for commercial. Departments, organizations, NGOs, and other groups.

The consultation with the locals was an important part of the stakeholder consultation, as they are directly involved in the project. The team has contacted the surrounding resident, community leader / activist, and some others.

A neighborhood survey was conducted to identify the interests in the area that may face direct impact from the proposed project. The survey was conducted in two stages. In the first stage, several site visits were carried out to identify all stakeholders that either reside or work in the project vicinity and conducted an initial identification of potential positive and negative impacts. During the second stage, a focus group meeting was conducted, team used a pre-designed semi-structured template to engage the residents, commercial interests, and public service institutions.

During each meeting, the project team introduced the project to the stakeholders, recorded their concerns and suggestions and provided contact details to enable stakeholders to share further comments over email or in writing. A 'Project Brief' providing the salient features of the project was also handed over to the available stakeholders as part of the information disclosure process. Moreover, the team inquired about the current situation of the area such as the status of utilities, security and law and order situation in the project area from the residents near the project site. Several open-ended questions were also included in the

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questionnaire to ensure that the respondents could openly share their opinions and suggestions relevant to the study.

The local landlord informed that there are two crops seasons; “Kharif” and “ Rabi”, Wheat, Cotton, Rice, Sugar Cane are the major crops while Jowar, Rapeseed, Mustard, Matter, Onion, Bajra and Maiz fall in the minor crops. They were upset for the current situation as due to the flood and rainwater, all crops are destroyed and that they will not be able to cultivate for a year or more.

The responses from residents of some of the villages that are located in the microenvironment of the project area were as follow:

- Provision of jobs and economic opportunities to locals in the Industrial zone.
- Industrial parks are an ideal catalyst for industrialization and economic development. They help put into place an infrastructure that fosters and attracts entrepreneurs of all scale and size.
- Company will develop community infrastructure in the project area. The villagers said project should provide well-furnished schools and health facility in the area where children acquire quality education at their doorstep and dropout ratio should be decreased. Moreover, villagers suggest to focus on decreasing the unemployment in the area. Because their area is underdeveloped and there are not many income generation opportunities in the area.
- They suggested that disturbance to the land shall be minimized and after completion of work, rehabilitation shall be undertaken.
- As this is the first Industrial Park project so community must get all the utilities
- All utilizes like water, sewerage, drainage, roads, and banks (micro loans) must be provided.
- As this is the most devastated district of Sindh with reference to flood so project will work for the community through CSR.
- Maximum security should be provided to ensure people’s safety from heavy traffic and labor working for the factories.

**Table - 5.2 Meeting with nearby Community Representatives**

S No.	Name	Status	Contact No.
1	Zakria Wassan	Resident / Contractor	0302-3210112
2	Ghulam Murtiza	Resident / Landlord	0306-2291038
3	Noor Illahi	Resident / Businessman	0305-32558-70
4	Sardar Ahmed	Community Leader	0304-4560565

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S No.	Name	Status	Contact No.
5	Ali Akbar	Resident / Advocate	0301-3696345
6	Asif Ali	Resident / Govt. Service	0313-3382186

### 5.7.2 Commercial

The commercial consultation was made with shopkeeper, businessman, hotel owner and petrol pump manager. They all welcome the new project which is the first Industrial Park in the district. They ensure for any facilitation and cooperation at every stage. The team briefed them about the complete scope of the project and informed them of the facilities to be provided i.e. roads, drainage, water, electrification, technical training center, Combined Effluent Treatment Plant, Gas, commercial services like banks, petrol pump, and weighbridge.

They have views that in terms of community, industrial parks produce more jobs, improve the tax base and business retention, as well as reduce development costs.

Meaning of Industrial Park: An industrial park is a portion of a city that is zoned for industrial use rather than residential or commercial needs. They also shared some advantages of the Industrial Park given as under:

- Proximity to labor: industrial parks are often built near a specialized labor force. They are generally located on the outskirts of urban centers, while also accessible by public transport.
- Existing infrastructure: with many industries gathered in a small area, park owners need to make sure they provide reliable access to all resources required for industrial operations. Water, gas, and electricity are usually not a problem, as infrastructure is designed to meet a high demand in both energy and resources. Sewage system will also be suitable for treating high-volume wastewater.
- Strategic location: many industrial parks are located between major urban centers. This strategic location could quickly increase the pool of potential consumers.
- Access to transport: industrial parks often combine different options for shipping goods. Depending on the location, some industrial parks offer access to a port, while other complexes provide access to a railroad network or to several major highways instead.
- Relationship with park owners: depending on park management, industries choosing to settle there may have a range of advantages. Many can offer lower prices than in urban areas. Others provide financing options for construction, like waiving municipal taxes for the first five years of operation on the land. In addition, most park owner's offer specialized support to help companies secure building permits and industrial licenses.

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- **Pollution Island:** industrial parks concentrate pollution produced by several industries in a specific area of the city. Although they are very often built away from residential and commercial areas, industrial parks are now rapidly approaching peripheral residential areas, due to urban expansion. Establishing an industrial zone can also lead to soil contamination.
- **Increased traffic:** parks often result in increased traffic in the industrial area and on nearby highways. In addition, manufacturers often use heavy vehicles to transport their materials and goods, which will cause road networks to deteriorate more quickly.
- **Additional costs:** depending on current management, additional costs may be charged every year to maintain the park's roads and infrastructure.

### 5.7.3 Proponent

- The main aim of the project proponent is to accomplish the objectives of the project through cost-effective and sustainable project activities. To this end, the project proponent has to recognize that strong association and responsive relations with stakeholders would go a long way to achieve the project objectives. Therefore, the proponent has to strive to engage stakeholders at all levels from the outset; inform them regarding project goals, design, and alternatives.

## 5.8 Government Agencies/ Other Line Departments

### 5.8.1 Board of Revenue, District Naushahro Ferozel

The revenue officer meets on November 16, 2022. He appreciated the new addition of the mega Industrial Park Project in the area and expected that they will take care of all rules and regulations and as per law. All demarcations must be according to the law. It must have provision of basic amenities of water supply, drainage, gas with electricity and law and order system.

Revenue officer suggested that anti-encroachment measures should be taken, which is a major problem in the old city and downtown. Anti-encroachment department is run by the Revenue Department but no role is played. It is needed to approach law enforcement agencies in the newly established areas and avoid any problem in the project area.

### 5.8.2 Taluka Municipal Department (TMA)

On November 16, 2022, team met with TMA. They added that the development downtown is ignored, as civic amenities are almost rare. People's adverse impact arises from deficiencies in infrastructure and other facilities in the rest of the Naushahro Feroze. The demand for utilities, such as water, sewage disposal, electricity and gas will be increased considerably for which there is no plan by the Municipal authorities, and the residents are already protesting against the proper management of traffic, cleanliness, water quality and noise pollution issues but the authorities are handicapped.

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TMA officer shared that EIAs are passed with the provision that the project will have its own energy generation, water supply, wastewater and solid waste disposal. The amount paid for the betterment of infrastructure goes into the exchequer of government departments and not towards the provision of infrastructure facilities, which is unfair.

### **5.8.3 Health Department (PPHI)**

The Primary Health Provider (PPHI) was contacted to query for health information in the project area well as at the district level. According to the team of PPHI Naushahro Feroze there is one major hospital, Taluka Head Quarter, Rural Health Center, Basic Health Unit and dispensaries; Naushahro Feroze still need a more effective treatment system for patients' healthcare facilities. There is a need of the health initiatives for the community as it is already very poor and passive services and added flood situation worsens the whole system of hospitals. On query, they added that some seasonal diseases are common like flu, skin diseases, malaria and diarrhea in children and old age people. They added that some paramedics and Unani practitioners are also practicing and who claim to practice medicine as quacks.

### **5.8.4 Education Department (Taluka Education Department)**

The Taluka Education Officer, Naushahro Feroze appreciated this new development of Industrial Park and said that he expects some educational initiatives as well in this project. As there are many high, middle, and primary schools but not up to the mark and more schools are required for the community. NFIP management can provide the education facilities from CSR perspective to uplift the educational level of the community living close to the project. It is also suggested to involve the students in extracurricular activities and sports.

### **5.8.5 Fire Brigade Department**

During the meeting held on November 16, 2022, the fire brigade team shared their performance, which was one of the weakest points of small city's environment performance. As per the officer, Naushahro Feroze fire brigade recognizes the said aspect of environmental performance. It is high time that new projects should be well equipped and good quality fire extinguishers should be used along with dedicated emergency numbers.

They also informed that they asked for the latest equipment from the government but the request was turned down because of the lack of budget. New techniques should firefighters for the safety of new projects. They suggested getting the latest equipment for fire-fighting and fire engine as the two old ones are not enough for the whole district. Other concerns were late salary and no fringe benefits from the fire Department.

### **5.8.6 Sindh Environment Protection Agency**

Sindh Environmental Protection Agency Meeting with Mr. Gul Ameer Deputy Director Regional Office Shaheed Benazirabad Sindh EPA was held on November 22, 2022 via online meeting, in which the main features of the project were presented to the Deputy Director SEPA. Mr. Gul



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Ameer said that Sindh Environmental Protection Act 2014 and all regulations thereunder shall be followed and we will review the project as described in the EIA and seek public concerns through a public hearing at the project site. On his query how many years the construction of project will be completed and started, the team replied that the total time of completion is two years and project construction work will be started within few months after having the NOC from SEPA.

He discussed regarding solid waste

How project get water from canals?

How NIFP treat wastewater?

He enquired about the location of project and wildlife habitat?

He enquired about source of water ?

All his question were addressed and responses are given in chapter 03 of this report and mitigations measure are also proposed in EMP chapter 08.

### **5.8.7 Sindh Wildlife Department**

Meeting was held on 29<sup>th</sup> November, 2022 with Conservator Wildlife and share the project details. He has shown the clear picture of the area with the help of map he added that the no forest area or Wildlife sanctuary exists the vicinity of the project area, which may be affected by the project. Few reptiles like lizard and mammals like squirrel; few birds like dove, Indian Roller, Shrike and house sparrow will be disturbed by the project activities and may have to move into nearby areas. This will be significant impact.

### **5.8.8 Forest Department Sindh**

A meeting with the forest department was held at the Taluka office. During the meeting, it was confirmed that no protected or reserved forest falls within 5 km of the proposed project area. Further native tree species have been identified during consultation through baseline knowledge sharing. The tree plantation plan has been shared and discussed with the department office and they offered expert opinions at the time of plantation.

### **5.9 Ngos/ Interest Groups**

The purpose of conducting consultation meetings with NGOs was to share the salient features of the project so that they are able to share their concerns and suggestions regarding the project. Since the NGOs are involved directly and indirectly with the community at the grassroots level they have a better understanding of the concerns of the community and hence their feedback is crucial for the formulation of Social Management Plan. Various organizations were invited but only few organizations participated in the meeting. However, NGOs ensured to convey messages and decisions of the meeting to remaining NGOs who were not part of the meeting.

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### 5.9.1 The Local NGO Aghaz

The NGO has been working in various sectors such as education, health and livelihood, reproductive health, community mobilization, youth empowerment, gender mainstreaming, poverty eradication, and emergency relief in the area. Following are the concerns and suggestions regarding the project:

- Compensation should be provided timely and as per government rule to the affected people if any land or community asset is affected. The EIA team ensured that the company would compensate accordingly if any agriculture land were acquired. Project undertakes a complete study before initiating any project to make sure that no damage is done to any property or land. In case of any affect caused by activities on the community asset, the company pays the compensation accordingly.
- The project will help in reducing poverty in the area. More jobs will be created for the local community.
- They said that projects should work for the betterment of community. They should work for community development project in the area and make Community Health Centers, primary and secondary schools and water supply for local community.
- One member suggested that in addition to the above, there are some secondary benefits too like lower income housing, easy connectivity to capital business centers, etc. that help exceedingly in improving socio-economic condition of the local population.
- Team member in this regard gave that Trafford Park which was nothing but a five-mile stretch barren land on the outskirts of Manchester in England a good example. In 1896, the world's first industrial park was developed on the east while deer park and within a few years, Trafford Park became the epicenter of England's Industrial grandeur.

**Table - 5.3: List of Stakeholder Meeting at Project Area**

S No.	Name	Designation / Department	Contact No.
1.	Mr. Ghulam Farooq Vistro	Additional Director / Agriculture Department	03007011038
2.	Mr. Gul Ameer	Deputy Director –Sindh EPA	0333-7026308
3.	Mr. Abdul Hafeez	Drafter / Agriculture Department	0300-2886141
4.	ShaMr. mshad Ali Wagan	Administration Officer / PPHI	0242-920012/3
5.	Mr. Zulfiqar Memon	Nutrition Officer / PPHI	0300-3096159
6.	Mr. Faheem Al Hassan	Executive Officer (Finance) / PPHI	0242-920012/3
7.	Mr. Moharam Ali Mashoori	Taluka Education Officer/Education Department	0300-3008636
8.	Mr. Adnan Ali Marri	President / Aghaz Social Welfare Organization	0315-3655347

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S No.	Name	Designation / Department	Contact No.
9.	Mr. Zafar Ali Shah	General Secretary / Aghaz Social Welfare Organization	0301-3664322
10.	Mr. Riaz Mahar	Agahi Study & Social Welfare Society	0333-7129456
11.	Mr. Qadir Marri	Revenue Officer / Board of Revenue, Naushahro Feroze District	0300-3684833
12.	Mr. Pir Ghous Mohammad	Junior Clerk / Board of Revenue, Naushahro Feroze District	0300-4328767
13.	Mr. Waqar A Lakho	Fire Officer / Taluka Municipal Administration Naushahro Feroze	0301-3737859
14.	Mr. Ashfaq Bhatti	Hotel Manager / Salatin Hotel	0305-2890780
15.	Mr. Dara Qazi	Deputy Conservator Wildlife Department Sindh	0333-2151523
16.	Mr. Gul Hasan	DFO Forest Department, Sindh	0307-8053046

## 5.10 Other Groups

### 5.10.1 Advocates / Political Activist / Philanthropist

The Advocates are the main source of information regarding the pre-consultation phase of the project, they can help with every sort of legal formalities and advise the proponent for any lapse during the process. Therefore, the lawyer was consulted who discussed all the pros and cons and ensure the team about the project status, which is going as per law and suggested some more meetings for better work.

Generally, political activists have a high impact on society so it was important to consult them at every phase of the project. Especially in these areas, people are orientated/ rooted in a specific political system. Political activist was briefed and he appreciated and told that it is first time that the mega industrial zone is being designed. This will be a major entertainment area for the locals where there is no such amenities and facilities are available. During the recent floods, the residents of this area suffered a lot, they lost their crops and livestock, and they are on the verge of collapse. Therefore, this opportunity will be a godsend help for them.

The philanthropist who resides says that it is a quite new window for the local poverty-stricken people. The project will support them to survive and recover from the disastrous situation, they requested to open employment windows for the local people and give maximum opportunities to them.

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**Photo Log:**



Meeting With Aghaas Social Welfare Organization



Meeting With Aghaas Welfare Organization



Consultation with officer at Agriculture Department



Additional Director Agricultural Office



Consultation with TMO Education



Consultation with TMO Education

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Consultation with Fire Brigade staff



Consultation with PPHI staff – Health Department



Meeting with Revenue Officer at Board of Revenue, Nashahro Feroze



Fire Brigade Vehicles of Naushahro Feroz



Meeting with Local Hotel Owner



Meeting with Public at Hotel

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Meeting with local Village Representative



Meeting with local Village Representative



Consultation DFO Naushshro Feroz



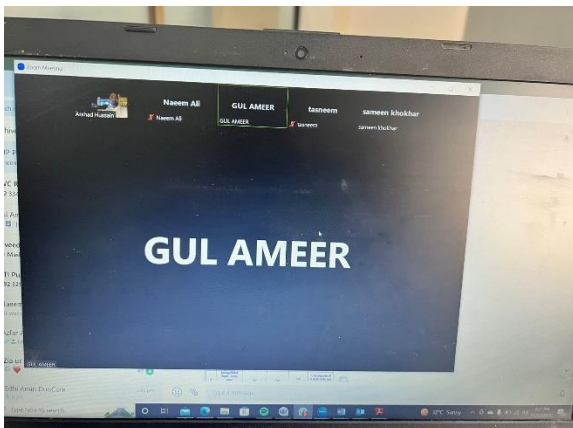
Consultation DFO Naushshro Feroz



Consultation with Deputy Conservator Wildlife Department



Office of the Deputy Conservator Wildlife Department



Zoom meeting with Deputy Director SEPA

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## 6. ENVIRONMENTAL & SOCIAL BASELINE

### 6.1 General

The environmental and social baseline conditions have been established based on information gathered through structured interviews, formal and informal scoping sessions and focused group discussions with the communities of various settlements located around the proposed project area. In addition, information was also gathered from officials of various stakeholders including Government departments, Academia and NGOs. The information available from limited secondary sources has also been used for drawing inferences.


### 6.2 Purpose of Baseline Studies

An environmental baseline study is intended to identify and establish all the physical, biological and human environmental conditions, prevailing before the execution of the project, In order to use this information as a reference datum to compare future changes and judge them If the condition has changed for better or worse. As such, it must include all resources, which can reasonably be expected to be affected by a project. The baseline description is intended to accomplish the following two objectives.

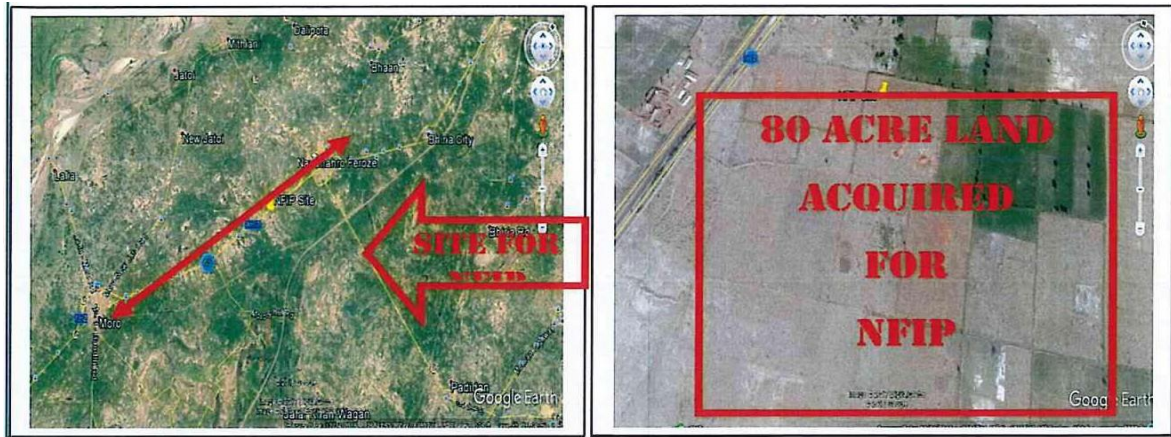
- To provide proponent of the project and stakeholders with sufficient knowledge about the socio-economic set-up agriculture ecological features, built-up budding and infrastructure of the project area.
- To allow the planners to evaluate the potential efficacy of actions to mitigate adverse impacts and enhance benefits.

### 6.3 Delineation of Study Area

An environmental assessment study should encompass all the project aspects and expected Impacts during different stages of the project execution in a delineated area, which is expected to be impacted by the project interventions. The NFIP is located at a distance of 18 km west of Moro on the N-5 National Highway it encompasses an area of 80 acres. (NFIP is the mid

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point 17 KM pass from Moro and 5.5 away from Naushahro Feroz city on main N-5 National Highway).



**Figure - 6.1: Location Map of NFIP**

## 6.4 Physical Environment of the Project Area

### 6.4.1 Topography

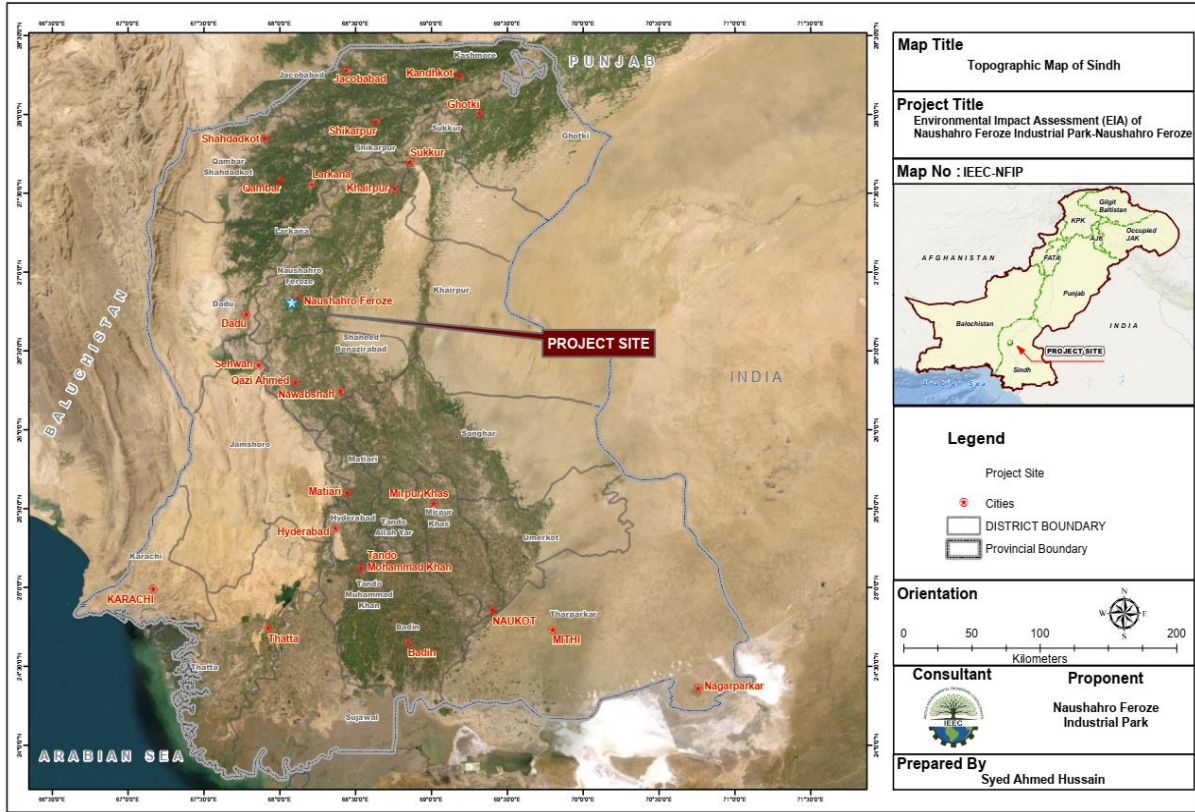
The entire district is a fertile plain formed by the Indus River with sandy and hard clay loams. The average elevation of the area is about 50 meters above sea level. The Indus River flows from north to south along the western border of the district.

The consultant's team visited the project site on December, 2016 and November, 2022 to collect first-hand information and conduct reconnaissance survey. The following facts are observed during reconnaissance survey.

- The selected site is situated along National Highway (N-5).
- The site is almost plain and no hilly area but hard rock has seen.
- Survey team demarcated the site and draw boundary of 80 acres.
- Surveyors have carried out land survey and topographic survey sheet is developed by AutoCAD and indicate levels of ground.
- Survey drawings and three sets of topographic survey sheets were submitted to NFIP D&MC on November 30, 2016.

The site for NFIP is surrounded by agriculture land and there is a "Mazar" which is nearest structure from proposed project site of NFIP.





**Figure - 6.2: Topographic Map of the Project Area**

### 6.4.2 Geotechnical Investigation

The first-hand information pertaining to soil type was assessed and the design of internal roads was carried out preliminary.

During geotechnical investigation at site, the soil consultant's team carried out many field tests. Then soil samples were collected and properly packed for testing from accredited laboratory to maintain their ambient characteristics.

#### 6.4.2.1 Sampling

Sampling forms an essential part of the geotechnical investigation process and good sampling is essential for proper laboratory testing of samples for determining strength and compressibility characteristics of soil. Bulk samples obtained from pits were stored in sample bags that preserve the natural moisture of the sample and transported to the laboratory for performance of relevant tests.

#### 6.4.2.2 Field Density Test

Field density tests were carried out at site for testing in-situ compaction (density) of soil. A small hole is dug in the soil layer of interest and the soil removed is retained. The volume of the hole is determined by filling the hole with a free flowing sand of known density and the

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volume is determined. The in-place wet density of the soil is determined by dividing the wet mass of the removed material by the volume of the hole. The water content of the material from the hole is determined and the dry mass of the materials and the in-place dry density are calculated using the wet mass of the soil, the water content and the volume of the hole.

**Table - 6.1: Summaries of Test Pits**

Test Location	Material Type	Maximum Dry Density	Optimum Moisture Content (%)	Field Dry Density	Percentage Compaction (%) at 1.0 M
TP-01	CL	1.91	14.0	1.61	84.11
TP-02	CL	1.94	11.1	1.71	88.35
TP-03	CL	1.89	11.7	1.60	84.58
TP-04	CL	1.90	11.1	1.59	83.54
TP-05	CL	1.95	10.0	1.60	82.14
TP-06	CL	1.92	11.5	1.79	93.40
TP-07	CL	1.79	15.2	1.54	86.25
TP-08	CL	1.82	13.5	1.75	96.07
TP-09	CL	1.77	14.2	1.69	95.70
TP-10	CL	1.78	13.7	1.77	99.17


#### 6.4.2.3 Engineering Design Considerations

##### A) Discussion on Test pits and Earth work pits

Ten (10) test pits were excavated at the site up to 1.0 meters depth at the locations designated by the clients. Bulk samples were collected from the test pits and transported to laboratory for further testing. Field density tests were carried out in all the test pits at the site. The details of test pits is presented below: The California Bearing Ratio(CBR) test conducted in the laboratory has been discussed in appendix C of this report. The results of the CBR tests are summarized below:

**Table - 6.2: Laboratory CSR Test Results**

Test Location	Test Sample Depth (M)	Test Type	Material Type	CBR 100% Maximum Dry Density
TP-01	1.0	Laboratory CSR	CL	5.58
TP-02	1.0	Laboratory CSR	CL	5.71
TP-03	1.0	Laboratory CSR	CL	5.87
TP-04	1.0	Laboratory CSR	CL	6.06
TP-05	1.0	Laboratory CSR	CL	5.63
TP-06	1.0	Laboratory CSR	CL	6.30
TP-07	1.0	Laboratory CSR	CL	6.55
TP-08	1.0	Laboratory CSR	CL	6.79
TP-09	1.0	Laboratory CBR	CL	5.16
TP-10	1.0	Laboratory CSR	CL	5.33

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#### **6.4.2.4 Recommendation for Backfill**

The subsurface deposits at the site consists of AASHTO class A-4 and A-6. These deposits are classified as fair to poor to be used as subgrade material. The field percentage compaction values at the site are in the range of 82.14% to 99.17% of Modified AASHTO dry density, however, the, the AASHTO field percentage compaction values should be kept, as a minimum, at 100% of Modified dry density. Moreover, the fill material is poorly graded clayey soil which is not suitable for backfill. Therefore, the use of subsurface deposits for backfilling purpose is not recommended.

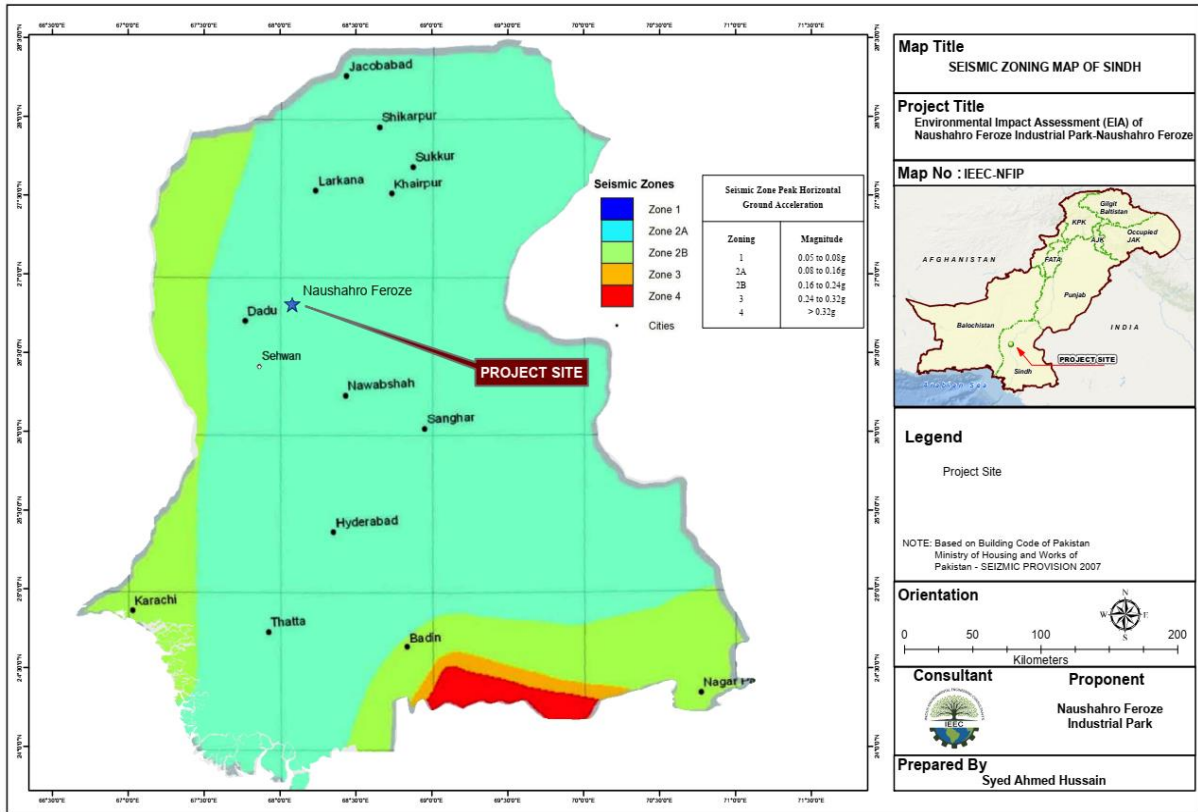
It is recommended that well-graded granular soil (sand-gravel mixture preferably A-1 a or A-1 b) should be used. Clayey soils should be avoided for backfilling purpose. Backfilling should be carried out in layers not exceeding 9" thickness in loose state. Compaction of backfill material should be conducted in such a manner that dry density achieved in field is not less than 100% of Modified AASHTO dry density. Moreover, every possible step should be taken to avoid accumulation of water on backfill. It must be understood that use of improper backfill material or inadequate compaction is likely to result in loss of resistance against uplift forces, and excessive settlement. This shall be confirmed by performing Field density test on each layer.

Field and laboratory tests for Infrastructure Works at Naushahro Feroze Industrial Park, Naushahro Feroze was carried out in March, 2017. Scope of field work included excavation of ten (10) test pits and performance of ten (10) field density tests. Soil samples were collected during the pit excavation. Laboratory testing on these samples has been carried out in the lab and includes determination of index properties.

Keeping in view, the results from field and laboratory tests, the use of subsurface soil deposits (clayey soils) for backfilling purposes is not recommended whereas the use of well-graded granular soil (A-1 a or A-1 b) is recommended for backfilling purposes. It should be ensured that the dry density achieved in field is not less than 100% of Modified AASHTO dry density during the compaction of backfill material. Confirmatory field tests such as field density tests are recommended to be carried out at each layer during backfilling.

#### **6.4.3 Seismicity**

The map shown in Figure – 6.3 indicates that the project area is falling in Zone 2A, with peak ground acceleration (PGA) varying from 0.08 to 0.16 (Pakistan Building Code of Pakistan, 2007). While proposed project area is quite away from Zone 4 which is called the High Damage Risk Zone and covers areas liable to MSK VIII



**Figure - 6.3: Seismic Zone Map of the Project Area**

#### 6.4.4 Climate

Like other Districts of Upper Sindh, Naushahro Feroze has extremes of cold and hot climates. However, there is slight variation between the climate of north and the southwestern part of the district. The south western portion enjoys the advantage of the sea breeze. The summer season commences from April and continues till October. May, June and July are the hottest months. The mean maximum and minimum temperatures during this period happen to be 44 & 26 degrees centigrade respectively. August and September are stuffy and suffocating. December, January and February are the coldest months. The mean maximum and minimum temperatures during these months are 28 degrees centigrade and 8 degrees centigrade respectively. The bright sunshine in winter makes the district one of the healthiest parts of the region. The monthly mean maximum and minimum temperatures and precipitation recorded at Naushahro Feroze during whole year are given as under, there are four distinct climatic seasons.

- Cold and moderate widespread rainfall - December through March.
- Extremely hot and dry April through June.
- Hot and Intense scattered rainfall - July through September.

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- Cool and dry- October through November

Naushahro Feroze has a hot climate (Koppen climate classification BWh) with extremely hot summers and mild winters. There is very little rain, and it mainly falls in the monsoon season from July to September. Occurs during the Monsoon season (July, August and September), while the period of minimum rainfall or drier period is October and November.

**Table - 6.3: Climate Data for Naushahro Feroz**

AVERAGE PRECIPITATION MM (INCHES)	RECORD LOW °C (°F)	AVERAGE LOW °C (°F)	DAILY MEAN °C (°F)	AVERAGE HIGH °C (°F)	RECORD HIGH °C (°F)	MONTH
1.2 (0.047)	-2.8 (27)	5.3 (41.5)	14.2 (57.6)	23.2 (73.8)	39.0 (102.2)	JAN
4.5 (0.177)	-3.0 (26.6)	8.1 (46.6)	16.9 (62.4)	26.0 (78.8)	37.0 (98.6)	FEB
4.5 (0.177)	3.0 (37.4)	14.0 (57.2)	23.0 (73.4)	32.2 (90)	41.1 (106)	MAR
2.1 (0.083)	10.0 (50)	20.2 (68.4)	29.6 (85.3)	39.0 (102.2)	47.3 (117.1)	APR
1.5 (0.059)	11.5 (52.7)	24.7 (76.5)	34.2 (93.6)	43.5 (110.3)	50.0 (122)	MAY
3.2 (0.126)	—	27.6 (81.7)	35.9 (96.6)	44.2 (111.6)	51.0 (123.8)	JUN
41.7 (1.642)	18.5 (65.3)	27.5 (81.5)	34.5 (94.1)	41.2 (106.2)	48.0 (118.4)	JUL
30.7 (1.209)	18.9 (66)	26.3 (79.3)	32.8 (91)	39.3 (102.7)	47.0 (116.6)	AUG
11.8 (0.465)	14.0 (57.2)	23.5 (74.3)	31.2 (88.2)	38.8 (101.8)	44.4 (111.9)	SEP
1.9 (0.075)	7.0 (44.6)	17.7 (63.9)	27.2 (81)	36.7 (98.1)	43.0 (109.4)	OCT
2.1 (0.083)	1.1 (34)	11.6 (52.9)	21.2 (70.2)	30.7 (87.3)	38.3 (100.9)	NOV
3.3 (0.13)	-1.1 (30)	6.6 (43.9)	15.6 (60.1)	24.5 (76.1)	32.7 (90.9)	DEC
108.5 (4.273)	-3 (26.6)	17.76 (63.97)	26.36 (79.46)	34.94 (94.91)	51 (123.8)	YEAR

#### 6.4.5 Rainfall

Rainfall Average annual rainfall in the project area wettest month (with highest rainfall) is July (41.7 mm) driest month (with lowest rainfall) is January (1.2mm) Maximum rainfall (about 60% of the total annual).

#### 6.4.6 Temperature

The entire Naushahro Feroze has extreme cold and hot climate and the soil formation is sandy and hard clay loams from Indus River formation.

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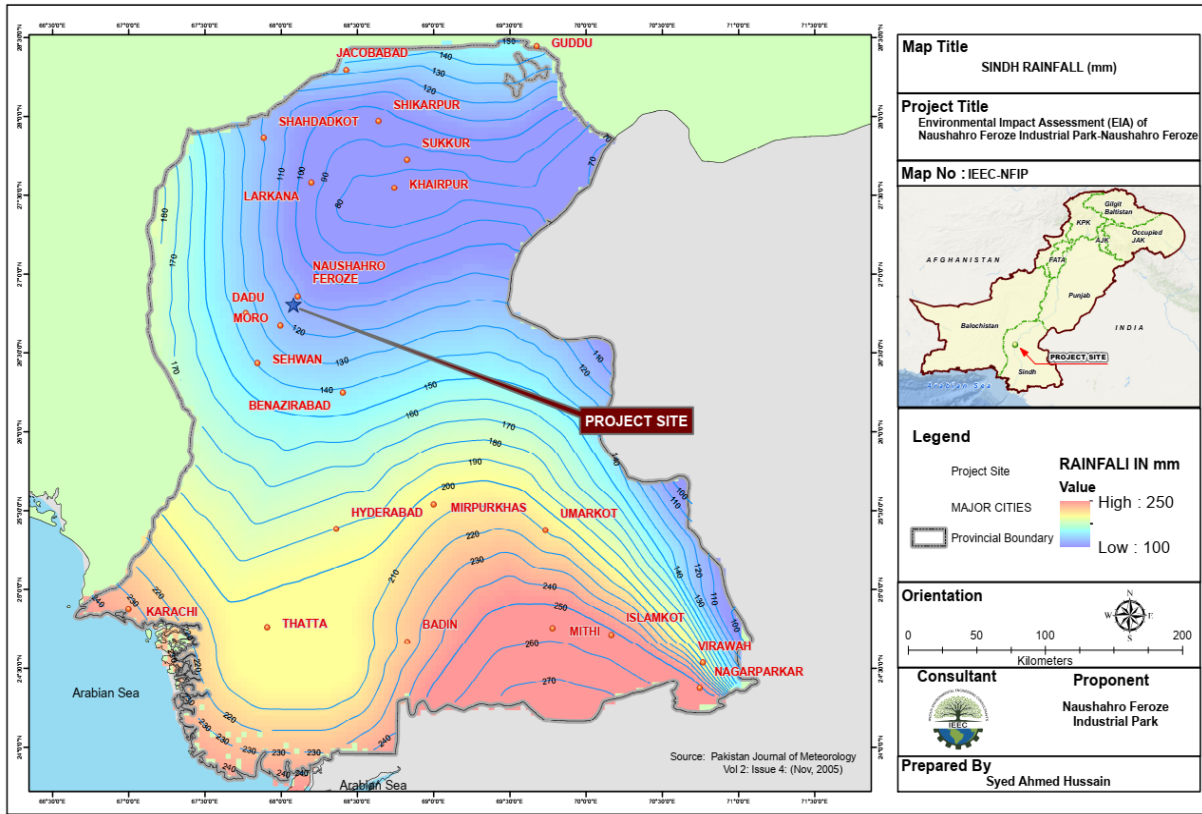


Figure - 6.4: Sindh Rainfall Map

Table - 6.4: Naushahro Feroze Average Rainfalls

Average Rainfall Naushahro Feroze, Sindh, Pakistan.		
Average Rainfalls	January	1.2mm
	February	4.5mm
	March	4.5mm
	April	2.1mm
	May	1.5mm
	June	3.2mm
	July	41.7mm
	August	30.7mm
	September	11.8mm
	October	1.9mm
	November	2.1mm
	December	3.3mm
	Wettest Month (With Highest Rainfall) Is July	(41.7mm)
Driest Month (With Lowest Rainfall) Is January	(1.2mm)	
<a href="http://www.weather-atlas.com/en/pakistan/naushahro-feroze-climate">http://www.weather-atlas.com/en/pakistan/naushahro-feroze-climate</a>		

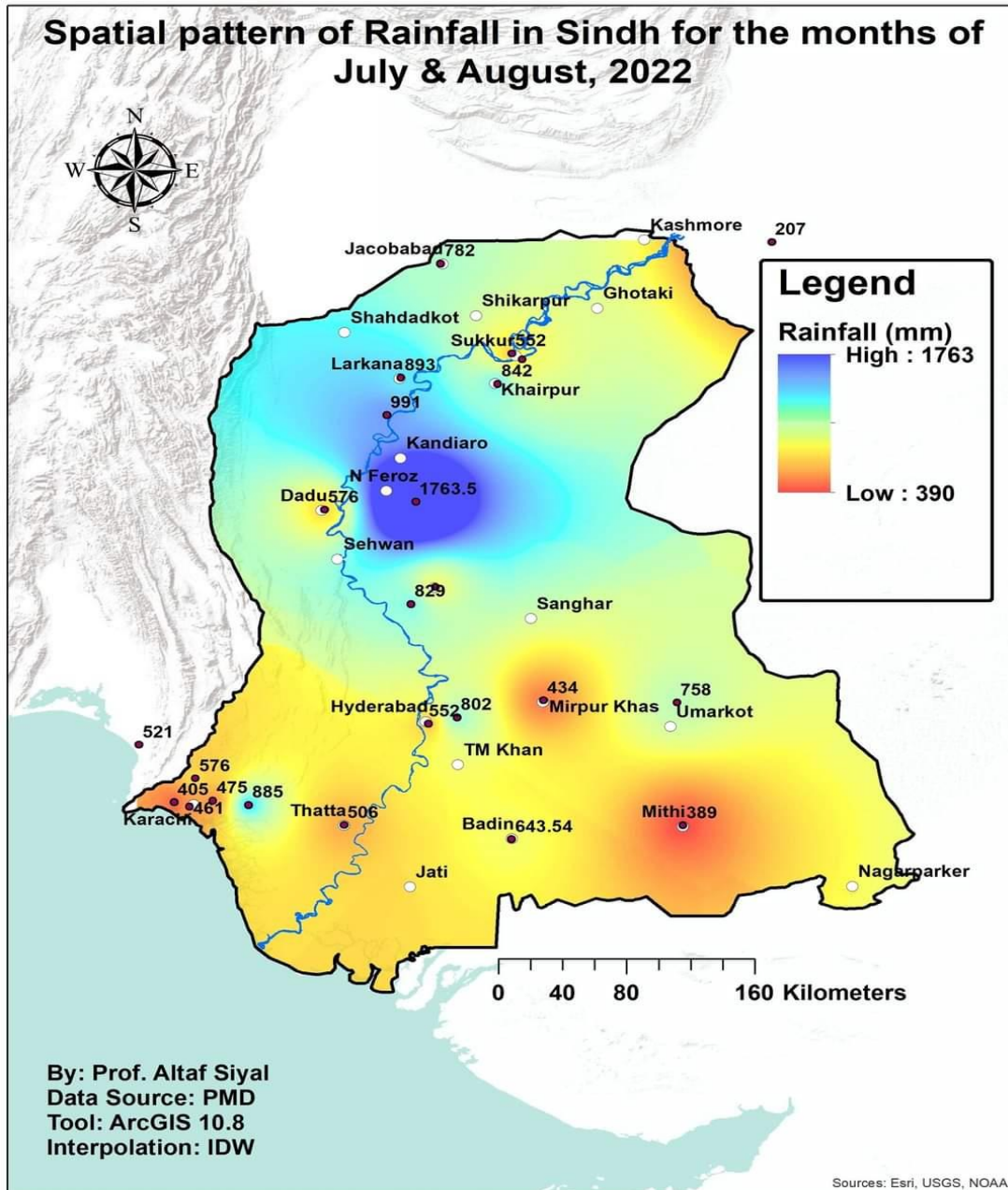


Figure - 6.5: Spatial pattern for Rainfall at Project Area

Table - 6.5: Naushahro Feroze Average Temperatures

Average Temperature Naushahro Feroze, Sindh, Pakistan.		
Average High Temperature	Months	Average Low Temperature
23.6°C	January	6.6°C
26.5°C	February	8.9°C
32.6°C	March	14.5°C
39.7°C	April	20.2°C
43.5°C	May	24.0°C
44.8°C	June	27.6°C
42.7°C	July	28.5°C

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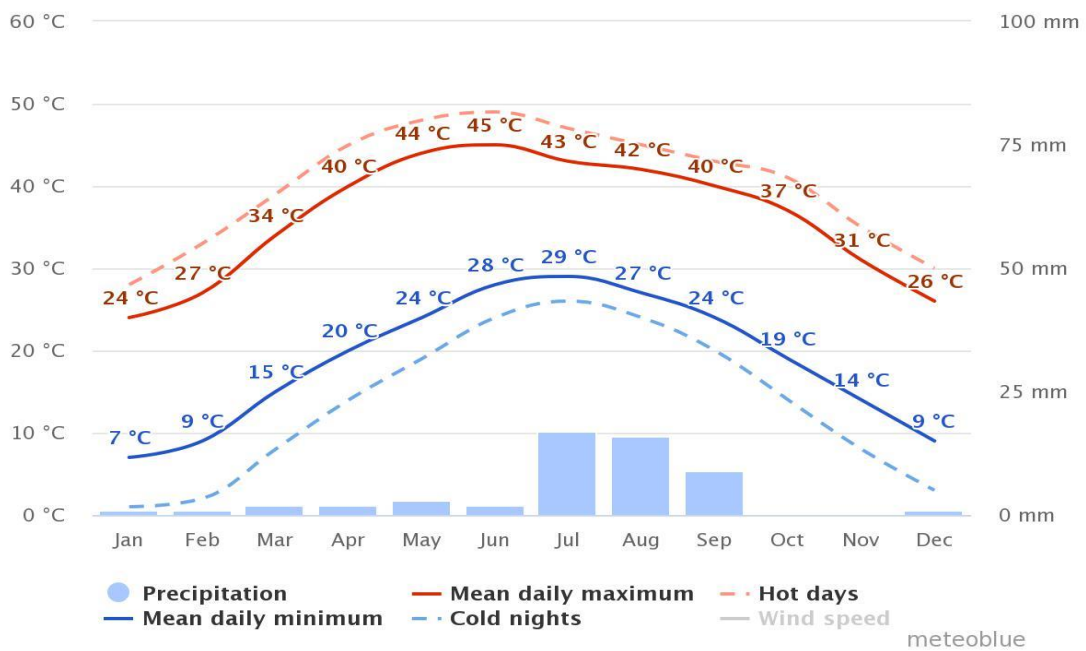
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Average Temperature Naushahro Feroze, Sindh, Pakistan.		
Average High Temperature	Months	Average Low Temperature
41.5°C	August	26.6°C
39.8°C	September	23.5°C
36.7°C	October	18.6°C
30.7°C	November	13.6°C
25.5°C	December	8.6°C

Warmest month (with highest average high temperature) is June (45.2°C). Month with lowest average high temperature is January (23.5°C)

<http://www.weather-atlas.com/en/pakistan/naushahro-feroze-climate>



**Figure - 6.6: The Mean Maximum Temperature & Precipitation**

#### 6.4.7 Wind

The wind blows throughout the year with highest velocities occurring during the summer months, June till July (2 to 5 knots at 0800 am and 2 to 6 at 0500 pm). Whereas the minimum Wind speed is during the month of November (2-3 knots at 0800 am and 3-4 knots at 0500 pm). The direction is primarily towards northwest during winter and southeast during summer months Average Wind speed never exceeds 6 knots (1 knot= 1.6 km/h) at 0800 am June and July are the months when windstorms occur. The wind rose for Naushahro Feroze shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE).



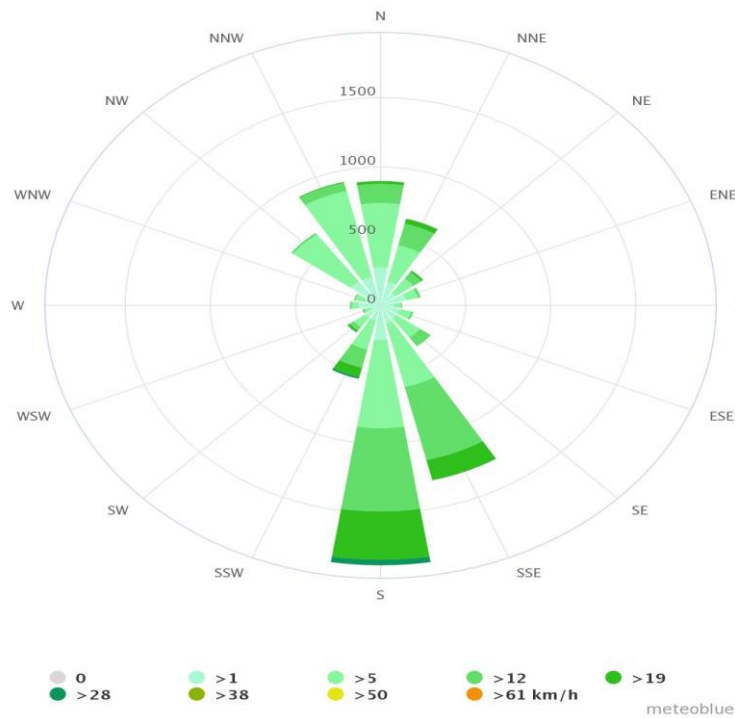


Figure - 6.7: The wind rose for Naushahro Feroze

### 6.4.8 Water Resources

#### 6.4.8.1 Surface Water

Sindh is one of the primary beneficiaries of the Indus Basin Irrigation System (IBIS). It has three major barrages on the Indus River that divert approximately 48 MAF of water annually to the 14 main canal commands in Sindh. These canal systems have an aggregate length of 13,325 miles and serve a gross command area of 14.391 million acres. There are about 42,000 watercourses, which have an aggregate length of about 75,000 miles.

#### 6.4.8.2 Surface and Groundwater Analysis

The groundwater sample was taken from the project site and tested in Sindh-EPA approved laboratory (named M/S Ducom Pakistan). The results indicate that the concentration of all the parameters for groundwater is well below the SEQs limits the analysis Report of Groundwater results is provided as follow. The sample of groundwater was collected on 18<sup>th</sup> November 2022. The parameters were analysed according to SEQs 2016. Results of baseline monitoring has been given in Table below while scan reports in Annexure – VII.

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**Table - 6.6: Drinking Water Analysis**

Sr.#	Test Parameters	Method	Limit	Unit	Results
1	Total Coli form count	EPA 1604	CSND	CFU/100ml	Nil
2	Color	Pt-Co color	< 15	TCU	2
3	Taste	Physical	--	--	No Objection
4	Odor	Physical	--	--	Odorless
5	Turbidity	EPA180.1	<5	NTU	3
6	Total Hardness	Titration	<500	mg/L	436
7	Total dissolved solids	Filtration	<1000	mg/L	893
8	pH	EPA150.3	6.5-8.5	--	7.89
9	Arsenic(As)	Atomic Absorption	<0.05	mg/L	<0.05
10	Chromium(Cr)	Atomic Absorption	<0.05	mg/L	<0.05
11	Nickel (Ni)	Atomic Absorption	<0.02	mg/L	0.01
12	Copper(Cu)	Atomic Absorption	<2	mg/L	0.04
13	Zinc(Zn)	Atomic Absorption	<2	mg/L	0.15
14	Aluminum	Atomic Absorption	<0.2	mg/L	0.03
15	Antimony	Atomic Absorption	<0.02	mg/L	<0.02
16	Barium	Atomic Absorption	0.7	mg/L	0.06
17	Boron	Atomic Absorption	0.3	mg/L	0.18
18	Cadmium	Atomic Absorption	0.01	mg/L	<0.01
19	Chloride	Method 811	<250	mg/L	185
22	Cyanide	Method 8171	<0.05	mg/L	<0.05
23	Fluoride	Method 8029	<1.5	mg/L	0.08
24	Lead	Atomic Absorption	<0.05	mg/L	<0.05
25	Manganese	Atomic Absorption	<0.5	mg/L	<0.02
28	Nitrite	Method 8507	<0.5	mg/L	0.13
29	Nitrate	Method 8171	<0.3	mg/L	0.10
30	Selenium	Atomic Absorption	0.01	mg/L	<0.01
31	Residual Chlorine	Method 8171	0.2-0.5	mg/L	0.2

**Table - 6.7: Ground Water Analysis**

Sr.#	Test Parameters	Method	Limit	Unit	Results
1	Color	Pt-Co color	< 15	TCU	12
2	Odor	Physical	--	--	Odorless
3	Turbidity	EPA180.1	<5	NTU	3
4	Total Hardness	Titration	<500	mg/L	486
5	Total dissolved solids	Filtration	<1000	mg/L	594
6	pH	EPA150.3	6.5-8.5	--	8.1
7	Arsenic(As)	Atomic Absorption	<0.05	mg/L	<0.05
8	Chromium(Cr)	Atomic Absorption	<0.05	mg/L	<0.05
9	Nickel (Ni)	Atomic Absorption	<0.02	mg/L	<0.05
10	Copper(Cu)	Atomic Absorption	<2	mg/L	1.3
11	Zinc(Zn)	Atomic Absorption	<2	mg/L	1.8
12	Aluminum	Atomic Absorption	<0.2	mg/L	0.14
13	Antimony	Atomic Absorption	<0.02	mg/L	<0.05
14	Barium	Atomic Absorption	0.7	mg/L	0.3
15	Boron	Atomic Absorption	0.3	mg/L	0.1
16	Cadmium	Atomic Absorption	0.01	mg/L	<0.05
17	Chloride	Method 811	<250	mg/L	248
18	Cyanide	Method 8171	<0.05	mg/L	<0.05
19	Fluoride	Method 8029	<1.5	mg/L	0.7
22	Lead	Atomic Absorption	<0.05	mg/L	<0.05
23	Manganese	Atomic Absorption	<0.5	mg/L	<0.05
24	Nitrite	Method 8507	<0.5	mg/L	0.44
25	Nitrate	Method 8171	<0.3	mg/L	0.26
28	Selenium	Atomic Absorption	0.01	mg/L	<0.05
29	Residual Chlorine	Method 8171	0.2-0.5	mg/L	0.3

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**Table - 6.8: Surface Water Analysis**

Sr.#	Test Parameters	Method	Limit	Unit	Results
1	Color	Pt-Co color	< 15	TCU	22
2	Odor	Physical	--	--	Odor present
3	Turbidity	EPA180.1	<5	NTU	16
4	Total Hardness	Titration	<500	mg/L	1236
5	Total dissolved solids	Filtration	<1000	mg/L	1690
6	pH	EPA150.3	6.5-8.5	--	8.4
7	Arsenic(As)	Atomic Absorption	<0.05	mg/L	18
8	Chromium(Cr)	Atomic Absorption	<0.05	mg/L	1285
9	Nickel (Ni)	Atomic Absorption	<0.02	mg/L	3564
10	Copper(Cu)	Atomic Absorption	<2	mg/L	8.4
11	Zinc(Zn)	Atomic Absorption	<2	mg/L	18
12	Aluminum	Atomic Absorption	<0.2	mg/L	2
13	Antimony	Atomic Absorption	<0.02	mg/L	1.6
14	Barium	Atomic Absorption	0.7	mg/L	3.5
15	Boron	Atomic Absorption	0.3	mg/L	2.4
16	Cadmium	Atomic Absorption	0.01	mg/L	6.8
17	Chloride	Method 811	<250	mg/L	1354
18	Cyanide	Method 8171	<0.05	mg/L	0.56
19	Fluoride	Method 8029	<1.5	mg/L	3.2
22	Lead	Atomic Absorption	<0.05	mg/L	6.7
23	Manganese	Atomic Absorption	<0.5	mg/L	9.1
24	Nitrite	Method 8507	<0.5	mg/L	16.2
25	Nitrate	Method 8171	<0.3	mg/L	12.4
28	Selenium	Atomic Absorption	0.01	mg/L	3.7
29	Residual Chlorine	Method 8171	0.2-0.5	mg/L	1.9

#### 6.4.8.3 Ambient Air & Noise Monitoring

The ambient air quality and noise level monitoring was conducted and compared against the Sindh Environmental Quality Standards (SEQS) for Sulphur dioxide (SO<sub>2</sub>), Oxide of Nitrogen (as NO), oxide of Nitrogen (as NO<sub>2</sub>), Ozone (O<sub>3</sub>), Suspended Particulate Matter (as SPM), Respirable Particulate Matter (as PM<sub>10</sub>), Respirable Particulate Matter (as PM<sub>2.5</sub>), and Carbon monoxide (CO), during 8 hours at the project site.

**Table - 6.9: Ambient Air Quality Analysis**

Sr.#	Test Parameters	Method	Limit	Unit	Results
1	Sulfur Dioxides(SiO2)	UV fluorescence	120	µg/m3	36
2	Oxides of Nitrogen as NO	Gas Phase Chemiluminescence	40	µg/m3	12
3	Oxides of Nitrogen as NO2	Gas Phase Chemiluminescence	80	µg/m3	22
4	Ozone(O3)	Non Dispersive UV absorption method	130	µg/m3	32
5	Suspended Particulate matter	B ray absorption method	500	µg/m3	210
6	Particulate matter(PM10) Repairable	B ray absorption method	150	µg/m3	54
7	Particulate matter(PM2.5) Repairable	B ray absorption method	75	µg/m3	43
8	Carbon Monoxide(CO)	Non Dispersive Infra Red method	10	µg/m3	2

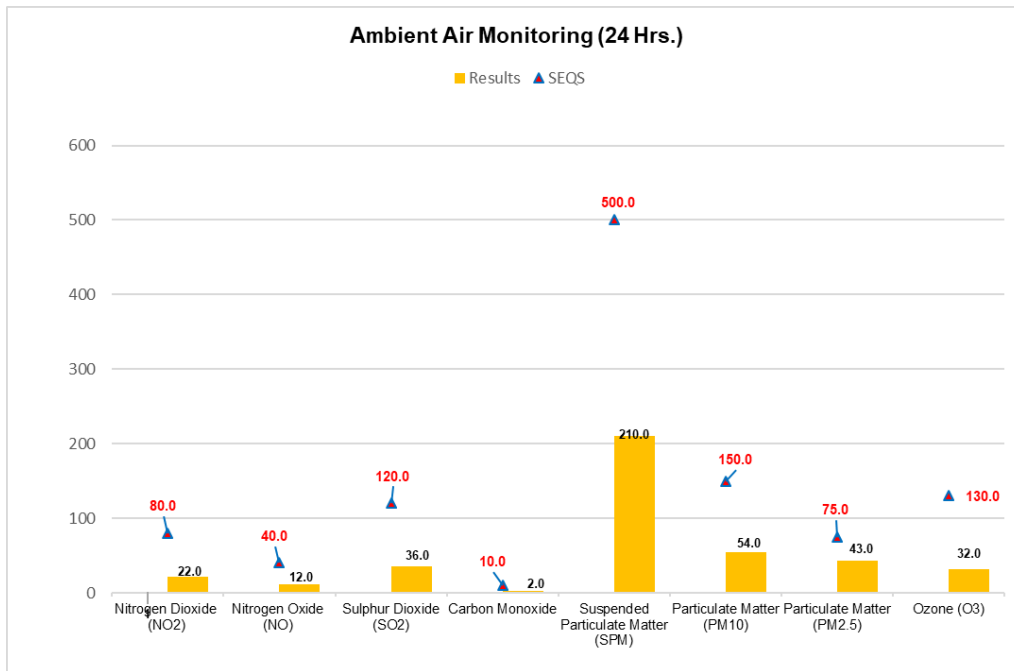


Figure - 6.8: Ambient Air Quality Monitoring Results

Table - 6.10: Ambient Noise Monitoring Results

S.No	Description	Co-ordinates	Unit	Limit	Result
1	Noise Level	Lat 26.790349 Long 68.093784	Decibel (db)	85	56.7
2	Noise Level	Lat 26.790362 Long 68.09375	Decibel (db)	85	55.9
3	Noise Level	Lat 26.790166 Long 68.094088	Decibel (db)	85	63.2
4	Noise Level	Lat 26.790673 Long 68.093885	Decibel (db)	85	65.8
5	Noise Level	Lat 26.79007 28.094729	Decibel (db)	85	53.3

## 6.5 Ecological Environment of the Project Area

The ecological environment includes terrestrial flora and fauna, aquatic flora and fauna, rare/endangered species and protected areas.

### 6.5.1 Forest

Forests are not only necessary for habitation of livestock population but also instrumental in improving environmental quality and dependable source for meeting domestic energy requirements of fuel wood. Besides it helps in conservation of soils, improve environment by controlling pollution, cause rainfall and climatic changes supplement source of energy and stabilize gas and oil prices. The forestry programme in Sindh envisages management of forest on commercial basis in the Riverine forests, irrigation plantation forests, mangrove forests, development of Social Forestry, Agriculture, Coconut and Range lands.

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Total forest area in Sindh is 1161 thousand hectares or 8.3% of the Sindh province area which is far below the desired ratio of 20 to 30 percent considered necessary for balanced ecology. The per capita forest area being 0.039 hectare in Sindh province or 0.032 hectares in the country was also quite low as compared to the world average of about 1.0 hectare.

In Naushahro Feroze District, the forest area is spread over 3.0 thousand hectares which is 0.3% of the total area under forest in Sindh in the year 1997-98. Naushahro Feroze district produced 40.0 thousand cubic feet timber wood and 19.1 thousand cft. Fire wood at the value of Rs.814.0 thousand which contributes about 4.6% of the total value of forest Timber & Fire wood in Sindh in 1996-97.

Progress in increasing forest area has been limited due to financial and social constraints. The only need to increase the forest wealth in the province of Sindh as well as in country is to extensively grow trees on farm lands. In order to involve farming community in tree growing activity, social forestry programmes have been launched throughout in the country with attractive incentives in the form of subsidized supply of planting stock, partial payment of planting cost, free protection of planted areas for a limited period of time and fair return to the farmers. The tree plantation on katcha/pucca road/canal path and in Government offices, health/education institution shall continue to be encouraged.

In the light of the above discussion the plantation at proposed project area has been proposed as per the following layout depiction, while detailed plantation strategy is given in relevant section.

### 6.5.2 Terrestrial Flora

The variation in climate between Upper and Lower Sindh is not reflected in any difference in the flora of the two zones. The vegetation is characteristic of edaphic conditions of the region viz. arid climate and sandy and calcareous soil, largely impregnated with salts. A notable feature is the predominance of plants and trees with small leaves, or none at all, and the large proportion of thorny species. The apparent contrast between the verdure of the riverine and irrigated tracts on the one hand, and the hilly and desert tracts on the other; is largely a matter of its intensity and distribution. The dwarf palm, Kher (*Acacia ruprstris*), and Lohirro (*Techoma undulata*) are typical of the western hill region as are Khip (*Periplo caaphylla*) and Phog (*Calligonum polygoni des*) of the eastern sandy desert. In the central valley, the Babbur (*Acacia nilotica*) tree is the most dominant and occurs in thick forests along the Indus banks. The Nim (*Azadirachtainidica*), Ber (*Ziziphus vulagaris*) or Jujuba, Lai (*Tamarix orienta lis*), Kirrir (*Capparis aphylla*) and Kandi (*Prosopis cineraria*) are the more common trees. Mango, date palms, banana, guava, orange and chiku are the typical fruit bearing trees. The coastal strips and the creeks abound in semiaquatic and aquatic plants, and inshore deltaic islands have mangrove forests of Timmar (*Avicennia marina*) and Chaunir (*Cerip stagal*) trees. Water lilies grow in abundance in the numerous lakes and ponds, particularly in the Lower Sindh region.

### 6.5.3 Terrestrial Fauna

Among the wild animals, the Sareh (Sindh ibex), Urial or Gadh (wild sheep), and black bear are found in the western rocky range. The Pirrang (large tiger cat or fishing cat) of the eastern

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desert plains is also disappearing. Deer lives in the lower rocky plains and in the eastern region, as do the Charakh (striped hyena), jackal, fox, porcupine, common gray mongoose, and hedgehog. The Sindhi phekari (red lynx or caracal cat) is encountered in some areas. Pharrho (hog deer) and wild boar occur particularly in the central inundation belt. There is a variety of bats, lizards, and reptiles, including the cobra, Lundi (viper), and the Peean, the mysterious Sindh krait of the Thar region, which is supposed to suck the victim's breath in his sleep. Crocodiles are rare and inhabit only the backwaters of the Indus and its eastern Nara channel. Besides a large variety of marine fish, the plumbeous dolphin, the beaked dolphin, orqual or blue whale, and a variety of skates frequent the seas along the Sindh coast. The Pa/lo (sable fish), though a marine fish, ascends the Indus annually from February to April to spawn and returns to the sea in September. The Bulhan (Indus dolphin) breeds in the Rohri-Sukkur section of the river.

#### **6.5.4 Aquatic Flora**

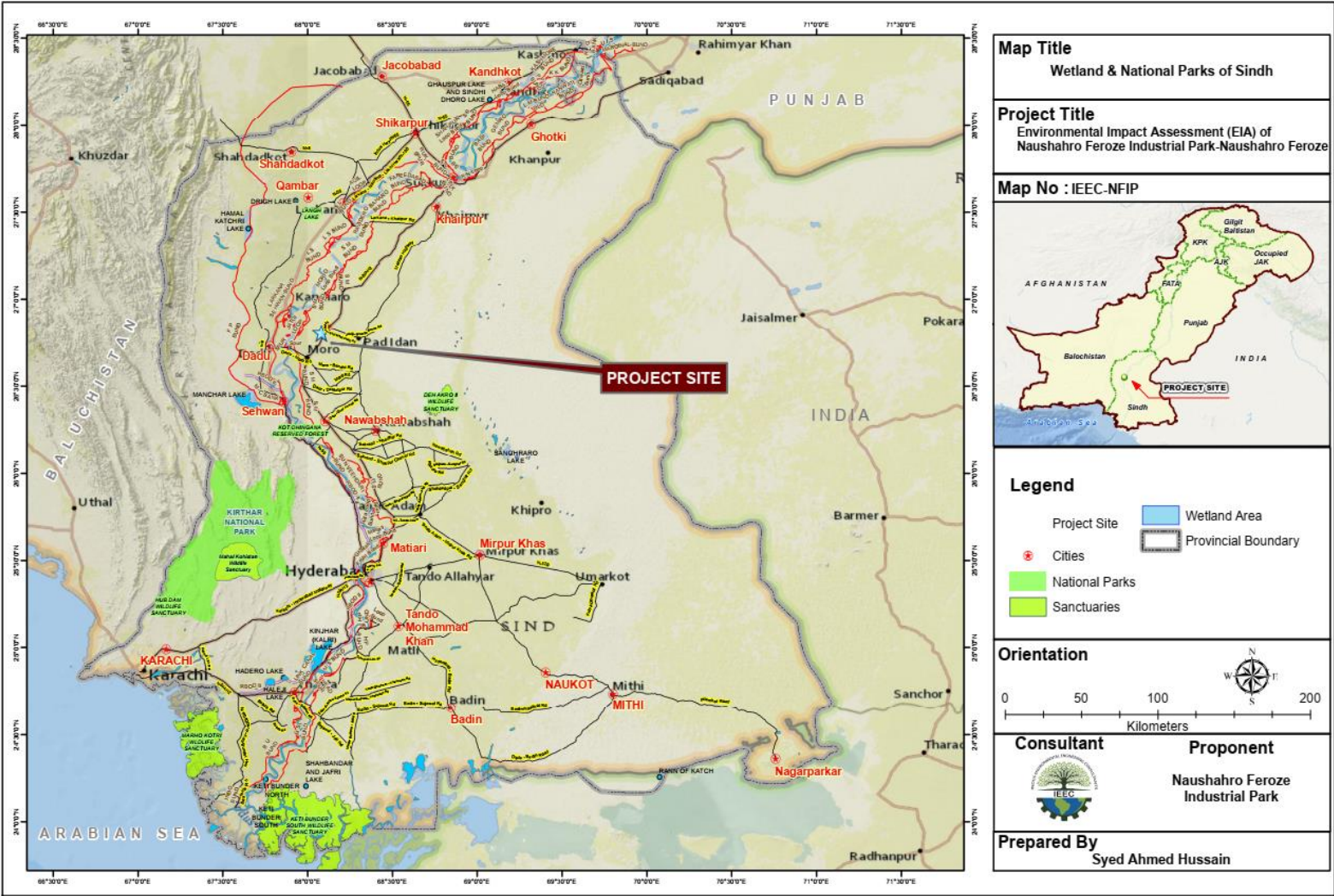
There are three water bodies in the project area namely Rohri Canal highly concentration of organic pollutants such as BOD and COD, the aquatic plant life is hard to survive in these water bodies.

#### **6.5.5 Aquatic Fauna**

Fish is the major aquatic fauna found in the project area. There are 6 private fish ponds owned by the local residents. The drains were also used to be the main sources of fish community around 20 years back, but after the industrial activities in the area, the aquatic life in these mediums has changed its habitat.

#### **6.5.6 Rare/Endangered Species and Protected Areas**

There exist no rare/endangered species and protected areas in the project area. (Refer Figure Below)



**Figure - 6.9: Protected Area Map with respect to proposed NFIP**



**6.6 Socio-Economic Environment of the Project Area**

This section covers the socio-economic conditions of the population that will be indirectly affected by the project. The socio-economic profile focuses on the sources of livelihood, income levels, and accessibility to social services like health, education etc.

The socio-economic data collection process covers the socio-economic profiles of the villages located in the immediate surroundings of the project site.

**6.6.1 Political and Administration Unit**

The district of Naushahro Feroze comprises of 4 talukas i.e. Naushahro Feroze, Bhirya, Kandiaro and Moro. The Administrative set up is based on 3 sub divisions viz: Naushahro Feroze itself, Moro and Kandiaro. The district comprises of one Municipal Committee, 9 Town Committees and 37 Union Councils. Very recently, the Town Committee Naushahro Feroze has been upgraded to the status of a Municipal Committee. The project area falls under the Moro Town Municipal Administration, City District Government, Naushahro Feroze. The NFIP is an administrative body of the Naushahro Feroze Industrial Park.

District Naushahro Feroze has its district headquarters in Naushahro Feroze city. This district has five talukas, named: Naushahro Feroze, Bhiria, Digri, Moro, Kandiaro and Mehrabpur. It has 51 union councils and 233 mouzas (revenue village). Out of the total mouzas, 194 are rural mouzas, 3 are urban, 15 are partly urban, 7 are forests and 3 are un-populated mouzas.

**Table - 6.11: Administrative Division Of District Naushahro Feroze**

NAUSHAHRO FEROZE	KANUNGO CIRCLES/ SUPERVISOR Y TAPAS	PATWAR CIRCLES / TAPAS	NUMBER OF MOUZAS					
			TOTAL	RURAL	URBAN	PARTLY URBAN	FOREST	UNPOPULATED
Naushahro Feroze District	14	97	233	194	2	27	7	3
Naushahro Feroze	3	21	60	51	1	7	-	1
Bhiria Taluka	2	17	33	21	1	10	-	1
Moro Taluka	4	26	53	47	-	2	3	1
Kandiaro Taluka	3	17	53	46	-	3	4	-
Mehrab Pur Taluka	2	16	34	29	-	5	-	-

Source: Mouza Statistics of Sindh 2008, Agriculture Census Organization



**6.6.2 Social, Political and Cultural Features**

The power structure in the NFIP project area, as revealed through the community profiles, is quite egalitarian and there are no major power monopolies by certain groups or families.

The existing communities reflect rural culture. The rural community has its own norms and values females are not exposed to males and exercise veil on their faces while going out of their houses. The women do all household work by themselves and their daughters help them.

**6.6.3 Settlement Pattern**

There are 1583 rural settlements having population 200-1000 of which 264 is categorized as settlements of population with 1000+ souls. By definition settlement is defined as "Place of human habitation from one isolated house to a big town or a city with certain identified location and name" on other hand the village as per definition of Board of Revenue Sindh is defined as "Place of human habitation having at least ten houses.

The village in population terms therefore could be defined as a place of human habitation having population of about 70-100 persons (7-10 household size) and above (but not more than 5000) with certain identified location and name. The Rural settlement pattern 200 and above according to survey conducted by Sindh Bureau of Statistics during 1995 are depicted below:

**Table - 6.12: Settlement Pattern**

Taluka	Settlement having Population			
	200-499	500-599	1000	+ Total
Naushahro Feroze	227	73	54	354
Moro	228	99	91	418
Kandiaro	239	119	62	420
Bhirya	231	103	57	391
Total:	925	394	264	1583

**Source: Sindh Bureau of Statistics**

The above table reveals that number of settlements having 200-499 constitute 58% of the total settlements of 200-1000. The rural settlements having population of 200+ may be considered as a cutoff point and need special attention by providing basic socio-economic facility School/Electricity. The rural settlements less than 500 and more than 200 (200-499) clearly qualify for a mosque school and provision of electricity. The rural settlements with population less than 1000 (500-999) may be considered for provision of education, electricity/pucca road facility and the rural settlements with population 1000 and above should be considered for all possible civic amenities to convert them into sub urban localities and to attract surrounding scattered hamlets to voluntary migration.

**6.6.4 Demographic Characteristics****6.6.4.1 Population Characteristics**

In Pakistan, male population is more than the female population and is among those four countries where life expectancy for female, at birth, is less than that of males. Sex ratio in district Naushahro Feroze is 106 males per 110 females, which is equal to the ratio at the National level that is also 106. Though there could be other possible reasons for such a difference in male to female ratio, one probable reason of this ratio could be underreporting of females during national surveys. Besides, a very high maternal mortality rate and poor health care at the district and provincial level are likely to be instrumental for this difference. District Naushahro Feroze, like majority of the other districts in Sindh, is rural by its characteristics. 82 percent of the population resides in rural areas as compared to the 18 percent that resides in the urban areas.

**6.6.4.2 Population Growth Pattern**

In 1998, the total population of the district was 1,087,571. Population of district Naushahro Feroze has an estimated growth rate of 1.61% per annum, which means that the population will double itself in 43.48 years from 1998. 45.63 percent of the population is below 15 years of age and 2.76 percent is 65 years or above. The estimated population for 2014 is 1,405,854, showing a 29% increase in 16 years from 1998.

**6.6.4.3 Population Distribution By Age And Gender**

Out of the total population, 52 percent are males and 48 percent are females. Largest cohort of the population is 5-9 years, which decreases with 5 years interval. Total population in this cohort is 237,957. Except in the age groups of 20-24 and 40-44, in all the rest of the age groups, male population outnumbered female population.

**6.6.4.4 Dependent Population**

The economically dependent population is considered to be the population that is less than 15 years and more than 65 years of age. In addition to them, widowed, and/or divorced women are also considered dependent population. Dependent population in the case of Naushahro Feroze district is 49.37 percent of the total population and the working population is 50.63 percent, which shows that dependency ratio in the district is 94 percent.

**6.6.5 Education Sector**

The Majority of Schools in the District belonging to Government are functioning under the supervision of District Education Officer (Male/Female). Education is basic right of the people; therefore, Primary Education for Children male/Female is mandatory and it is provided free of cost in the province of Sindh. The formal educational structure in Sindh is divided into four main streams, the first level known as primary refers to Grade 1-V for age of school going population 5-9 years, 2nd stage includes middle secondary, elementary and higher secondary. The third

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stream is called college education which consists of higher education. After completion of the college education, a candidate is awarded Bachelor degree in Arts/Commerce or Science. Duration of post-secondary education varies in Technical and Professional fields, the Poly-Technic Institutes offer four years B-Tech course. A Bachelor degree in medicines requires five years education. Similarly, Bachelor degree courses in Engineering, Agriculture and Veterinary medicines are awarded of four years duration after the intermediate examination.

An additional two years after the bachelor degree are required to acquire a master degree in Arts/Commerce or Science leading to award of Ph.D degree which may require two or three more years after the completion of master degree course.

#### 6.6.5.1 District School Enrolment Ratio

The education status is quite better in district Naushahro Feroze. The overall literacy rate (for the population of 10 years and above) is 60%; for male it is 77% and for female it is 40%. For the urban rural comparison, urban literacy rate is higher than the rural, which is 77% (male: 87% and female: 66%); whereas the rural literacy rate is 56% (male: 75% and female: 35%). Adult literacy rate (for the population of 15 years and above) is 57%. Gross Enrollment Rate<sup>32</sup> (GER) at the primary level in Naushahro Feroze is 79% (Male: 92%, Female: 66%), in urban community it is 98% (Male: 98%, Female: 98%) and in rural community it is 75% (Male: 90%, Female: 59%).

Net Enrollment rate<sup>33</sup> (NER) at the primary level in district Naushahro Feroze is 55% (Male: 59%, Female: 51%), in urban community it is 70% (Male: 69%, Female: 71%) and in rural community it is 52% (Male: 57%, Female: 47%). Table 6.21 shows details of Gross and Net Enrolment Rates by Rural, Urban and Gender at different levels.

Urban/ Rural/ District	Gender	Gross Enrolment Rates			Net Enrolment Rates		
		Primary	Middle	Metric	Primary	Middle	Metric
		Group (5-9)	Group (10- 12)	Group (13- 14)	Group (5-9)	Group (10- 12)	Group (13- 14)
Urban	Male	98%	73%	80%	69%	33%	27%
	Female	98%	67%	82%	71%	33%	32%
	Total	98%	71%	81%	70%	33%	29%
Rural	Male	90%	58%	48%	57%	19%	11%
	Female	59%	25%	24%	47%	13%	6%
	Total	75%	45%	38%	52%	16%	9%
Total	Male	92%	60%	53%	59%	21%	14%
	Female	66%	34%	35%	51%	17%	11%
	Total	79%	49%	45%	55%	19%	12%

#### 6.6.5.2 Gender and Level Wise Details

The total enrollment of students in the government schools of district Naushahro Feroze is 234,526 (Male: 141,220 and Female: 93,306). Out of a total of 6,992 teachers, 5,415 are male and 1,577 are female teachers. This illustrates that one teacher is teaching averagely 34 students. The total boys' schools of District Naushahro Feroze are 565, and the total female schools are



334. Besides, there are 1,518 mixed gender schools. Thus, the total number of schools is 2,417 and averagely every school has an enrolment of 97 students and a teaching staff of around 334.

### **6.6.5.3 Primary**

The total number of primary level schools, that are reported, is 2,179 and the total enrollment at the primary level is 156,928 (Male: 93,543 and Female: 63,385). Total number of teachers, at the primary level, is 4,984, out of which 3,920 are male and 1,064 are female teachers. Thus, on an average, each primary school has an enrolment of 72 students with a teaching staff of 2. However, the student class ratio is 50 and each school has averagely around 1 class rooms.

### **6.6.5.4 Middle**

There are a total of 150 middle schools reported. Total enrollment, at the middle level, is 16,141 (Boys: 8,055 and Girls:8,086). The total number of teachers at the middle level is 555, out of which 386 are male teachers and 169 are female teachers. Thus, on an average, each middle school has an enrolment of 108 students with a teaching staff of 4. However, the student class ratio is 61 and each school has averagely around 2 class rooms.

### **6.6.5.5 Matric**

There are a total of 69 secondary schools. Total enrollment at the secondary level is 37,066 (Boys: 24,995 and Girls: 12,071). The total number of teachers at the secondary level is 940, out of which male teachers are 756 and female teachers are 184. Thus, on an average, each secondary school has an enrolment of 537 students with a teaching staff of 14. However, the student class ratio is 53 and each school has averagely around 10 class rooms.

### **6.6.5.6 Higher Secondary**

There are a total of 19 higher secondary schools in the district. Total enrollment at the higher secondary level is 24,391 (Boys: 14,627 and Girls: 9,764). The total number of teachers at the higher secondary level is 513, out of which male teachers are 353 and female teachers are 160. Thus, on an average, each higher secondary school has an enrolment of 1,284 students with a teaching staff of 27. However, the student class ratio is 109 and each school has averagely around 12 class rooms.

### **6.6.5.7 Technical/Commercial vocational Education**

Presently, in Naushahro Feroze 6 Commercial training Centers are having enrolment of 214 students. Besides these 2 vocational institutes for women in Naushahro Feroze and Moro Taluka have intake capacity of 100 students with enrolment of 55 female students.

## **6.6.6 Occupation, Employment and Workforce**

Based on the sample-based socio-economic survey of the project area, Table 6.23 presents distribution of household members by occupation.



**Table - 6.13: Distribution of Household Members By Occupation**

OCCUPATION	PERCENTAGE
Agriculture	37.68
Shopkeeper	1.67
Student	19.69
Labor	10.81
Teacher	0.90
Tailor	0.79
Factory Worker	0.79
Driver	0.79
Unemployed	0.00
Housework	26.98
Total	100.00

**6.6.7 Agriculture Sector**

Agriculture sector plays a significant role in the overall economic performance of Pakistan. Currently, this sector provides employment opportunities to 45% of the labor force in Pakistan. This sector provides sources of livelihood to 60% of the population in the rural areas. Agriculture contributes 21% to the Gross Domestic Product (GDP) of Pakistan. Naushahro Feroze contributes significantly in agriculture sector of Sindh because its climate is suitable for production of various food items including the Kharif crops of maize, rice, sugarcane, cotton and the Rabi crop of wheat. In addition to these, fruit orchards are abundant in this district. Mouza statistics have reported that fruit orchards are widespread in 57% of the mouzas.

Total reported area of the district is 303,000 hectares, out of which 161,000 hectares (53%) are cultivated. Within the cultivable area, 169,000 hectares are net sown whereas 30,000 hectares are currently fallow lands. The remaining 112,000 hectares of the total reported area is un-cultivated; out of which 53,000 hectares are not available for cultivation, 10,000 hectares are forests and 49,000 hectares are cultivable waste.

**Table - 6.14: Land Utilization Statistics of District Naushahro Feroze**

NAUSHAHRO FEROZE		AREA
<b>Reported Area</b>		303
<b>Cultivated</b>	Total	161
	Current Fallow	30
	Net Sown	169
	Total	112
<b>Un-cultivated Area</b>	Cultivable Waste	49
	Forest	10
	Not available for Cultivation	53

Source: Sindh Development Statistics

**6.6.8 Livestock**

Livestock sector maintains a unique position within the agriculture sector of Pakistan. It contributes about 56% to the value addition in agriculture sector of Pakistan. It also contributes 11% to the GDP of Pakistan. Besides, this sector provides foreign earnings, dairy products' needs,

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food security and daily cash income to the people of Pakistan. It helps to reduce the income inequalities, especially in case of emergencies (floods, crop failure). Hence this sector is considered as most secure source of livelihood for small farmers and landless poor. The share of Sindh province in livestock population of Pakistan is 20%. The livestock population of district Naushahro Feroze is given in the following table.

Pakistan's economy has undergone considerable diversification over the years yet the agriculture sector still constitutes its back-bone. With its present contribution to GDP at 24.87 percent, Agriculture accounts for half of the total employed labour force and are the largest source of foreign exchange earnings while it serves as the base sector for the country's major industries like textiles and sugar.

The economic development of Sindh is largely dependent on the progress and growth of Agriculture sector. Sindh province contributes significantly towards over all national agriculture with 26% of the cultivated area, 17% of the cropped area and 16% of the irrigated area, 19% of the total forest area, 43% of the total production of rice, 25% of cotton, 14% wheat, 30% sugar cane, 22% other food grains, 59% of marine fish, 60% of inland fish and 28% of the livestock production originates in Sindh. Lower productivity levels per hectare continue to be problem No. 1 of crop production. Over the last ten years period, most insignificant increases are noticeable in yield of major crops over several years in view of efforts undertaken to eradicate water-logging and Salinity, provision of new seed varieties, increased use of fertilizer, pesticides, provision of agriculture extension services and on-farm water management practice and close co-ordination among farmers and agricultural field staff. Achievements of self-sufficiency in major crop production must, therefore, address to the key issue bottlenecks. The enhancement of yields in the shortest possible time needs to be taken by reviewing existing programme by involving farming community in co-operative manners reducing reliance on extension staff.

Live Stock is one of the major sub-sectors of Agriculture and back bone of our economy. It contributes roughly one third in the total share of Agriculture GDP. Its main by-products including hides and skins have substantial potential as semi-finished products. A substantial growth on Live Stock products such as milk, meat, beef, mutton, poultry and eggs have been noticed since many years.

It has been estimated that over three - fourths of the farm power comes from animals, and they are used for most of the farm operations. Bullocks provide the draft power on farm and in transport around the villages.

Most farmers traditionally keep a few heads of livestock, ranging from bullocks for draft to buffaloes or cattle for milk and poultry for eggs & meat. There is a need for increasing the heads of livestock to supplement income by selling products. Production for market even at the expense of consumption at home has become quite common in many areas of Sindh. There are pockets of organized livestock farming, such as cattle farms (or colonies) and poultry farms located mainly in the urban areas. Most other units are of small size and not well kept.

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As per livestock census 1996, the population of cattle, buffaloes, sheep and goats in Naushahro Feroze district were recorded at 309207, 395090, 110529 and 26528 respectively. The population of livestock grew by 4.7% cattle, 5.7% buffaloes, 1.3% sheep and 4.8% goats over the last livestock census enumerated in 1986.

Meat, hair, hides, skins and wool are the other major products of livestock. Beef is the most important source of meat. But most of this beef is produced from discarded old bullocks, milch cattle and buffaloes, and buffalo calves. Mutton comes next in the market place, and it is provided by a variety of goats and sheep.

During the recent years it was reported that 48117 animals were slaughtered in the Naushahro Feroze district. Out of the total slaughtered animals, 12684 cattle, 9229 buffaloes, 6272 sheep and 11932 goats were slaughtered. It was estimated that 4.1% cattle, 2.3% buffaloes, 5.7% sheep and 2.3% goats were slaughtered out of the total livestock population in 1997-98. It was observed that slaughtering of cattle was increased by 93.7% whereas in case of buffaloes, sheep and goats were decreased by 1.5%, 54.6% and 54.9% respectively.

In order to meet the requirements of meat and milk, livestock farming seems to be necessary in joint venture of public/private sector or helping private sector in importing the livestock for establishing livestock farms through loans on easy terms & conditions. The Naushahro Feroze district possesses vast potential for establishing livestock farming in the district.

#### 6.6.9 Veterinary Institution

The under nourishment, disease and internal parasites, act as a serious constraint on animal production. The animal has to be guarded against ill health, and preventive/curative measures are required to be taken regularly. The veterinary hospitals, dispensaries and centers provide preventive and curative services for disease control for livestock.

In Naushahro Feroze district one veterinary hospital, 9 dispensaries and 28 veterinary centers were functioning during the year 1997-98. In all 38 veterinary institutions were available to provide health coverage and treatment facilities to the entire livestock of the district. Total number of 866 veterinary institutions was established in the Province of Sindh which translated into the health care ratio of one veterinary Institution for 2628 livestock. It is worked out that Naushahro Feroze district had 4.4% of the total veterinary Institutions in Sindh.

The establishment of veterinary hospitals/centers at district, tahsil and taluka level has hardly contributed towards livestock disease control. Though expansion of livestock dispensaries and centers in the rural area has partially been successful in disease control there is a dire need for diversification of veterinary health institutions from cities to rural areas.

The existing position indicates that 130417 animals were treated, and 155913 animals were vaccinated for the control of various diseases in veterinary institutions thereby representing 9.7%



of curative and 11.6% of preventive coverage over the total livestock population in Naushahro Feroze district.

## 6.7 Land Utilization

The pattern of land use in a region determines crop production. Soil & climate play an important role in the management of cropping pattern of a region. Crop area used for food and cash crops can be taken as an index of the type of land system and the economic use for these crops. Land use data for latest five years are given in table No.1. The reported area in Naushahro Feroze increased from just over 294.4 thousand hectares in 1993-94 to 302.1 thousand hectares and remained the same up to 1996-97. It declined by 2.6% during the year 1997-98 & registered at

302.1 thousand hectares. However, not all of this area is cultivable and 27.5% was reported as "uncultivable."

The share of cultivated area (in the area reported) was 72.5% in 1997-98. It, however, is still higher as compared to overall Sindh reflecting higher cropping intensities. From the data given in table No.1, the cropping intensities had been increased since last many years and an acre of land in Naushahro Feroze district is almost cropped fully in a year. However, the cropped area decreased from 226.7 thousand hectares in 1996-97 to 216.4 thousand hectares in 1997-98 and occupied same position as in 1993-94. The cropping intensity is recorded at 101.4%. A small part of the area about 4.8% is being used for grazing or forest and remaining land is lying unused due to unfavorable condition or lack of irrigation water.

It is noted that the pressure of total rural population on cultivated area has increased considerably since last many years. The ratio of cultivated area per person decreased from 0.26 in 1993-94 to 0.21 in 1997-98.

### 6.7.1 Crop Position

There are two main crop seasons; "Kharif" and "Rabi" in Naushahro Feroze District. The Kharif season starts from April-May and ends in October-November while the Rabi starts from November- December and ends in April-May. However due to regional variation in temperature, several factors i.e varieties, availability of water, soil texture etc. determine the crop pattern, sowing and harvesting time. The Crops are further categorized into major and minor crops. Wheat, Cotton, Rice, Sugar- cane are the major crops of the district; Jowar, Rapeseed & Mustard, Mattar, Onion, Bajra and Maize fall in the category of minor crops.

### 6.7.2 Wheat

Wheat is also a staple food crop of the people of Naushahro Feroze district. Thus, it occupies the majority of cultivated land under wheat. Its share in total cropped area was recorded at 58.9%. The area and production of wheat for the year 1997-98 were estimated at 127.4 thousand hectares and 375.2 thousand tones respectively. The yield, however, was recorded at 2945 kgs.





The wheat production significantly increased by 22.2% during the year 1994-95 and the situation generally remained satisfactorily over the last five years since it grew at the rate of 5.5% due to favorable weather condition at sowing times.

### **6.7.3 Cotton**

Cotton is not only an export earning crop but it also provides raw material to local textile industries in Naushahro Feroze as well as Sindh. Its share in production stands at 9.1% in Sindh. at 56.3 thousand hectares and 211.8 thousand bales representing slightly decrease in area by 0.1% and an increase in production by 1.5% over the previous year. However, the yield per hectare also increased by 1.6% from 629 kgs per hectare in 1996-97 to 639 kgs per hectare in 1997-98.

### **6.7.4 Rice**

Rice is an important food as well as highly valued cash crop that earn substantial foreign exchange for the country. Despite relative price having favored the high yielding varieties, farmers traditionally grow the IRRI, and other varieties in district Naushahro Feroze.

The area under rice decreased by 19.0% from 8.5 thousand hectares in 1996-97 to 6.8 thousand hectares in 1997-98. Besides, the production of rice also went down significantly by 17.9% from 17.4 thousand tones to 14.3 thousand tones. However, yield per hectare slightly increased by 1.4% from 2057 kgs per hectare to 2085 kgs per hectare.

### **6.7.5 Sugarcane**

Sugar production in the Sindh province depends mostly on sugarcane crop. Keeping in view its importance, great deal of attention has been paid to increase both the area and production of sugarcane. It was reported that during the year 1997-98 the sugarcane area and production upsurge by 4.7% & 9.8% respectively.

Similarly, the yield per hectare increased by 4.9% from 56.9 metric tons per hectare in 1996-97 to 59.7 metric tons per hectare in 1997-98. The increase was mainly due to the attractive incentives to the farmers provided by the sugar mill management and also due to an increase in support price and favorable climatic condition prevailing in the sugarcane growing areas of district Naushahro Feroze.

### **6.7.6 Minor Crops**

The information available in table No.3 depicts that Jowar, Rapeseed & Mustard, Mattar, Onion, Bajra and Maize were the minor crops which contributed the share of 5.8%, 4.3%, 0.7%, 0.7%, 0.5% and 0.2% in the total cropped area of the district Naushahro Feroze respectively during the year 1997-98.

**6.7.7 Fertilizer**

Fertilizer is one of the major inputs which can enhance the crop production. The timely application and use of correct doze is an essential factor for increasing crop yields. Its contribution to increased crop production is about 50%. Mostly, the soils of Naushahro Feroze district are fertile but they are deficit in nitrogenous and phosphatic nutrients. Nitrogen is very essential for accelerating plant vigour producing large number of flowers, number of sound seeds per capsule and their proper size. It increases protein content of the seed as well. Phosphorous contributes in photosynthetic activities of plants, formation of seed, fiber and proper development of root system.

The recommended doses of nitrogenous, phosphatic & potassium fertilizer vary from crop to crop. Other factors like fertility of soil, topography, availability of water, use of quality seed, proper preparation of land, etc. also contribute towards crop production.

The information available in table No.4 on off-take of fertilizer for the period from 1993-94 to 1997-98 depicts that it grew at the rate of 3.9% per annum in Naushahro Feroze district. The total off-take of fertilizer (N+P+K) in Naushahro Feroze district in both the Kharif and Rabi seasons of 1997-98 was 37.9 thousand nutrients tones which was 17.3% lower than the corresponding period of the last year. It is estimated that off-take of fertilizer in Naushahro Feroze district was 6.3% of the total off-take in Sindh.

**6.7.8 Improved Seed**

Quality of seed is a basic requirement for increasing the production and productivity of the crop. It is a low-cost input but has the potential to increase crop yield on an average by 20% as compared to non-certified seeds. It is reported that sale of certified seeds has been declining since many years. The figures indicate in table No.5 that the sale of wheat, paddy and cotton certified seeds drastically decreased by 97.6%, 49.9% and 88.5% respectively over the period of last five years. The sale of wheat certified seed was recorded at 220 thousand kg mds at the cost of Rs.101 thousand during the year 1997-98 which was 79.1% lesser than the preceding year. It is estimated that 88.9 thousand hectares of wheat crop were cultivated under certified seed which was only 0.07% of the total cropped area under wheat in Naushahro Feroze district.

The distribution of improved paddy seed was estimated at 324 kg mds with a total outlay of Rs.121.5 thousand during the year 1997-98. Its share to the total cropped area under paddy in Naushahro Feroze remained at 3.8%. Similarly, the sale of cotton certified seed is reported at 256 kgs mounds with estimated cost of Rs.337.5 thousand in the year 1997-98 which was 82.0% less than the previous year. Likewise, its share in the total cropped area was 0.7%.

The most farmers use their own farm seed. Vast majority have little access for quality control as the public agencies and market agencies do not provide more than 3 to 17 percent of good and certified seed for these crops. The less use of improved seed is one of the most serious factors for obtaining low yields.

**6.7.9 Pesticides**

Pesticides play a major role in protecting crops from the attack of pest and disease. It is estimated that crop losses during the growth season and after harvesting caused by insects & pests are considerably high to the extent of 25%. Many of these losses are avoidable, if proper preventive and curative measures are taken. Plant protection measures, dependent mainly on pesticides, are grossly inadequate even for the four leading crops. The most preferred use of plant protection measures on crops are now the ground sprays both as preventive and curative measures.

Increase in cropping intensities and cultivation pattern help in the development of permanent flora for retaining the sufficient quantity of seed in soil. The application of tillage operation including hand labor for control of weeds is not traditionally practiced due to shortage of labor and its high costs. Weedicides are not mostly used; however, only insignificant progressive farmers are applying weedicides in wheat crop.

It is reported that the area of 3558 hectares under wheat crops was treated with 7.5 metric tons weedicide for the control of weeds which covered only 2.8% of the total area under wheat in Naushahro Feroze district in 1997-98.

The latest information available on use of pesticides indicates that the plant protection measures were carried out over an area of 2087 hectares under rice crop which utilized the pesticide of 2.4 metric tons. The coverage was only 30.9% of the total area cultivated under rice in district Naushahro Feroze. Cotton crop is attacked by large number of insect & pests from sowing to picking stages. In Naushahro Feroze district, 124.9 thousand hectares under cotton were treated for the control of insect pests. The coverage was 214.3% of the total area under cotton which consumed 380.5 metric tons of pesticides. The figure of coverage indicated that the same area of cotton was sprayed/treated more than twice. Similarly, Sugar Cane crop with an area of 17.1 thousand hectares was protected from the attack of insect pests. The 19.1 metric tons pesticides were used with coverage of 73.0% of the total area under sugar cane in Naushahro Feroze district.

**6.7.10 Inland Fisheries**

For inland fishing, main economic activity is practiced in rivers, lakes and ponds, etc. in Sindh province. Fish not only supplements protein deficiency of food but also earns foreign exchange for the country. A fishery contributes to both the national income and export earnings. Inland fish production has been increasing over the years. In Naushahro Feroze district the inland fish production registered an increase of 11.7% to 86 m.tones in 1997 over the preceding. It is estimated that Naushahro Feroze district contributes 0.1% of total 91903 m.tones inland fish production of Sindh. It is reported that 150 fishermen were engaged full time in the fisheries sector whereas 885 fishermen contributed their services for part time during the year 1997. Total numbers of boats used for the catchment of fish were 147. Of these, 69 boats were sail type and 31 boats were row type. Per capita consumption of inland fish in the province of Sindh is very low i.e., 3.1 kg only. Keeping in view of the high-rate population growth, production from land resources will not be able to keep up with the population increase. Protein deficiency could



become serious problem in near future. In order to solve this, fish production needs proper attention to exploit the abundant resources to meet the protein needs of a growing population.

### 6.7.11 Food Storage

Maintenance of food grain reserves is necessary to meet the off-season requirements and to stabilize the prices. To achieve this end storage facilities are required by the producers as well as by marketers, processors and the government. The farmer needs storage in order to sell when prices are favorable and reduce seasonal fluctuations in prices. The government requires stocks to carry out the country through bad years. Government role as the distributor agency of essential items necessitates enlargement of storage facilities.

The main thrust of government storage policy is to make available proper storage facilities, bring improvement in grain handling system & reduce grain losses to ensure the supply of adequate and good quality of food grains to the consumers. Food storage in public sector was provided for wheat, rice & cotton.

As a result of significant increase in domestic production and future needs of storage for important agricultural commodities and inputs, the demand for increase in storage capacity has become acute.

As per information the storage capacity of 746120 metric tons was available with government of Sindh. Of these, 95% godown's capacity owned by food department. Additionally, 0.4% H.type storage accommodation was constructed through annual development programme while 4.6% storage facility was provided at an open plinth. Whereas Naushahro Feroze district had storage accommodation with total capacity of 711120 metric tons. In addition, district had the open plinth storage facility of 35000 metric tons.


### 6.7.12 Industry

#### 6.7.12.1 Existing Manufacturing Units (Medium & Large Scale)

The manufacturing establishments in district Naushahro Feroze are reported as 15 units during the latest census of manufacturing Industries (CMI) 2016. By comparing with the previous census that took place in 1997-8, under which 3 units were reported, it shows that 12 units have been increased. The leading order of the manufacturing groups during 1997-98 is given below:

**Table - 6.15: Existing Manufacturing Units (Medium & Large Scale)**

INDUSTRIAL UNITS	FUNCTIONING IN NUMBERS
Cotton Ginning	102
Rice Mills	13
Oil Mills	25
Sugar	01
Miscellaneous	14

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The detailed position of above-mentioned Cotton Ginning Sugar Mills and Rice Mill (location wise) is given as follows.

### **Taluka Naushahro Feroze**

In this taluka there are 4 establishments (3 Cotton Ginning and one Oil Mill) reported during the census of manufacturing industries (CMI) 1997-98 against the total number of 15 units for the whole district.

### **Taluka Kandiaro**

In this taluka, there are 5 industrial units including 3 Cotton Ginning Mills, one Oil Mill and a Rice Mill as reported during the last census.

### **Industries in Rest of District**

In the rest of District Naushahro Feroze, there are only 6 Industrial Units including 4 units in Moro and 2 units in taluka Bhirya as reported during the census.

### **Sugar Mill In District Naushahro Feroze (Al Noor Sugar Mill)**

There is one Al Noor Sugar Mill in Naushahro Feroze district located in Shahpur Jhanian taluka, Moro. An area of 23,492 hectares with production of 14,02,514 Tones was brought under Sugar Cane cultivation. The field production at 58.2 tones yield per hectare happens to be on higher side. However, the Sugar Cane requirements of the mill are also being fulfilled by procuring additional Sugar Cane from other districts.

### **Industrial Park (Small Scale) In Naushahro Feroze**

There is no any Industrial establishment under Sindh Small Industries Corporation in Naushahro Feroze district. There are only 8 Small Industrial Units functioning under self-employment schemes and also one project with 37 employee's capacity is under process in the district. There is no industries along the along with National Highway N-5 in district Naushahro Feroze.

### **6.7.12.2 Trading Activities**

Agricultural and livestock mainly suffice to the needs of the people living in the project area. Very few people sell their harvest and livestock (including its products such as milk, ghee, butter) in the market for monetary gains. Besides this, there are number of small fish farms in the project area, which are meant for commercial fishing.

**6.7.13 Household Utilities & Appliances****6.7.13.1 Potable Water Supply**

Invariably, groundwater is used for all domestic purposes, in the project area no community water supply schemes are laid in these settlements. Population relies upon their private sources, with majority using hand pumps for tapping groundwater. Most of the houses have their own hand pumps, generally, located in the courtyards of their houses. The groundwater is not palatable owing to its quality it is brackish in taste. The people are not adopting safe drinking water practices such as boiling, filtering etc because they are unaware about the consequences of unsafe drinking water.

**6.7.13.2 Electricity Supply**

All the settlements except Naga Shah in the project area have been provided with power supply network, by the (SESCO). There is seldom breakdown of electricity but sometimes it happens due to strong Wind High-tension voltage lines (132 KV) are passing through the project site. no construction activity is planned under these lines.

**6.7.13.3 Natural Gas Supply**

There is no natural gas supply in the area Majority of the people uses cow dung and wood as fuel for cooking and heating.

**6.7.13.4 Telecommunication Network**

Majority (about 80 per cent) of the population are using mobiles (cellular) telecommunication networks making use of telephonic facilities only about 20 per cent are availing the PTCL facility.

**6.7.13.5 Transport and Travel Mode**

According to the sample-based socio-economic survey of the project area, the main mode of transport among the local villagers is public bus and wagons motorcycles and cycles are also in use of some of the villagers .

**6.7.13.6 Sanitation**

The sewerage /drainage system in the area is not satisfactory. Most of the people discharge their wastewater into open drains and few have got pit latrine and septic tanks system inside their houses. It is also a common practice to dispose of solid waste into nearby open land.

**6.7.13.7 Road Network**

Road network is a vehicle for economic development and social change. It is used as an Indicator for computing the stage of economic development. Efficient road network not only develops a quick and efficient transportation system but also opens up new area hitherto remained closed. It brings about social integration among rural and urban sectors and greatly assist in accessibility to basic needs i.e. schools, hospitals, etc. It brings rural areas in constant touch with urban



segment of society and creates better understanding necessary for social change and political awareness.

Important road links in Naushahro Feroze district are given as under:-

- i. Road from Naushahro Feroze to Padidan.
- ii. Road from Naushahro Feroze to Mithiani.
- iii. Road from Naushahro Feroze to Tharu Shah.
- iv. Road from Sadhuja to Deparja Phul.
- v. Road from Sadhuja to Padidan via Phul.
- vi. Road from Kandiaro to Lakha road.
- vii. Road from Kandiaro to Tharu Shah.
- viii. Road from Moro to Chandarsingh via Trimori. Road from Moro to Dadu via Lalia Patan.

Among the means of transportation buses, motor cars, jeeps, van, loading trucks, mini trucks, bullock carts and donkey carts are used. Most of the commercial goods are transported by loading trucks, vans and by railway. Up to June 2017, there were 968.12 kms of metallic roads and 222.4 kms of katcha roads. The overall position (by type of roads) is as under:-

The available international standard related to agriculture postulates that there should be at least 2 km. of road for every sq.km of cultivable area. Modification of this standard appears necessary from two angles: Firstly, this standard includes katcha roads as well whereas we would like to evolve a standard in terms of metallic road only. Secondly, the standard is related to cultivable area which is invariably greater than cropped area. The cropped area standard of 1 km. of metallic road per sq.km. of cropped area is also misleading. As in irrigated area, it must be much higher than in deserted/hilltop areas. However, the settlements located in un-irrigated zone also require special attention and connecting of 1000+ & 500+ villages appears appealing except some settlements located in unproductive zones (desert, hill tracts) the settlements lying therein with population 1000+ should at least be connected.

Under the population standard, urban settlements with large population would get more roads. However, the data of movement of persons, goods and services is not easily available. Under these circumstances, the standard based on geographical area is most suited i.e. (0.5 km. of pucca road per 1sq. km. of geographical area).

#### **6.7.13.8 Railway**

The main Railway line between Lahore and Karachi passes through some towns of the District such as Padidan, Bhirya Road and Mehrabpur. All the taluka headquarters are also connected by loop lines such as Mehrabpur via Tharu Shah to Moro, Padidan via Tharu Shah to Moro and Nawabshah via Sakrand to Moro. But the system of this railway lines is out of use now.

#### **6.7.13.9 Postal Services**

There is no post office facility provided in the project area NFIP people have to go to Moro or Naushahro Feroze for dispatching and receiving their letters and other mails.



## **6.8 Cultural And Religious Resources**

According to the sample based socio-economic survey, there are 19 mosques, one imam bragha, 3 madrassa and 2 graveyards around the project area. All of the mosques are built in the recent past and do not have any historical or architectural value.

## **6.9 Archeological And Historical Resources**

None of the monuments or sites, of archaeological or historical importance, declared so by the following Institutions, exists in the project area.


- World Heritage sites in Pakistan per UNESCO.
- Notified Archaeological Sites and Monuments (Protected by Federal Government) .
- Monuments Declared as Special Premises by the Government of Sindh.

## **6.10 Perceptions of The Community**

Concerning their views about the existing industries and the proposed NFIP, they opined "the existing Industries have provided job opportunities to the local people to some extent and we also expect from the proposed project to cater Job opportunities to the locals" . In addition, steps should be taken to improve their existing infrastructure such as drainage/sewerage system as well as provision of gas supply.

The locals, residents of the affected villages, expressed grudges over compulsory and injudicious land acquisition and compensation process of the NFIP. They argued that the lands were compulsorily acquired at a cheaper price and allotted to the industrialists at a higher price, which was sheer injustice to them. There are many affectees, who are still entangled in the cumbersome process of getting compensation.- People, who are not satisfied, have filed references under Section 18 of land acquisition with civil courts.



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## 7. PROJECT IMPACTS AND MITIGATION

### 7.1 General

This chapter describes the potential impacts of the proposed project on the environmental and social setting of the project area. The chapter also deals with the proposed actions for mitigation requirements of the proposed project.

Environmental Impact Assessment has been carried out in line with guidelines issued by the Sindh – EPA. The assessment has generally been based on the factual site conditions in light of experience gained from similar projects and discussions held with the local communities, Stakeholders, knowledgeable people review of other related projects.

The description provided in this section is based on following:

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

### 7.2 Project Area and Study Area (Area of Influence)

Before proceeding to the environmental analysis of the project, it is imperative to delineate the project area and study area.

#### 7.2.1 Project Area

The project area is that which will be directly impacted by the project. It includes areas where major construction activities are going to take place for the project structures, the establishment of construction camps, borrowing, quarrying and spoils disposal areas, etc.

Strictly speaking, the project area is directly related to the circumstances where land is to be acquired; people are affected as far as their physical displacement or relocation is involved. Likewise, the removal of vegetative cover for construction may also be considered a primary impact.

#### 7.2.2 Study Area

Besides the project area referred to above, construction-related and subsequently traffic-borne noise and air pollution may influence areas at large distances away from the primarily affected areas. The project construction, as well as operational activities, may have a variety of direct and indirect effects on the physical, biological, and human resources of the project area and its environment. For the proposed project, the study area will be up to 3 km in radius.

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The study area depends on many factors relating to the environmental settings, type of resources and project-related parameters. The situation becomes even more complicated when the indirect impacts are also taken into consideration.

### 7.3 Impact Characteristics<sup>4</sup> (Assessment of Significance)

The assessment of effects and identification of residual significance takes account of any incorporated mitigation measures adopted due to any impact of project activities and is largely dependent on the extent and duration of change, the number of people or size of the resource affected, and their sensitivity to the change. Impacts can be both adverse and beneficial and the methodology defined below has been applied to define both beneficial and adverse impacts of the project.

The criteria for determining significance are specific for each environmental and social aspect but generally, the magnitude of each impact is defined along with the sensitivity of the receptor. Generic criteria for defining magnitude and sensitivity are summarized below:

### 7.4 Impact Scoping Matrix

Impact scoping matrix mentioned in Table - 7.1 is developed on the basis of following consideration:

- Outcome of the present baseline conditions and the changes in environmental parameters which are likely to be affected due to the proposed project related activities.
- Any impact by which provincial environmental standards such as the Sindh Environmental Quality Standards (SEQS) or international environmental guidelines such as the World Bank, International Finance Corporation (IFC) and WHO environmental guidelines applicable to the project will be breached.
- Any high risk of permanent, irreversible, and significant change to environmental conditions due to the particular project activity.
- Any concern related to aspects/potential impacts by the community.

**Table - 7.1: Impact Scoping Matrix**

Project Phase	Environmental Impacts	Social Impacts
•Construction Activities involving access road to site, Site survey, soil investigation, site clearing, excavation, earthwork, Mobilization / demobilization of equipment & Labour	<ul style="list-style-type: none"> <li>•Water Resource Depletion</li> <li>•Landscape disturbance</li> <li>•Soil erosion, removal of top soil contamination, spillage</li> <li>•Waste generation from construction activities</li> <li>•Hazardous and Non-hazardous waste generation</li> <li>•Vehicles and equipment exhaust</li> <li>•Noise Pollution</li> <li>•Impacts on flora, fauna, birds etc.</li> </ul>	<ul style="list-style-type: none"> <li>•Traffic disturbance, unrest, road accidents.</li> <li>•Employment conflicts</li> <li>•Archaeological resource damage</li> <li>•Employment Opportunity</li> </ul>

<sup>4</sup>Source: Handbook of Environmental Impact Assessment, Volume II, Judith Petts, 1999. Blackwell Science Ltd.

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Project Phase	Environmental Impacts	Social Impacts
<ul style="list-style-type: none"> <li>• Installation Activities involving setting up of</li> <li>• Tilt brackets/ racking system</li> <li>• Installation of Mounting structures</li> <li>• Module Installation</li> </ul>	<ul style="list-style-type: none"> <li>• Water Resource Depletion</li> <li>• Landscape disturbance</li> <li>• Soil erosion, removal of top soil contamination, spillage</li> <li>• Waste generation from construction activities</li> <li>• Hazardous and Non-hazardous waste generation</li> <li>• Vehicles and equipment exhaust</li> <li>• Noise Pollution</li> <li>• Impacts on flora, fauna, birds etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Traffic disturbance, unrest, road accidents</li> <li>• Employments conflicts</li> <li>• Archaeological resource damage</li> </ul>
<ul style="list-style-type: none"> <li>• Operation Activities involving</li> <li>• vehicles operation,</li> <li>• maintenance activities</li> <li>• campsite activities</li> </ul>	<ul style="list-style-type: none"> <li>• Land and soil contamination</li> <li>• Hazardous and non-hazardous material usage and storage</li> <li>• Vehicles and Machinery exhaust</li> <li>• Noise from operation</li> </ul>	<ul style="list-style-type: none"> <li>• Dust Generation from Vehicular movement</li> <li>• Employment Opportunity</li> </ul>

#### 7.4.1 Magnitude

The assessment of magnitude will be undertaken in two steps. Firstly, the key issues associated with the Project are categorized as beneficial or adverse. Secondly, impacts will be categorized as major, moderate, minor, or negligible based on consideration of the parameters such as:

- Duration of the impact;
- The spatial extent of the impact;
- Reversibility;
- Likelihood (something probable)

The magnitude of impacts will generally be identified according to the categories outlined in Table – 7.2.

**Table - 7.2: Impact Characteristics Criteria**

Impact Characteristics	Category
Nature of the Impact	<p><b>Direct:</b> The environmental parameter is directly changed by the project.</p> <p><b>Indirect:</b> The environmental parameter changes as a result of the change in another parameter.</p>
Duration of the impact	<p><b>Short term:</b> Lasting only till the duration of the project such as noise from the construction activities.</p> <p><b>Medium-term:</b> Lasting for a period of a few months to a year after the project before naturally reverting to the original condition such as contamination of soil or water by fuels or oil.</p> <p><b>Long term:</b> Lasting for a period much greater than medium-term impacts before naturally reverting to the original condition such as loss of soil due to soil erosion.</p>
Geographical Location of the impact	<p><b>Local:</b> Within the area of the project i.e. operation site and access road.</p> <p><b>Regional:</b> Within the boundaries of the project area.</p> <p><b>National:</b> Within the boundaries of the country.</p>
Timing	<p><b>Construction</b></p> <p><b>Operation</b></p>

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Impact Characteristics	Category
Likelihood of the impact	Qualitatively measured on a scale of: <b>Almost certain:</b> Impact is expected to occur under most circumstances. <b>Likely:</b> Impact will probably occur under most circumstances. <b>Possibly:</b> Impact may occur at some time. <b>Unlikely:</b> Impact could occur at some time. <b>Rare:</b> Impact may occur but only under exceptional circumstances.
Consequence severity of impact	Rated as: <b>Major:</b> When an activity causes irreversible damage to a unique environmental feature; affects an entire population or species of flora or fauna in sufficient magnitude so as to cause a decline in abundance or change in distribution over more than one generation; has long-term effects (years) on socio-cultural or economic activities of regional significance. <b>Moderate:</b> When an activity causes long-term (period of years) reversible damage to a unique environmental feature; affects a portion of a population of flora or fauna causing reversible damage or change in abundance or distribution over one generation; has short term effects (months) on socio-cultural or economic activities of regional significance. <b>Minor:</b> When an activity causes short term (period of few months) reversible damage to an environmental feature; slight reversible damage to a few species of flora or fauna within a population over a short period of time; has short-term (months) effects on socio-cultural or economic activities of local significance. <b>Negligible:</b> When no measurable damage to the physical, socio-economic, or biological environment above the existing level of impacts occurs.
Significance of the impact	Categorized as <b>High, Medium, or Low</b> Based on the consequence, likelihood, reversibility, geographical extent, duration, level of public concern and conformance with legislative or statutory requirements.

#### 7.4.2 Sensitivity

The sensitivity of a receptor will be determined based on the review of the population (including proximity/numbers/vulnerability) and the presence of strategic/sensitive features on the site or in the surrounding area. Criteria for determining the sensitivity of receptors are outlined in Table 7-1. Each assessment will define sensitivity about the topic.

#### 7.4.3 Project Impact Matrix

Table - 7.3: exhibits the impacts of the Project in the form of a matrix. This illustrates the impacts of various components of the Project during construction as well as operation phases on various physical, biological and social environmental parameters qualitatively. The evaluation ranking of effects on various environmental parameters has been indicated with symbols denoted as “O” for insignificant or none, “L” for low, “M” for medium and “H” for a high while the type of effect is designated as “A” for adverse and “B” for beneficial. Likewise “NA” denotes not applicable and “ND” for not determined.

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PROJECT ACTIVITIES		PHYSICAL ENVIRONMENT					BIOLOGICAL ENVIRONMENT					HUMAN ENVIRONMENT						
		SOIL CONTAMINATION	SURFACE WATER QUALITY	GROUNDWATER QUALITY	AIR QUALITY	NOISE & VIBRATION	TERRESTRIAL FLORA	TERRESTRIAL FAUNA	AQUATIC FLORA	AQUATIC FAUNA	PROTECTED AREA	PUBLIC HEALTH	OCCUPATIONAL HEALTH & SAFETY	EMPLOYMENT	POPULATION DISTURBANCE	SOCIAL DISORDER	CULTURAL & RELIGIOUS VALUES	AESTHETIC & LANDSCAPE VALUES
1	TRANSPORT OF CONSTRUCTION MATERIALS	O	O	O	MA	O	O	O	O	O	N/A	MA	MA	MB	MA	O	O	O
2	OPEN STORAGE OF CONSTRUCTION MATERIALS	O	O	O	MA	O	O	O	O	O	N/A	MA	MA	O	MA	O	O	LA
3	EARTHWORK OPERATION (LAND EXCAVATION DUMPING ETC)	O	O	O	MA	O	O	O	O	O	N/A	MA	MA	MB	MA	O	O	LA
4	PREPARATION OF CONCRETE AT BATCHING PLANT	LA	O	O	MA	LA	O	O	O	O	N/A	MA	MA	MB	MA	O	O	LA
5	EXHAUSTS OF CONSTRUCTION MACHINERY & MATERIALS TRANSPORT VEHICLES	O	O	O	O	O	O	O	O	O	N/A	MA	MA	MB	MA	O	O	LA
6	MOVEMENT OF CONSTRUCTION MATERIALS TRANSPORT VEHICLES	O	O	O	O	MA	O	O	O	O	N/A	MA	MA	MB	MA	O	O	O
7	CONSTRUCTION & ERECTION OF ELECTRICAL & MECHANICAL EQUIPMENT	O	O	O	O	LA	O	O	O	O	N/A	LA	LA	LB	LA	O	O	O
8	SOLID WASTE (DOMESTIC, CONSTRUCTION DEBRIS, USED OIL, CONSTRUCTION CHEMICALS) DISPOSAL	MA	MA	LA	MA	O	O	O	O	MA	N/A	MA	MA	O	MA	O	O	MA
9	WASTEWATER DISPOSAL	MA	MA	MA	O	O	O	O	O	MA	N/A	MA	MA	O	O	O	O	MA
LA - LOW		LOW ADVERSE			MA	MEDIUM ADVERSE			HA	HIGH ADVERSE			O	INSIGNIFICANT				
LB - LOW		LOW BENEFICIAL			MB	MEDIUM BENEFICIAL			HB	HIGH BENEFICIAL			NA	NOT APPLICABLE				

**Table - 7.3: Project Impact Matrix**

In general, the impact assessment has been made specific to the areas likely to be affected directly by the Project components. As there is no settlements exist near the major construction areas, the impacts in respect of health and safety hazards will be insignificant for the local communities. While, from the public receptor point of view, the impacts of noise and air pollution hazards will be significant. The risks in respect of these parameters will also be there for the crew working at the site. In consideration of these factors, and assuming that the contractors will take every precaution for protecting the workforce from the construction hazards through providing safety equipment and imparting training to the workforce, the level of impact from these parameters has been kept at “Medium” adverse to Low Adverse.

The preceding paragraphs have provided a generalized overview of the Project Impact Matrix, while a detailed account of the effects of the Project on various environmental and social parameters, particularly with reference to potential effects of the Project is given in the subsequent sections.

#### 7.4.4 Rapid Environment Assessment (REA) Checklists

A rapid environment assessment of the project area was carried out as depicted in Table – 7.4.

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**Table - 7.4: Rapid Environmental Assessment (REA) Checklist**

<p><b>Instructions:</b></p> <ul style="list-style-type: none"> <li>• This checklist is prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared.</li> </ul>
--

SCREENING QUESTION	YES	NO	REMARKS
<b>A. Project Planning</b>			
Is the project area adjacent to or within any of the following environmentally sensitive area?			
❖ Protected area		✓	
❖ Wetland		✓	
❖ Mangrove		✓	
❖ Estuarine		✓	
❖ Buffer Zone of the protection area		✓	
❖ Special area for protecting biodiversity		✓	
<b>B. Potential Environmental Impacts</b>			
Will the project cause.			
❖ Loss of precious ecological values (e.g. rules of encroachment into forests/swamplands or historical/cultural buildings/areas, disruption of the hydrology of natural waterways, Regional flooding and drainage hazards.		✓	
❖ Loss of archaeological, historical or cultural monuments?		✓	
❖ Dislocation or involuntary resettlement of people?		✓	
❖ Disruption/destruction of tribal groups/indigenous peoples?		✓	
❖ Environmental degradation from increased pressure on land?	✓		Only during the construction phase
❖ Conflicts on water supply rights and related social conflicts?	✓		Confined only during the construction stage
❖ depletion of dissolved oxygen by large quantities of Decaying plant material, fish mortality due to reduced dissolved oxygen content in water, algal blooms causing successive and temporary eutrophication, growth and proliferation of aquatic weeds?		✓	
❖ Increased incidence of waterborne or water-related Diseases?	✓		During the construction phase particularly in the monsoon seasons
❖ Deterioration of water quality?		✓	
❖ Alteration of water quality due to evaporation, lowered temperatures during low flow periods, silt concentration in density currents, low dissolved oxygen, and high levels of iron and manganese?		✓	
❖ Salinization of floodplain lands?		✓	
❖ Decrease in floodplain agriculture?		✓	
❖ Environmental problems arising from uncontrolled human migration into the area, made possible by access roads and transmission lines?		✓	
❖ Impediments to movements of people and animals?	✓		During construction, diversion will be made.

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SCREENING QUESTION	YES	NO	REMARKS
❖ Potential social conflicts arising from land tenure and land use issues.		✓	
❖ Labor-related social problems especially if workers from different areas are hired?	✓		Problems will be there but will be mitigated.
❖ Traffic burden at project area ❖ Solid Waste disposal in sustainable manner ❖ Wastewater generation and disposal ❖ Relocation of High-tension line which is located inside IPark	✓		Mitigation measures have been given in subsequent section

## A –Impacts and Mitigations

### 7.5 Temporary Impacts during the Construction Phase

#### 7.5.1 Water Quality Deterioration

During the construction phase, the surface water like drains/canals/river and ground water may get polluted by the wastewater disposal from contractors housing facilities for staff. The extent of surface and ground water pollution would very much depend upon the implementation of pollution control measures. The increase in pollution of surface and ground water may impair health of the workers and local population, using this water.

#### 7.5.2 Disposal of Solid Waste in the Project Area

Following would be the major sources of solid waste, associated with the construction of the project.

- Domestic solid waste from contractors housing facilities.
- Construction debris and waste.
- Waste mechanical equipment and parts.
- Used Oil.
- Waste construction chemicals.

The extent of environmental Impacts of the solid waste would depend upon their disposal practices indiscriminate disposal of solid waste would lead to surface as well as ground water pollution.

#### 7.5.3 Air Pollution

In case of the project, the following would be the major potential sources of the fugitive PM emissions to the atmosphere.

- Transport of construction materials like earthen materials, sand, in uncovered form, blown by wind and vibration.
- Open storage of construction materials like earthen materials and sand, blown by wind.

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- Earthwork operations including land clearing, excavation, dumping, spreading, grading and compaction.
- Other construction activities like preparation of concrete at batching plants.
- Movements of construction machinery and construction materials transport vehicles over unpaved areas.
- Exhausts of the construction machinery and construction materials transport vehicles, mostly using diesel as fuel.

The dust emissions from the above sources and operations would cause public health hazards and nuisance, to the nearby communities particularly since these emissions are released at the ground level, with less chances of diffusion. Much of the fugitive dust generated by construction activities consists of relatively large size particles, which are expected to settle within a short distance from their source. A continuous flux of PM generation, however, during the active construction period, would keep the atmosphere polluted for longer periods.

Major sources of other principal pollutants including CO, SO<sub>x</sub>, NO<sub>x</sub> and VOC would be construction machinery, equipment and construction materials transport vehicles, mostly diesel based, employed for the project. Generators, to be operated as standby in case of shut of electricity supplies from the SESCO, shall also contribute to air pollution. The extent of pollution would depend on the rate of usage of these equipment. Dispersion of these pollutants in the atmosphere would be primarily governed by the prevalent climatic conditions of the area.

#### **7.5.4 Noise Pollution and Vibration**

Major sources of noise and vibration from the project during its construction phase would be.

- Movement of construction materials transport vehicles.
- Construction and erection of electrical and mechanical equipment.

Noise and vibration levels, at a given location, depend on types and numbers of the construction equipment being operated in the vicinity, their noise generation characteristics, and their distance from that location. For reference and comparison, the SEQS noise level (for vehicles) is 75 dBA, at a distance of 7.5 meters from the source.

Noise is considered as an interference to and imposition upon comfort, health and the quality of life. Noise may have both physiological as well as psychological effects on human beings. Physiological effects include dizziness, nausea, unusual blood pressure variation, physical fatigue, hearing impairment and, in acute cases, permanent hearing loss. A single or relatively few exposures to noise of excessive sound energy (like blasts) may also cause acoustic trauma, causing rupture of the eardrum. The psychological effects may comprise reduced mental capability and irritations. Chronic exposure of people to higher noise levels also impairs their efficiencies and skills.



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### 7.5.5 Impacts on Local Employment

During the construction phase, there will be significant positive Impact on the local employment it is assessed that the local people will get opportunities to get direct construction-related jobs.

### 7.5.6 Impacts on Public Health and Safety of the Local Population

Following are the key public health and safety concerns associated with the construction activities of the project.

- Increased incidences of diseases in the local population may result from the rise in populations of disease vectors including flies and mosquitoes, from increased levels of wastewater and solid waste pollution, generated by the construction workers in the area.
- Increased air pollution levels in the atmosphere are the source of greatest concern from public health point of view.
- Most of the public and workers safety hazards would be associated with the operation of construction machinery and equipment, transportation. The causes of safety hazards generally involve human errors, operational faults of machinery and unforeseen Incidences majority of the causes can be controlled with efficient management, staff training, equipment maintenance and other preventive measures. Accident prevention is essentially an engineering and administrative problem and rests manly on strict compliance with the established safety rules and regulations.

### 7.5.7 Impacts on Local Social Order

The influx of large work force in the project area, during the construction period, may disturb the local communities and create social and cultural problems. Enhanced levels of adverse interactions, tensions and conflicts, may lead to some serious law and order problems. The control of such situations shall, in anticipation, be exercised by including appropriate clauses in the construction contract, which shall comprise the regulations on the workforce necessary to avoid any law and order situation.


## 7.6 Impacts during Operational Phase

### 7.6.1 Industrial Wastewater Impacts

It is estimated that about 150,000 m<sup>3</sup>/d flow will be generated from the proposed NFIP when fully developed Table - 7.5 presents wastewater characteristics, expected from the NFIP, reaching at the CETP Location of CETP has been given in the layout plan.

**Table - 7.5: Wastewater Characteristics**

Pollution Parameter	Flow Rate (m <sup>3</sup> /d)	Concentration (mg/l)	Pollution Load (Kg/d)
BOD	150,000		52,500
COD		700	105,000
SS		300	45,000

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**Table - 7.6: Presents Impacts of Wastewater on Environment and Human Health**

Parameter	Impacts
pH	Growth Inhibition of bacterial species (responsible for removing organic pollution) under highly acidic or alkaline conditions.
	Corrosion of water carrying system and structures with acidic wastewater having low pH.
	Malfunctioning and impairment of certain physic-chemical treatment process under highly acidic or alkaline conditions.
Organic Pollutants	Depletion of dissolved oxygen (DO) levels, of the receiving water body, below limits necessary to maintain aquatic life (4-5 mg/l).
Suspended Solids	Sedimentation in the bottom of water bodies leaving adverse impacts on flora and fauna.
	Localized depletion of dissolved oxygen in the bottom layers of water bodies.
	Reduced light penetration in natural waters and consequent reduction in photosynthesis.
	Aesthetic nuisance.
Oil and grease	Reduced re-aeration in natural surface bodies, because of floating Oil and grease film and consequent depletion in dissolved oxygen levels.
	Reduced light penetration in natural waters and consequent reduction in photosynthesis.
	Aesthetic nuisance

The Impacts of untreated wastewater on physical, biological and human environments would range from low adverse to medium adverse.

### 7.6.2 Solid Waste Impacts

The solid waste will generally comprise empty containers of lube oil and chemicals, metal scrap, discarded mechanical parts and domestic solid waste from all the Industries in the NFIP. Other major solid waste streams will depend upon the varying nature of Industries in the NFIP solid waste will also be produced from commercial and institutional activities in the NFIP.

### 7.6.3 Liquid Waste Impacts

The liquid waste is generally the used lube oil from different machines, especially from the gears and from the vehicles. The quantity of this waste stream is not possible to estimate at this stage. The Improper disposal of liquid waste can cause air, water and soil pollution. The solid and liquid waste impacts on different environmental conditions would be medium adverse.

### 7.6.4 Air Pollution Impacts

There will essentially be the following major sources of air pollution in the NFIP.

- Generators/Power Plant
- Boilers

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- Vehicles

#### 7.6.4.1 Generators/Power Plant

Natural gas fired generators will be used as gas fired generators are preferred for because their emissions are quite clean Diesel based generators generally emit pollutants like CO, NO<sub>x</sub>, SO<sub>2</sub> and particulate matter.

#### 7.6.4.2 Boilers

The boiler flue gases are the major air emissions in the industry. The major pollutants in the gas fired boiler are CO, NO<sub>x</sub>, CO<sub>2</sub> and PM. This is a visual nuisance as well as health concern.


#### 7.6.4.3 Vehicles

With the commencement of the NFIP, the traffic in the area will increase. Such increase in traffic would cause fugitive dust emission in the area. The traffic will mainly comprise trucks, vans and office cars. These vehicles will also increase an emission due to fuel combustion. The major pollutants present in air emission will be oxides of nitrogen and carbon, particulate matter and un-burnt hydrocarbons, the air emissions will remain within the SEQs.

The NFIP a blend of different industrial clusters, which will produce air emissions (of varying Intensities) relative to their respective processes. All these industries (as planned to be installed in NFIP) will be required to have their own EIA's /IEE as per their category mentioned in IEE/EIA regulations prior to construction in the NFIP and get their approvals from SEPA.

**Table - 7.7: Impacts of Air Emissions on Environment and Human Health and Life**

Parameter		Impact
Particulate Matter	E	Damage to plants by choking the leaf pores and restricting photosynthesis
		Global cooling of earth by reflecting back the solar radiation
		Impairment of the atmospheric visibility affecting transportation safety
		Deterioration of aesthetic quality of atmosphere, land and water
		Soiling of materials physical properties and infrastructure
	HL	Increase in the frequency of respiratory infections such as bronchitis
Carbon Monoxide	HL	Heart attack by reducing the oxygen carrying capacity of blood
		Birth defects including mental retardation and impairment of fetus growth
		Dizziness, headache, and nausea
		Increase in reaction time of the drivers, a threat to the road safety
Oxides	E	Chlorosis and Plasmolysis in plants
		Damage to material and property, by acid rains, resulting from oxidation of sulfur oxides to sulfuric acid, after reacting with water vapors
		Serious lung damage, particularly in sulphate form
		Respiratory diseases like bronchitis
Oxides of Nitrogen	E	Formation of photochemical oxidants
		Damage to material and property, by acid rains, resulting from oxidation of sulfur oxides to sulfuric acid, after reacting with water vapors
		Retardation of growth in plants
	HL	Reduction in oxygen carrying capacity of blood
		Impairment of olfactory sense and night vision

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Parameter		Impact
		Dryness and roughness of throat
Voc		Formation of photochemical oxidants
Photo Chemical Oxidants	E	Leaf discoloration and cell collapse in plants
		Damage to rubber, textiles, paints and other materials
	HL	Sever eye, nose and throat irritations
		Serve coughing and shortness of breath

However, the impacts of air pollution and assessed as low adverse to medium adverse.

**7.6.5 Noise Pollution and Vibration**

There are two types of noise sources i.e. plant noise and vehicular noise. The possible sources of noise after the establishment of the NFIP would be different process equipment (depending upon the types of Industries), boilers and generators.

**7.6.5.1 Vehicular Noise**

The industrial activities In the NFIP will increase traffic in the area the vehicular noise will be one of the added nuisances for the nearby community. An area of about 2 km radius will be directly affected by vehicular noise the ambient noise levels of the area lie in the range. The office vehicles will also contribute to this noise level, which further Increase after startup of the mill operations. Generally, the well maintained vehicles have noise levels within the SEQS level of 75 dBA.)

**7.6.5.2 Acoustic Trauma**

Acoustic trauma, which results from a single or relatively few exposures, is defined as "immediate organic damage to the ear from excessive sound energy". If the noise is intense enough, other structure outside the Inner ear may also be affected, such as the eardrum, which may become ruptured. However, such damage is rare, and occurs only in instances involving extremely intense noise and blasts. Additionally, acoustic trauma often causes some degree of permanent damage to the auditory system.

**7.6.5.3 Temporary and Permanent Threshold Shift**

In temporary and permanent threshold shift, the person's auditory sensitivity decreases. The difference between these two effects is that, in temporary threshold shift, the auditory level returns to its original level, whereas in permanent, problems remain permanent. Thus a person with permanent threshold shift, no further recovery is possible sometimes, the permanent threshold shift results from acoustic trauma but it often results from long period of repeated exposure of noise.

**7.6.5.4 Physiological Effects**

In addition to effects on hearing, noise also causes some physiological effects. These include cardiovascular and gastric effects. The studies have shown that anti-hypertensive medication consumption is generally higher in the noisy areas loud noise is related with the

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vasoconstriction with the consequent increase in blood pressure. One laboratory study showed that plasma cortisol and blood cholesterol levels were increased with the Increase of noise level above 75 dBA. Exposure to noise can also lead to gastric changes. A study showed noise level above 70 dBA resulted in a reduction in stomach contraction strength and helped in ulcer development.

#### 7.6.5.5 Other Effects

Some of the other effects of noise are cognitive performance, occupational performance, psychological functioning, effects on social behavior and effects on aggression.

Various studies related with cognitive performance reveal that recall is detrimentally affected by background noise vigilance and attentions are also impaired by noise exposure.

Occupational performance exerts Its Influence either directly or indirectly on the person through annoyance or job dissatisfaction. It has been seen that in the situation involving noise levels over 90 dBA, there are often increased number of errors in tasks requiring continuous attention. In addition, the occupational tasks involving sensory input can be hindered by noise. Poor concentration, irritation, nervousness, frustration, headaches, accidents, aggressive social behavior, fatigue and anxiety are some of the common other effects. There would be low adverse to medium adverse impacts on public health and OHS.

#### 7.6.6 Hazard Vulnerability and Capacity Analysis

Prior to analyzing existing hazards<sup>5</sup>, vulnerability to hazards and capacity to cope with the same of the district and its population needs to be understood. An explanation of the terms used is given under each heading, as follows:

##### 7.6.6.1 Natural Hazard

Natural hazards are natural processes or phenomena within the earth system that may constitute a damaging event. For example typhoons, tsunamis, earthquake and volcanic eruption cyclones, earthquakes, floods, landslides, storms are natural hazards.

##### 7.6.6.2 Man-Made Hazard

Any industrial, nuclear, or transportation accident, explosion, power failure, resource shortage, or other condition, resulting from man-made causes, which threaten or cause damage to property, human suffering, hardship or loss of life constitute 'Man-made hazard.

**Table - 7.8: Hazard Matrix of District Naushahro Feroze**

Hazard	Frequency	Area Affected	Severity/Force	Year
Riverine Floods	Monsoon	Western Talukas	High	1973,1976, 2010, 2022
Rain floods	Monsoon	Entire district	High	2011, 2012, 2022

<sup>5</sup> A hazard is a situation, which triggers disaster. But it can be also defined as: "A potentially damaging physical event, phenomenon or human activity that may cause the Loss of life or injury, property damage, social and economic disruption or environmental degradation"

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Hazard	Frequency	Area Affected	Severity/Force	Year
Epidemic	Seasonal	Entire district	Low	Every year
Earthquake	Rare	Entire district	Low	Very rare
Accident fire	Frequent	Entire district	Low	Through out

#### 7.6.6.3 River Indus Flooding

Impart training to the concerned departments like police, revenue, agriculture, irrigation, education, health etc. on how to deal with emergencies or disaster situations. Take measures to address both structural and nonstructural issues of flood management. The structural ones may include addressing physical vulnerability like poor housing, mobility, embankments/spurs etc. and nonstructural ones- early warning system, community mobilization and organization, evacuation mechanisms, improved Natural Resource Management and livelihood centered approaches etc.

Women, grown up children and youth should be made the driving force and center of community mobilization and organization efforts for community-based flood management/ORR.

#### 7.6.6.4 Heavy Rains in Monsoon Season

The efficiency of Taluka municipal administrations should be improved to lay and manage appropriate storm water drainage system especially in the urban settlements. Install and maintain a state-of-the-art system for canal surveillance and maintenance involving communities - Issue timely early warnings. Respond appropriately for the safety of population/settlements lying closer to vulnerable points by preparing comprehensive land use and land use control plans and strategies.

#### 7.6.6.5 Epidemics

Establish an effective disease surveillance mechanism. Devise mechanism to provide timely emergency health services especially in the aftermath of floods for both human and animal disease outbreaks.

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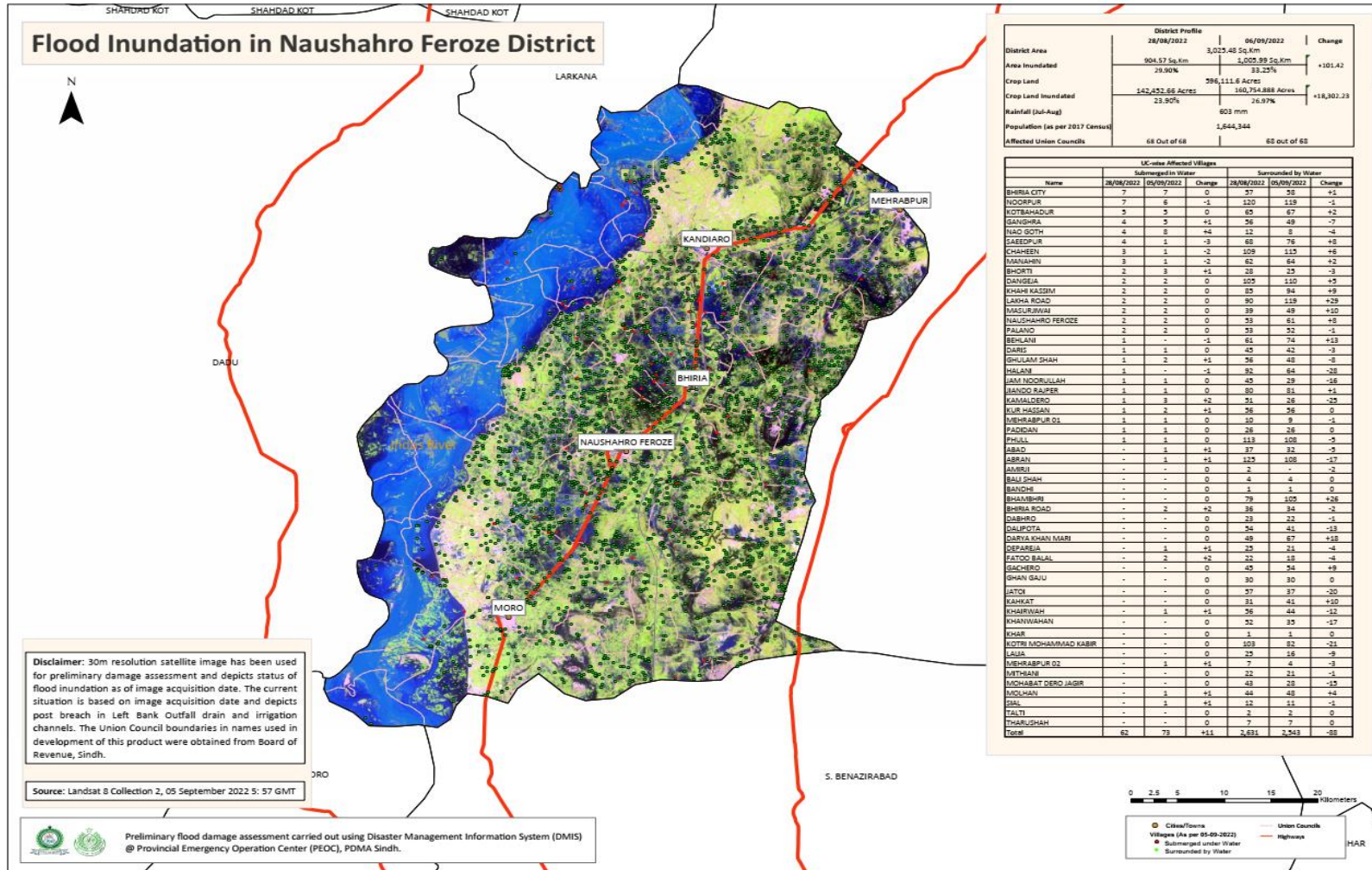



Figure - 7.1: Flood Map of District Nausheroferoz

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#### **7.6.6.6 Transport Accidents Due to NFIP on N-5 National Highway**

Ensure that highways, main corridors of movement within the district/intra-district roads and city roads are provided with proper road furniture and safety measures. Educate children and common citizen about road/traffic sense and precautionary measures - Strengthen Road patrolling mechanisms. Establish first aid/emergency centers at convenient distances and locations on roads. These centers should be adequately staffed and equipped, and during normal days should render health services to common citizens. Strengthen services including fire brigade and ambulance services. Undertake a study to document existing coordination mechanism between police, government rescue services, health facilities and non-government emergency services like ambulance 1122. Introduce appropriate reforms in the light of the findings of the said study

#### **7.6.7 Socio-Economic Impacts**

After startup of the Industrial operations, there will be increase in traffic in the project area, which may result in traffic jams, road accidents and unnecessary delays. There may also be the job opportunities available to the local residents.

#### **7.6.8 Mitigation Measures for Socioeconomic Impacts**

The traffic management measures are required as a means of reducing road accidents improving the residential living environment and reducing the chance of collisions between vehicles, pedestrians and cyclists.


After the NFIP is in operation, there will be traffic load on the major external roads. (Moro-NFIP Road, N5 and Motorway) as well as internal roads proper traffic management measures should be adopted such as traffic soothing and channelization. As a measure to streamline heavy traffic in the area, proper road marking and signboard posting should also be done proper pedestrian precincts should be provided where development has encroached the human passages.

The vehicle drivers should be apprised of the local customs and values, and be advised to remain courteous to the local population.

#### **7.6.9 Impacts on Occupational Health and Safety**

There could be a number of safety Issues in the Industrial operations general impression in the industrial operations is that the workers hesitate to use the occupational health and safety equipment's.



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## **7.7 Mitigation Measures for the Construction Phase**

### **7.7.1 Water Quality**

During the construction phase domestic sewage shall be generated at residential facilities for staff. This can result in pollution of surface and ground water if not treated in order to allay concentration of pollution caused by sewage water, treatment of the waste is recommended before final discharge. According to the SEQS BOD of all the surface discharges from domestic or industrial wastes should not exceed 80 mg/l. Therefore, sewage should be treated by septic tank. The sewage should not be let exposed in open areas, which may cause health hazards.


### **7.7.2 Land Pollution**

- Construction camps will be the main sources for the generation of municipal solid waste unsafe disposal of this waste will lead to generation of obnoxious smells and badly disturb the aesthetic condition of the land besides land pollution. A complete waste management plan is recommended to deal with the collected wastes and to dump that at proper location sanitary landfill is one of the most popular methods for the safe disposal of solid waste.
- During the wrapping up of the construction phase, machinery and equipment will be packed up and transported back. For the sake of site clearing, discarded NFIP machineries, construction material should be disposed of at the dumping sites.
- Different kind of lubricants for oiling, greasing and fueling of machineries and equipment used during the construction phase. The conventional disposal method for the used lubricants and waste chemicals is to throw it in a ditch/water pit. This practice's environmentally unfriendly, and may cause negative impacts on the soil quality. A better way of dealing with depleted lubricants is to send it back to the suppliers for recycling or otherwise environmentally safe disposal. Moreover, leakage from fuel storages on construction sites also pollutes the land. These materials ought to be stored, carried and handled properly careful handling of fuel should be monitored to avoid surface contamination.

### **7.7.3 Air Quality**

Presently, the air quality of the project area is good but the construction activities will invariably result into pollution of the ambient air fugitive particulate matter (PM) emissions to the atmosphere can be caused by earthen materials, transport and storage of construction materials in uncovered form, blown by Wind and vibration, exhausts of the construction machinery and construction materials transport vehicles, mostly using diesel as fuel gases emitting from generators are also a source of air pollution.

The dust emissions from the above sources and operations would cause public health hazard and nuisance to the nearby communities particularly when these emissions are released at the ground level, with less chances of diffusion. Most of the dust generated by construction activities

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consists of relatively large size particles, which are expected to settle within a short distance from their source. A continuous flux of particulate matter generation, however, during active construction period, would keep the atmosphere polluted for longer periods.

- Likely pollutants are CO, SO<sub>x</sub>, NO<sub>x</sub> and VOE etc.
- Sprinkling of water should be performed during the construction stage.
- Chimneys and particulate scrubber should be provided to the plants generating, Particulate matter.
- The project construction vehicles having an age of more than 5 years should not be allowed to use.
- Masks should be provided to drivers and operators of vehicles and construction machinery.

#### **7.7.4 Noise and Vibration**

Operation of construction machinery, movement of construction materials transport vehicles etc. can cause noise at the project site.

- The SEQS noise level limit (for vehicles) is 75 dBA, at a distance of 7.5 meters from source.
- The noise levels should be kept under this permissible limit, otherwise these may cause unusual blood pressure variation, physical fatigue, hearing impairment and, in acute cases, permanent hearing loss, rupture of ear drum etc. Chronic exposure of people to higher noise levels also Impairs their efficiency and skill.
- Construction contractors should maintain heavy-duty machinery in good operating condition in this regard; restricting noisy activities to normal working hours, when ambient noise levels are higher make Incremental Impacts less obtrusive.
- Mufflers should be provided to the drivers, workers in the vicinity of the machinery producing noise more than permissible level.

#### **7.7.5 COVID 19 risks & Mitigations**

The movement into the area of construction workers from outside the local area has the potential for the spread of infection – in particular, COVID-19. The Project Implementation Unit and Construction Supervision will work with contractors to ensure that the risk of COVID-19 is assessed and measures are taken in line with the donor's Guidance on managing risk from COVID-19 on construction sites. Guidance is being updated regularly as knowledge of COVID-19 improves.

The following prescriptions are based on good international practice, using guidance from World Health Organization (WHO), and national guidance from the UK and Canada and a review of other national government public information on COVID-19. These include:

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- Develop and communicate a work plan on safe working for COVID-19. Such a plan will be fully aligned with any government regulations and guidelines on COVID-19 prevention and control, or in the absence thereof, with international good practice guidelines as may be updated from time to time.
- Avoid physical interaction and maintain physical distancing requirements as prescribed by national policy, or in the absence thereof, international good practice.
- Avoid concentration of workers - limit the capacity of common areas such as changing rooms to allow the minimum separation of 2 meters and organize one-way systems.
- The construction site is to be segregated to the extent possible in zones or other methods to keep different crews physically separated at all times. This is essential if locally hired workers are involved. Workers hired from local communities must be in crews segregated from workers from outside the local area. This will apply to work site activities, meals, washing/toilets and training activities.
- Discourage the sharing of items such as cups, glasses, plates, and tools.
- Provide workers with the conditions and means necessary for frequent hand washing (soap, water, or alcohol gel) with a posted hand washing protocol at site entries.
- Inform workers of the need to cover the mouth and nose with a disposable handkerchief when coughing or sneezing or in the crook of their arm.
- Dispose of tissues in a lined and covered waste bin and wash hands afterward.
- Identify appropriate PPE related to the tasks and health and safety risks faced by workers according to the results of risk assessment and the level of risk, and provide it to workers free of charge and in sufficient numbers, along with instructions, procedures, training and supervision.
- Before entering the site, staff and visitors must confirm that they are not currently exhibiting flu-like symptoms.

## **7.8 Mitigation Measures during the Operation Phase**

### **7.8.1 Wastewater**

The wastewater impacts are in the category of low adverse to medium adverse. Such impacts can be managed by incorporating the pollution control technology. Some of these impacts can be eliminated through the administrative controls but not all. The control technology is the CETP (at the NFIP level) and pre-treatment plants (at the industrial level) whereas the administrative

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controls include training of workers, implementation of operational and process control, preventive maintenance, and environmental monitoring and reporting. The management has incorporated wastewater pollution control measures in the planning stage.

The management of the NFIP is recommended to implement the following measures to manage the process wastewater.

#### **7.8.1.1 Water Consumption Monitoring**

Water consumption both for the process and sanitary purposes should be monitored and its quantities recorded by each industry in the NFIP. All the main water inlets shall be provided with flow meters to record daily water intake unit water consumption with respect to production and water consumption per capita per day for domestic use can be established by this measured water quantity.

#### **7.8.1.2 Sanitary Wastewater Disposal**

The management should encourage the use of the septic tank for pre-treatment of sanitary wastewater in each industrial unit. This system is the partial treatment of wastewater. The BOD and suspended solids are decreased 40 per cent and 80 per cent respectively from this system in this process, the suspended solids are settled down by the provision of retention time of about 18-24 hours. The BOD is reduced by anaerobic treatment, in which organic matters are converted into methane, H<sub>2</sub>S and CO<sub>2</sub> the overflow water from the septic tank will be conveyed to the CETP prior to disposal into the nearby water body, which is Rohri canal.

#### **7.8.1.3 Process Wastewater**

The concentration of the wastewater pollutants (BOD, COD, TSS) originating from the process areas is above the SEQS level. To comply with the SEQS, it is recommended that the management of CETP will treat wastewater of all industries by adopting Activated Sludge Process technique.

#### **7.8.1.4 Wastewater Monitoring and Reporting**

Wastewater discharged from all the industries including the CETP will be monitored with respect to its quantity and quality. As per the SEQS (Self-Monitoring and Reporting) Rules, 2001 the priority parameters for wastewater from different industries will vary accordingly. After monitoring water consumption and wastewater discharges, water balance can be established based on monitoring, the factories consuming huge water quantities can be controlled through water audit.

In addition to this cleaner production, techniques will also be adopted by the industries, in order to reduce the resources consumption.

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The frequency of reporting of the priority parameters to the concerned authority will vary according to the nature of industries in the NFIP. The services of some reliable third laboratory can be hired and an in-house laboratory can be established and training can be imparted to its own professionals for this exercise.

## **7.8.2 Solid Waste**

### **7.8.2.1 Plant Solid Waste Disposal**

For safe disposal of industrial wastes, the management can encourage the use of three R's concept (reduce, reuse and recycle the solid waste). The plant operators should be trained to do their best to produce less solid waste from the process by employing different cleaner production techniques. The solid waste management team should explore ways to reuse waste In house as such if it is possible to reuse any waste after making some change on It (called recycling), It should be practiced.

Monitoring of the solid waste with respect to its source, type, and generation rate is essential. For such monitoring, there will be solid waste management system in the organizations in which, waste segregation, collection and storage will be integrated with the plant's operations. The management will ensure that these wastes are used under no objection circumstances. The management of the NFIP will do in contract with Local Administration/SSWMB to dispose of waste generates t the proposed project.

### **7.8.2.2 Domestic Solid Waste Disposal**

The domestic waste generated from the administration buildings In the NFIP will be collected and dumped at appropriate bins inside the plants/ factories. From waste collection bins, it will be transported to the NFIP designated solid waste dumping site daily.

### **7.8.2.3 Liquid Waste Disposal**

Major liquid waste streams include used lubricants. There should be a mutual agreement with the major suppliers of lube Oil to take them back after use. Their safe disposal or reclamation will be the responsibility of the suppliers.

## **7.8.3 Air Pollution Control**

### **7.8.3.1 Air Emission Control Program**

The following measures are recommended for air emissions control.

- Process control of combustion chambers.
- Air emissions monitoring and reporting.

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### 7.8.3.2 Process Control of Combustion Chambers

The combustion process can be controlled to make air pollutants within the SEQS level. The parameters to control are the uniform supply of fuel, control on air supply and fine tuning of the combustion equipment and burners.

There should be regular monitoring of boiler flue gases for NO<sub>x</sub>, CO, excess air supply, the PM, and generator emissions for CO, NO<sub>x</sub>, SO<sub>x</sub> and the PM by the industries in case, these parameters are above the desired level, the appropriate measures can be taken.

### 7.8.3.3 Air Emissions Monitoring and Reporting

As mentioned earlier that the NFIP falls under the Category 'A' for effluent and air emissions. For the SEPA monitoring and reporting requirement, the Category 'A' industry has to monitor its air emissions and report to the SEPA monthly.

The priority parameters for air emissions monitoring and reporting for different industries in the NFIP will vary accordingly.

## 7.8.4 Noise Pollution and Vibration

The management should encourage the use of the following sequence to control noise at various plants locations within the NFIP.

- Noise measurement of the noisy areas (If required).
- Audiometric testing of workers exposed to high noise levels.
- Record keeping of medical tests and follow up.
- Engineering control for noise reduction.
- Administrative control for noise reduction.
- Training of employees.
- Vehicular noise.

### 7.8.4.1 Plant Noise Measurement

Table 7.8 Provides threshold limit values (TLV) of the noise according to the American Conference of Government Industrial Hygiene (ACGIH).

**Table - 7.9: Noise Threshold Limit Values**

Duration Per Day (hours)	Sound Level (dbA)
16	80
8	85
4	90
2	95
1	100
1/2	105
1/4	110
1/8	115

When the sound levels listed above exceed, the feasible administrative or engineering controls should be instituted if these controls fail to reduce the sound levels to within those listed above, the hearing protection devices should be provided and used to reduce sound levels to an acceptable level.


#### **7.8.4.2 Engineering Control**

There are three components of noise hazards i.e., noise source, and noise path and noise receiver. The most desirable noise controls are those that reduce noise at the source. The second priority is to reduce the noise along its path. The last resort is noise reduction at the receiver using personal protective devices. The latter approach should never be substituted for the two former approaches.

- Noise can be reduced at its source by enclosing the source, altering the acoustical design at the source, substituting equipment that produces less noise, making alternations to the existing equipment or changing the process so that less noisy equipment can be used.
- Noise can be reduced along its path by moving the source farther away from receivers and improving the acoustical design of the path so that more sound is absorbed as it travels toward receivers, and
- Noise can be reduced at the receiver by enclosing the worker, using personal protective devices.

#### **7.8.4.3 Administrative Control**

Administrative controls are the controls that reduce the exposure of employees to noise rather than reducing the noise. There could be many operations in the NFIP In, which the exposure of employees to noise could be controlled administratively, that is, production schedules can simply be changed or jobs can be rotated so that exposure times are reduced. This includes such measures as transferring employees from a job location with a high noise level to a job location with a lower one if this procedure would make the employee's daily noise exposure acceptable.

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Administrative controls should be considered a second level approach with engineering controls given top priority.

### 7.8.5 Fire

Fire is one of the hazards in an industry. Fires can cause loss of life and property. However, at the same time fires have the potential to severely harm the people in the vicinity and affect the environment. The risk involved in the fire hazards can be reduced by adopting the following measures

- For all engineering designs, NFPA (National Firefighting Protection Association) codes need to be followed.
- Firefighting plan for the NFIP has been prepared and will implemented accordingly.
- Training of workers on fire extinguishers and evacuation procedures.
- Standard fire and smoke detection and protection devices such as alarms to be provided.

### 7.8.6 Training

The workers' training and education will be helpful for the management of each industry In the NFIP to convince workers for the Implementation of nose control strategies. The training and education program will provide Information about the adverse effects of noise and how to prevent noise induced hearing loss. At a minimum, all trainings will cover the following topics.

- Noise Induced hearing loss.
- Recognizing hazardous noise.
- Symptoms of overexposure to hazardous noise.
- Hearing protection devices (HPD) - advantages and limitations.
- Selection, fitting, use, and maintenance of the HPD.

### 7.8.7 Improvements in Occupational Health and Safety

#### 7.8.7.1 Training of Workers

Workers of the Industries in the NFIP need training on the OHS issues such as the use of the OHS equipment, firefighting, first aid, emergency response etc. Frequency of these trainings can be established according to the need. The consultants, trainers and people from different agencies working on these issues can provide In house trainings.



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Each new entrant will undergo such trainings at the time of joining. Afterward he/she will also attend the scheduled trainings. To evaluate the effectiveness of these trainings, people of the facility should be tested time to time through different drills.

### **7.8.7.2 Comfortable Working Environment**

The management of the NFIP should ensure the following sequence to be adopted to control heat stresses on workers and to improve the working conditions In Industries.

- Measurement of heat stresses at high temperature working areas.
- Establishing rest break schedules for workers of heat stress areas.
- Improving working conditions by improving ventilation.
- First aid training to workers to fight heat stresses.


### **7.8.7.3 Enforcement and Use of the OHS Equipment**

Workers should be enforced to use the OHS equipment in the plants. The management should also adopt such practices to motivate workers. Workers should be trained on these issues and provide knowledge of all the occupational hazards and associated diseases. After getting knowledge, they will definitely follow safety protocols. All such measures can eliminate the chances of accidents in the working areas. The management has the responsibility to supply this equipment to the workers uninterruptedly.

## **7.9 Rehabilitation Plan**

The management of the NFIP should formulate rehabilitation plan for the NFIP. At the end of the NFIP life, there should be a planning for it. This plan should focus on the following areas.

- Removal of machines and their safe disposal.
- Filling of all the excavation and restore land to its original form.
- Clearing of soil from soil pollutants like lubricants and chemicals.
- Plantation of plants (If required).

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## **8. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN**

The Environmental Management Plan (EMP) is developed to implement mitigation measures proposed for the environmental Impacts during the construction and the operation phases it comprises Institutional arrangements, risk/hazard management, occupational health and safety and monitoring plan.

### **8.1 Objectives of the EMMP**

The overall objective of the EMMP is to provide framework for addressing and managing environmental issues following are the main objectives.

- Provide an Institutional framework accompanied with roles and responsibilities of different role players such as environmentalist, estate engineer, design engineer, resident engineer, contractor, plant manager (O & M team), plant operators (O & M team) and stakeholders.
- Develop monitoring mechanism and Identify monitoring parameters to ensure effective Implementation of all the mitigation measures
- Identify training requirements and develop plans for Implementation.
- Identify resources required to implement the EMP and ensure availability of these resources.

### **8.2 Institutional Needs for Implementing the Environmental Measures**


The potential Impacts of the NFIP on air, water and soil necessitate Institutional support for efficient conduct and supervision of materials handling, pollution control, and waste reduction. This section of the EIA report aims at assessing the Institutional capabilities that exist within the NFIP identifying their future plans for Implementing environmental measures, and then providing an outline of recommended institutional measures, which need to be developed by the NFIP in order to make them an environmentally-sensitive and abiding entity.

### **8.3 Existing Institutional Capabilities and Environmental Awareness**

The top management of the NFIP is well-versed with the environmental concerns Optimum recycling option having been built-in and Incorporated In the design is a positive step in this of the NFIP is direction, and is clearly symptomatic of the fact that the technical department environmental concerned, and has taken maximum precautions to keep emissions and discharges to a minimum. The proposals show that the policy of waste reduction at source is being strictly followed.

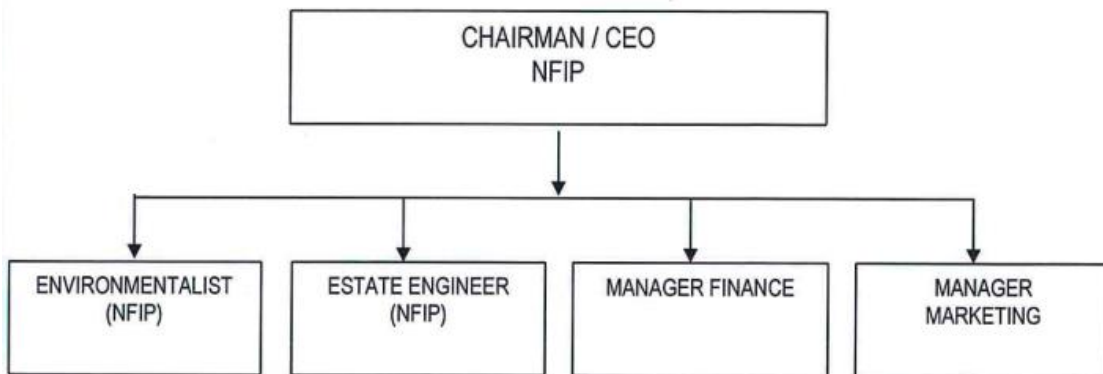
#### **8.3.1 Recommended Institutional Measures**

The NFIP is responsible for overall, Implementation of the NFIP project Figure - 8.1 represents its organizational structure and Figure - 8.2 indicates the key roles and responsibilities assigned within the NFIP as well as its Interrelationship with the other monitoring agencies.

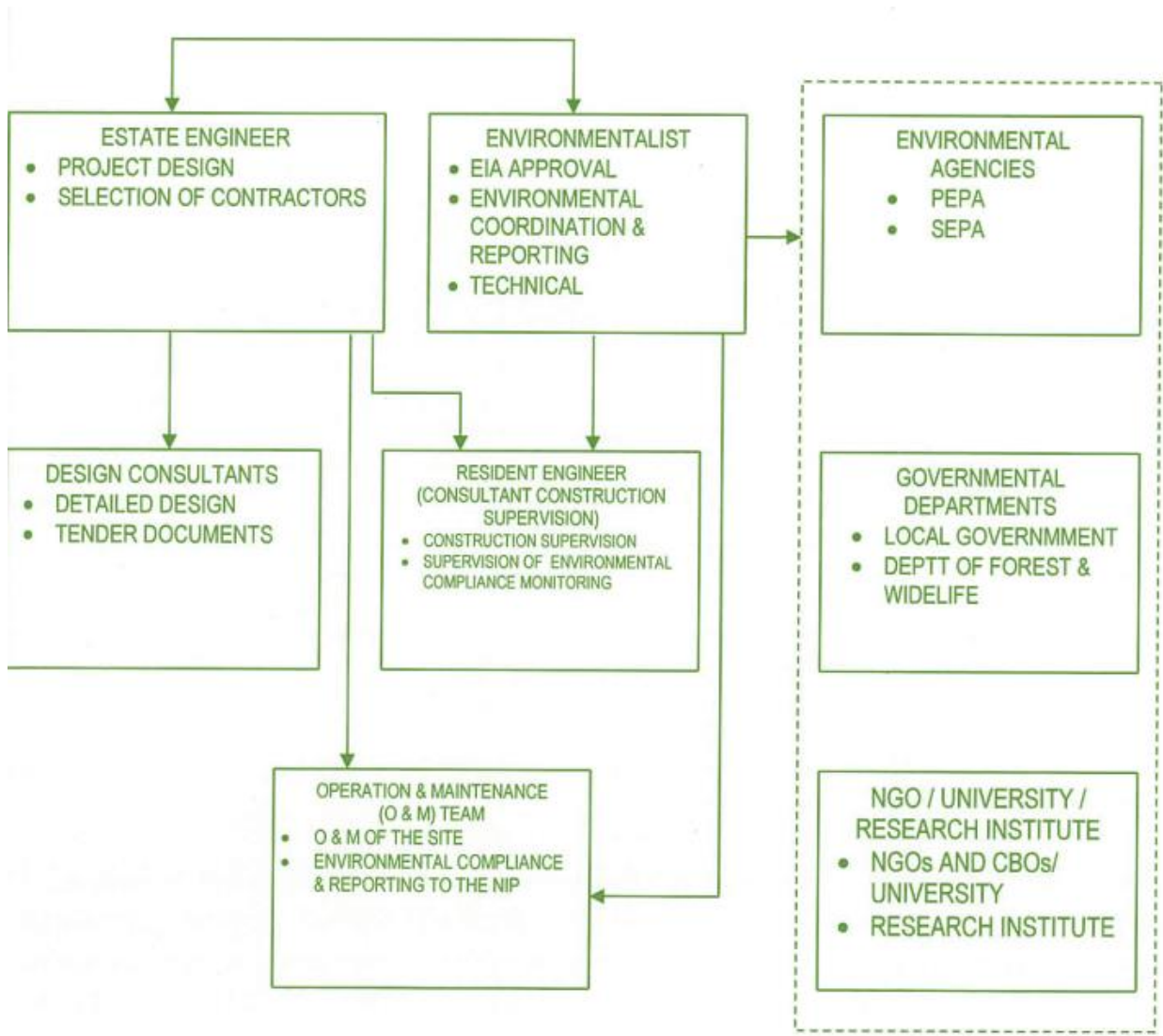
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The main individual, groups, government agencies, NGOs etc., identified with their respective responsibilities for implementing the mitigation plan Include.

- Environmentalist (NFIP)
- Estate Engineer (NFIP)
- Design Engineer
- Resident Engineer
- Contractor
- Plant Manager
- Plant Operators and
- Stakeholders



**Figure - 8.1: Organizational Structure of the NFIP**



**Figure - 8.2: Schematic Role & Responsibilities for EMP**

#### 8.4 Environmental Management Plan Staff & Responsibilities

##### 8.4.1 Environmentalist (NFIP)

The Environmentalist, NFIP will have overall responsibility for ensuring compliance of the EMP. The scope of responsibilities will include:

- Setting up system for environmental management and supervising environmental and social Impact assessment,
- Providing Information and support to the Estate Engineer to ensure that the environmental considerations have been incorporated in the design of the CETP NFIP.
- Liaising with the Resident Engineer (consultant construction supervision) and the Estate Engineer to ensure monitoring of environmental compliance during construction and provide technical support where required,

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- Coordinating With the regulatory agencies Including SEPA, District Local Government, Local NGOs, CBOs that could assist the NFIP In Independent review of environmental compliance,
- Reporting environmental monitoring and evaluation of compliance to the EPA
- Devising system of tariffs for treatment of waste depending upon the quality of effluent received from the Industries
- Providing Incentives for Industries to progressively implement their own pretreatment systems.
- Setting up forum for Industrialists to discuss waste management.
- Acting as a facilitator by assisting with solutions to the wastewater treatment management problems.

#### **8.4.2 Estate Engineer (NFIP)**

The Estate Engineer and his staff are responsible for

- Supervising the design consultant when preparing an outline design and tender documents for project contracts,
- Hiring contractors for construction of the CETP-NFIP, using a competitive bid process, and
- Ensuring that all the recommendations of the EIA have been Incorporated In the design

#### **8.4.3 Design Engineer**

The CETP-NFIP Design Engineer must ensure.

- Mitigation requirements are appended to the mitigation costs are also incorporated by the contractors while preparing bids,
- Mitigation requirements Included In tender documents are enforceable,
- Features are provided for public and operator's safety.
- Design facilities, which can be readily operated and maintained properly.
- Features are Incorporated to minimize production of odors,
- Areas With higher potential of odor production are enclosed,
- Features are provided for security,
- Appropriate landscaping is provided for visual effect and noise suppression,
- Modular type of design for the CETP-NFIP is provided,
- Noisy equipment are enclosed,
- Emergency generators are provided so that the facilities can operate during power failures, or ensure continuous supply of electricity from the power plant Installed within the NFIP, and
- Contractor to plan and Implement traffic control system for safety of public and workers, and reconstruction of disturbed and damaged facilities during construction to restore them.

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#### **8.4.4 Resident Engineer (Consultant Construction Supervision)**

The Resident Engineer has the following responsibilities

- Ensure contractors to understand mitigation requirements and their responsibilities for
- Implementing the mitigation plan,
- Monitor contractor's actions and enforce contractual obligations,
- Plan construction schedule with contractors to ensure that the construction process is as quick and efficient as possible,
- Ensure efficient traffic management during the construction process, and
- Ensure provisions for health and safety of construction workers are in place, including swift supply of medical facilities in the event of accidents, PPEs etc.

#### **8.4.5 Contractor**

The responsibilities envisaged for the contractor working for the CETP-NFIP are as follows.

- Ensure efficient Site management for the storage of equipment, stockpiling materials etc.,
- Ensure construction plan devised and agreed With the Resident Engineer,
- Recruit labor from locally affected communities first.
- For the construction camp on the Site, ensure appropriate sanitary arrangements, accommodation and drinking water availability,
- Liaise With the local communities regarding services and goods supply at the Site,
- Liaise With the local communities regarding construction activity, time span, likely nuisances such as noise, dust and disturbance,
- Ensure provision of appropriate night lights, and
- Plan working hours to provide minimum disturbance to the community

#### **8.4.6 Plant Manager (O & M Team)**

The Plant Manager during operation of the CETP-NFIP is responsible for the tasks

- Manage plant efficiently at all times,
- Maintain cleanliness of the Site and the facilities,
- Recruit highly motivated and well trained staff to run the plant,
- Ensure staff is aware of the contents of the operational manuals (on the wastewater treatment In particular) comprising safety procedures, emergency, shut-down or accidental injury on the Site,
- Ensure all equipment regularly maintained and repaired,
- Keep stocks of spares In case of equipment failure,
- Ensure dally effluent quality monitoring and problems remedied as soon as possible,
- If problems of receiving un-authorized wastewater at works crop up, coordinate with the NFIP.
- to identify source of problem and take remedial action,
- Ensure timely removal of sludge from the Site to the landfill.

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- Ensure Instant diagnosis and repair of leaks, spills and blockages alert communities of Imminent health hazards in discharge area,
- Liaise with community organizations regarding nature, functions and relationship with operation of the plant,
- Ensure timely redress of complaints about the plant,
- Maintain record of complaints received and actions taken,
- Ensure positive response to requests for site visits etc. with the view to enhance relations with the locals and other Institutions,
- If monitoring shows that the effluent treatment is not adequate to meet the water application of technology and the quality standards, then take action to install treatment which is adequate,
- If necessary, seek advice on how to improve the situation. especially If equipment not performing to the specifications,
- Ensure sludge dewatering and removal In an efficient and environment-friendly manner, and
- Devise odor control system if problems occur and persist.

#### **8.4.7 Plant Operators (O & M Team)**

The following responsibilities are identified for the Plant Operators.

- Read and digest operational manuals,
- Ensure safety and firefighting equipment are in place and accessible,
- Ensure regular maintenance of the equipment,
- Report malfunctioning of the equipment and equipment failure to the Plant Manager, and
- Ensure responsible and conscientious attitude towards execution of their duties at all times.


#### **8.4.8 Stakeholders**

The following responsibilities are identified for the community as Stakeholders during the construction and operation phases of the CETP-NFIP.

- Liaise with the Resident Engineer regarding schedule of construction activities,
- Avoid construction routes for personal and work routines,
- If plant creates nuisance, odors or excessive noise, contact the Plant Manager, with the information on time, place and Wind direction, etc.
- In case of inefficient sludge removal, lodge complaints with the Plant Manager, and
- If the CETP-NFIP: or activities associated with it, in any way, jeopardize health of the nearby community, ensure the Plant Manager and the EPD are alerted.

#### **8.5 Disaster/Hazard Management**

The existence of hazards, associated with industrial facilities, calls for disaster/risk management plan, which will comprise.

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- Conditions potentially leading to major release accidents Including releases from pipes, flexible
- Connections, filters, valves, vessels, pumps, compressors, tanks, stacks etc.
- Explosion In boiler and storage areas.
- Occupational health and well-being conditions.
- Occupational safety conditions.

The last two points will be discussed under "Occupational Health and Safety Planning". The discussion under disaster management mainly pertains to the hazards associated with the NFIP and the controls to be exercised, as part of the disaster management, to overcome the danger of being exposed to these hazards.

Hazards assessment for the proposed facilities In the NFIP will take into account the potential hazards likely to occur during the construction and the operation stages of the project. The construction phase hazards may involve danger to the safety of workers as a result of unforeseen accidents exposure to toxic materials and explosives can pose serious threats to the health of the workers. The hazards associated with the operation phase may be of the following categories.

#### **8.5.1 Electrical**

Electrocution from live conductors and misuse of power tools, overhead power lines, downward electrical wires, buried cables, and work during electric storms.

#### **8.5.2 Mechanical**

Collision accidents with moving equipment, especially when operating in reverse, failed pulleys, snapped cables and clothes catching in gears or drills.

#### **8.5.3 Structural**

Potential for fatling or strain when working conditions include slippery surfaces, steep grades, narrow stairs, open holes, trip hazards and unstable flooring, potential puncture from objects and potential burial from trench cave-ins or from unstable slopes on material stock-piles.

#### **8.5.4 Temperature**

Heat stress in hot environments or when working in clothing, which limits the dissipation of body heat and moisture.

#### **8.5.5 Noise**

Stress and physical damage to the ear when subjected to noise levels exceeding recommended guidelines (e.g. an 9-hour, time-weighted average sound level of 90 dBA, as per the US guidelines, SEQS recommended 95 dBA as the limiting value for motor vehicle noise - there is no SEQS limitation Imposed on noise generated from industrial processes.



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## 8.6 Engineering Controls Layout Design

Unit operations being laid out in such a manner that Incompatible substances and Incompatible operations are not located within close proximity to each other Specific examples of Incompatible substances, Include.

- Particulate matter and liquid droplets from boilers will not fall within the battery limits of the complex, and will be sufficiently diluted before reaching the ground.
- It is planned that the wastewater treatment plant will be declined so as not to allow the of Incompatible streams - each stream will be given specific treatment before mixing with other wastewater streams on entering the wastewater treatment plant.
- It's planned that solid waste and sludge will be dumped at the designated landfill area in the NFIP, and then transported to local administration site.

### 8.6.1 Resource Minimization

Recycling and reuse of wastewater generated in the plant, Most of the uses of water reclamation are non-potable uses such as washing cars, flushing toilets, cooling water for power plants, concrete mixing, irrigation for parks, and for hydraulic fracturing etc

### 8.6.2 Access Control

Limitations of personnel to those specifically trained in the work conditions present within a potentially hazardous area including use of personnel Identification, double lock security services and barriers.

## 8.7 Administrative Controls

These controls need to be exercised in situations where it is not possible to reduce hazards through engineering controls. It is recommended that administrative controls should be implemented in the form of rearrangement of work schedules so as to minimize the duration of exposure to hazards and transfer or rotation of personnel who have, over a period of time, reached a maximum allowable exposure limit.

The controls should also be exercised to ensure easy access to and availability of PPE for use within the vicinity of potential hazards such equipment could include chemical resistant gloves. Safety shoes, ear protection plugs safety glasses etc. Special clothing should be provided as well as basic Items for use In emergencies such as portable light, safety belt, two-way radio etc. should be easily accessible at all times for 24 hours a day.

During training, the following areas of knowledge and experience are considered essential.

- Appreciation of the properties (e.g., flammability, corrosiveness, toxicity, reactivity) of hazardous substances, as well as the levels at which they pose a significant danger requiring protective measures.
- Awareness of early-warning indicators, hazards/risk identification, and ability to recognize potentially hazardous situations.

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- Familiarity with engineering controls to avoid occurrence of hazardous situations.
- Familiarity with capabilities and limitations of the facility to respond to hazardous emergencies ventilation systems, plumbing systems, shut-off systems, containment devices, and emergency response procedures.
- Knowledge of the use and maintenance of emergency response equipment as well as routine equipment for health and safety monitoring and protection.
- Knowledge of methods and procedures for decontaminating personnel, equipment, and facility, following potential chemical contamination.


## 8.8 Occupational Health and Safety Planning

It is recommended to the management of the NFIP to carry out a complete assessment and identification of all potential hazards anticipated during the planning construction, and operation, phases of the NFIP, and to prepare a Health and Safety Plan (HSP) along with the Plant Health and Safety Rules developed The HSP, aimed at identifying, evaluating, monitoring and controlling health hazards, should provide the following basic information.

- Definition of all potential hazards.
- Health and safety implications of each hazard.
- Description of routine health and safety management techniques, including health and safety inspections, maintenance/repair follow-up on inspection critical, record-keeping, personnel protective gear, and medical monitoring.
- Outline of the emergency response procedures following occurrence of a major hazard including organizational structure of key trained personnel to act as emergency responders, action steps for entering and working within zone of hazard, evacuation procedures, protective
- Gear requirements, decontamination procedures, lines of communication, emergency telephone numbers, map of route to nearest medical center etc.
- Follow-up procedures after the emergency is over.

The management needs to ensure that the HSP along with the associated Health and Safety Rules is established and enforced. The Plant Health and Safety Rules should include provisions for prevention of and response to toxic chemicals and gases.

An Occupational Health and Safety Programme (OHSP) needs to be developed, which is both appropriate and affordable Major components of such a programme should include control of injury hazards, procedures for emergency care of injured personnel, routine medical examinations of the plant workers and surveillance programme. Provision for compensation of injured workers, maintenance of in-plant sanitation including proper management of hazardous wastes and provision of safe drinking water supply and adequate bathing/washing facilities including emergency showers and eye douches Occupational Health and Safety Training in plant health and safety should be imparted on a regular basis. With emphasis being given on good environmental house-keeping practices.

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## 8.9 Environmental Monitoring Program

It is the process of repeated observation and measurement of one or more environmental quality parameters to enable changes to be observed over a period of time. These changes relate to the physico-chemical and biological parameters of various components of the environment such as air, water, and soil.

The main objective of this programme is the conservation of the quality of the various components of the environment monitoring is carried out to obtain quantitative information on current levels of harmful or potentially harmful parameters of water quality, air quality and soil quality. The information, so obtained, enables an assessment to be made of the evident of the polluting damages of these parameters, the rising and falling levels of specific polluting parameters, and the control measures that need to be implemented.

This programme needs to be developed by the NFIP with the following functional parameters.

- **Planning:** This is to include economic projections and engineering-economics analysis of what structural and non-structural measures need to be put into use when, where and how.
- **Implementation:** This shall comprise design and construction of facilities, setting effluent and emissions standards and establishing Inspection procedures.
- **Operation:** This is based on the opening/closing of facilities, making Inspections, and repairs and maintenance.

It is, therefore, recommended to the NFIP to develop a monitoring programme based on the above functional parameters, to include a whole range of activities from selection of sampling station sites of monitoring network, effluent and emissions quality parameters, instrumentation, sampling and analyses, data processing and documentation, research and development, Including training of personnel.

Organizational Structure of the Environmental Monitoring Department and its functions detailed assessment of the discharges and emissions anticipated.



**Figure - 8.3: Schematic Presentation of the proposed Environmental Monitoring**

The instrumentation requirement of the environmental monitoring programme falls under the categories of


- Physical analysis Instruments
- Chemical analysis Instruments
- Biological analysis Instruments
- Data processing Instruments

In case of the NFIP, the monitoring of the following parameters is recommended on the basis of the following:

### 8.9.1 Water Quality Monitoring

Water quality monitoring is essential for analyzing the quality of drinking water and discharges from point sources during the construction and the operation stages. The monitoring is carried out for the purpose of obtaining quantitative information about the current levels of harmful or potentially harmful water quality parameters. These parameters include physical, chemical and biological parameters. Through a proper and effective monitoring network, water and wastewater samples can be collected, tested and analyzed against regulatory standards. The WHO drinking water quality guidelines and the NEQS will, therefore, be the yardsticks by which the performance of the NFIP (Including the CETP and the landfill Sites) will be evaluated In terms of compliance/noncompliance.

Specific drinking water and effluent quality monitoring requirements identified for the construction stage are specified below

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- Quantities of pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, Iron, fecal coliforms, total coliforms in groundwater or the NFIP water supply should be monitored quarterly on the construction site to ensure compliance with the WHO drinking water guidelines.
- Quantities of pH, BOD<sub>5</sub>, COD. TSS present in the effluent generated from the construction. Site offices should be monitored quarterly so that they do not exceed the limits prescribed in the SEQS. The sampling points will be taken from each office.
- Specific drinking water and effluent quality monitoring requirements identified during the operation stage are given below
- Quantities of pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, Iron, faecal coliforms, and total coliforms in groundwater at the NFIP in general and the sanitary landfill site in particular should be monitored quarterly to ensure compliance with the WHO drinking water guidelines.
- Quantities of pH, BODS, COD and TSS in the effluent (from the CETP) should be monitored monthly so that they don't exceed the limits prescribed in the SEQS.

### 8.9.2 Air Quality Monitoring

The first step in air quality monitoring is to prepare an inventory of all the emissions for the purpose of establishing benchmarks. The inventory will include location of the air pollution source, type and magnitude of pollution, projected emissions of pollutants, frequency and duration. The frequency and intensity of air quality monitoring supplements to housekeeping practices.

The monitoring will be carried out at both the construction and the operation stages. The parameters to be monitored during these stages include CO, NO<sub>x</sub>, SO<sub>x</sub>, and PM<sub>10</sub>. During the construction stage, the monitoring will be carried out near main entrances of the NFIP in the downwind direction. During the operation phase, the samples will be taken near main entrances.

### 8.9.3 Noise Level Monitoring

The noise levels will be measured for different noise producing entities (vehicles, construction equipment and machinery) during the construction and the operation stages. During the construction stage, the noise of each vehicle will be measured at a distance of 7.5 m for 15 minutes time each on quarterly basis in addition, the sampling points will also be taken at the construction site (to gauge noise produced from different construction machinery and equipment) as well as near the main entrances. During the operation stage, the noise levels will be measured for each vehicle, near the main entrances, at the CETP Site, near generator room for 15 minutes each on quarterly basis. All these noise levels will be compared with the SEQS, OSHA and the WHO noise guidelines for compliance.

### 8.9.4 Solid Waste Monitoring

The anticipated solid wastes generation from the construction Site offices, administrative buildings, and the CETP site will need to be monitored so as to ensure that no immediate and long-term environmental and health problems are caused.

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The parameters to be monitored daily during the construction stage include domestic solid waste (source, type and generation), used Oil, discarded mechanical parts, and construction chemicals and generation) during the operation stage, the monitoring of domestic solid waste (source, type and the sludge produced at the CETP site will be carried out on daily basis.

Unfortunately in Pakistan, there are no national regulations for monitoring of the toxic chemicals and solid wastes to ensure that these are not improperly used and that all precautions are taken to prevent and minimize the likelihood of accidents involving such chemicals and solid wastes.

Table - 8.1: Presents summary of the environmental monitoring plan comprising environmental quality parameters, applied standards, sampling locations, frequency and duration.

There is dearth of Information about priority parameters for effluent monitoring from the CETP. However, the selection of these parameters is tentative contingent upon the data received from each industry about its effluent characteristics.

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**Table - 8.1: Environmental Monitoring Plan**

PROJECT STAGE	PARAMETERS	DETAILS	APPLIED STANDARDS	LOCATION	FREQUENCY	DURATION
<b>WATER QUALITY</b>						
<b>1) CONSTRUCTION</b>						
a) Drinking water	pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, Iron, faecal coliforms, total coliforms	Groundwater or NFIP water supply	WHO drinking water quality guidelines	Construction Site	Quarterly	
b) Wastewater	pH, BOD <sub>5</sub> , COD, TSS	Wastewater from the Site offices	NEQS	One point from each office	Quarterly	
<b>2) OPERATION</b>						
a) Drinking water	pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, Iron, faecal coliforms, total coliforms	Groundwater	WHO drinking water quality guidelines	NFIP Site in general and sanitary landfill Site in particular	Quarterly	
b) Wastewater	Effluent flow, temperature, pH, BOD <sub>5</sub> , COD, TDS, Oil and grease, chromium, copper, zinc, TSS, chloride	Effluent from the CETP and leachate from the landfill Site	NEQS	CETP and landfill Sites	Monthly	
<b>AIR QUALITY</b>						
Construction	CO, NO <sub>x</sub> , SO <sub>x</sub> , PM <sub>10</sub>	Boundary wall	USE-PA, WHO air quality guidelines	Ai 3 points (near the main entrances) in the downwind direction	Quarterly	9 hours
Operation	CO, NO <sub>x</sub> , SO <sub>x</sub> , PM <sub>10</sub>	Boundary wall	USEPA, WHO air quality guidelines	5 pants (near the main entrances, the CETP Site, landfill Site) in the downwind direction	Quarterly	9 hours
<b>NOISE LEVELS</b>						
Construction	Norse levels on dB(A) scale	7.5 m from the vehicles	NEQS, OSHA, WHO noise guidelines	For each vehicle 6 points at the construction Site	Quarterly	15 minutes at each point
Operation	Noise levels on dB (A) scale	7.5 m from the vehicles	NEQS, OSHA, WHO noise guidelines	For each vehicle Main entrances CETP site Generator room	Quarterly	15 minutes at each point
<b>SOLID WASTE</b>						
Construction	Domestic solid waste (source, type, generation), used OI, discarded mechanical parts, construction chemicals			Construction Site	Daily	
Operation	Domestic solid waste (source, type,			Administrative buildings	Daily	

**Table - 8.2: Annual Budget Estimates for Environmental Monitoring (Construction Phase)**

Monitoring Component	Parameters	Amount
<b>Water Quality</b>		
Drinking Water	pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, Iron, faecal coliforms, total coliforms	23,000
Wastewater	PH, BOD <sub>5</sub> , COD, TSS	34,400
Air Quality	CO <sub>x</sub> , SO <sub>x</sub> , PM <sub>10</sub>	96,000
Noise Levels	10 vehicles, 6 points at the construction Site	19,200
<b>Total</b>		<b>172,600</b>

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**Table - 8.3: Annual Budget Estimates for Environmental Monitoring (Operation Phase)**

Monitoring Component	Parameters	Amount
<b>Water Quality</b>		
Drinking Water	pH, color, turbidity, TDS, hardness, calcium, magnesium, chloride, sulfate, fluoride, nitrate, Iron, faecal coliforms, total coliforms	46,000
Wastewater	Effluent flow, temperature, pH, BOD <sub>5</sub> , COD, TSS, TDS, Oil and grease, chromium, copper, Zinc	192,000
Air Quality	CO <sub>x</sub> , SO <sub>x</sub> , PM <sub>10</sub>	160,000
Noise Levels	10 vehicles, Main entrance, CETP Site, Generator room	19,000
Sludge Monitoring	Heavy Metals	25,000
<b>Total</b>		<b>442,000</b>

## 8.10 Implementation of the Operation

### 8.10.1 Co-Ordination with Stakeholders

Project proponent will ensure that co-ordination required with the project stakeholders on environmental and social matters as required by the EMP is maintained throughout the operation.

### 8.10.2 Environmental Management Systems

NFIP and its contractors will ensure that the mitigation measures provided in the mitigation management matrix for construction, installation & operation activities (Table - 8.4 & Table - 8.5) are adhered to and organizational HSE Management Systems are implemented during the proposed project activities. The contractors will abide by the relevant contractual provisions relating to the environment.

### 8.10.3 Monitoring

Project proponent and its contractors will ensure that monitoring of the project activities is carried out according to the monitoring programme given.


## 8.11 Change Management

The EIA recognizes that changes in the operation or the EMP may be required during the construction, installation & operation activities and therefore provides a Change Management Plan to manage such changes. The management of changes is discussed under two separate headings, changes to the EMP and changes to the Operation.

## 8.12 Communication and Documentation

For effective monitoring, management and documentation of the environmental performance during the operation, environmental matters will be discussed during daily meetings held on-site. Environmental concerns raised during the meetings will be mitigated after discussions between project proponent and the contractors. Any issues that require attention of project



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proponent higher management will be communicated to them for action. Project proponent and its contractors will ensure that the communication and documentation requirements specified in the EMP are fulfilled during the project.

### **8.13 Operations Monitoring**

Project proponent and its contractors will be responsible for effective monitoring for efficient operations of the proposed project. Proposed project and its auxiliary systems will be monitored for their performance within the acceptable limits.

### **8.14 Restoration**

Project proponent will ensure that the restoration of the site after the end of construction and installation activities and after the useful life of proposed project is carried out according to the requirements of the EIA and EMP.

### **8.15 Audits**

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

### **8.16 Mitigation Management Matrix**

Mitigation Management Matrix will be used as a management and monitoring tool for implementation of the mitigation measures required by the EIA. The matrix lists down the following:

- The mitigation measures recommended in the EIA;
- The person/organization directly responsible for adhering to or executing the required 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.

Table - 8.4 and Table - 8.5 provides the Environmental Management Plan to address and handle issues related to physical, biological, socio-economic issues during civil construction, installation and operation activities respectively.

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**Table - 8.4: Environmental Management Plan for Construction and Installation Activities**

S. No	Aspect	Key Potential Impact	Mitigation Measures	Monitoring Requirements	Frequency	Reporting	Performance Indicator	Responsibility
<b>PHYSICAL ENVIRONMENT</b>								
1	Soil	Soil disturbance due to removal of top soil, potential accidental spillage	A spill prevention and response plan shall be prepared by the contractor in order to control any inadvertent leakage and spillage. Spill response measures shall be implemented as necessary to contain and clean up any contaminated soil.	Visual inspection of storage area, and machinery through conducting regular audits of on-site activities and incident reporting forms. Availability of spill kit at each hazardous and chemical storage area must be ensured.	Weekly	All unplanned incident/ accidents must be recorded by the contractor	Number spills or incidents to be recorded during on-site audits	Contractor
			Construction of bunds around relevant work and storage areas to avoid soil erosion and spill control. Bunds in areas of hazardous chemical storage including temporary storage should be lined to contain accidental spillage and minimize the potential for migration to the underlying soil.					
			Any spilled chemical shall be immediately collected and disposed of in accordance with spill prevention and response plan and MSDS.					
			Contractor shall ensure that a spill kit and adequate PPE is available at the site for emergency clean-up activities in case of chemical / oil spillage					
			To control soil erosion surface run-off should be collected from a paved working areas into retention ditches to restrict concentration of flows.					

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S. No	Aspect	Key Potential Impact	Mitigation Measures	Monitoring Requirements	Frequency	Reporting	Performance Indicator	Responsibility
2	Water Resource	Depletion in available water resources	A complete record of water consumption during construction and installation will be maintained.	Check local demand and water abstraction	Daily construction	Contractor shall prepare and submit Report to project proponent	N/A	Contractor
			Water required for construction may be obtained from the local existing NFIP wells in the project areas or new wells installed by NFIP.					
			Water from local well will only be used after ensuring that the available capacity all the tube well (safe yield minus local demands) is at least 50% greater than the project demand. Discharge from the tube well will be regularly monitored to monitor.					
			The quantity of water used will be kept to the minimum required by taking prudent water conservation measures on site.					
3	Air Quality	Dust generation due to construction and installation activities	Setting an appropriate side speed limit to reduce dust generation from vehicles travelling over unmade surfaces.	Visual monitoring of dust emissions during construction and installation activities	Daily	Contractor shall prepare and submit a report to the project proponent in case of complaints	No visible dust plumes originating from construction and installation sites	Contractor
			During construction dust generated on unpaved roadways and work area should be controlled by the application of water on as needs basis.					
			Unnecessary handling of dusty material will be avoided such as minimizing drop heights when loaders dump soils into trucks.					
			Train workers to handle construction material and debris to reduce emissions.					

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S. No	Aspect	Key Potential Impact	Mitigation Measures	Monitoring Requirements	Frequency	Reporting	Performance Indicator	Responsibility
			Cover truck when transferring fine and dusty material outside the project location					
		Exhaust emissions due to operation of generators, vehicles and machinery	Ensure adequate maintenance and inspection of vehicles to minimize exhaust emissions. Machines and vehicles which are out of order should be removed from site	Visual Monitoring of exhaust emissions during construction & installation activities	Daily	N/A	Regular vehicle maintenance records	Contractor
4	Noise	Increased noise levels due to construction and installation activities and machinery	The contractor shall use heavy equipment machinery, and fuels which are in compliance with national regulations. The contractor shall perform regular maintenance on all equipment vehicle and machinery to prevent noise emissions. Noise canopy / silencer should be used to reduce noise levels	Noise measurements to be undertaken during construction activities at the site in order to demonstrate compliance with the SEQS guidelines using a portable noise meter	Daily	Contractor shall prepare and submit a report to project proponent in case of any exceeding	Compliance will national guideline limits for environmental noise at sensitive receptors	Contractor
5	Waste Generation	Improper management and handling of hazardous and non-hazardous waste during construction and installation	The contractor shall segregate storage for different type types of waste such as hazardous non-hazardous recyclable construction material, plastic, paper, to facilitate proper disposal, through Sindh EPA certified contractors.	Visual monitoring of site cleanliness and proper storage and handling of hazardous waste and sewage	Daily	Contractor shall prepare and submit monthly report to project proponent	Compliance with waste management procedures	Contractor
			The contractor shall provide a separate storage area for hazardous material. The hazardous materials / products must be labeled with proper identification of its hazardous properties.					
			Chemical waste shall be stored in accordance with the provision of material safety Data sheets	Inspect that segregated waste disposal or storage areas are clearly marked		Contractor shall prepare and submit	Compliance with waste management procedures	

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S. No	Aspect	Key Potential Impact	Mitigation Measures	Monitoring Requirements	Frequency	Reporting	Performance Indicator	Responsibility
			(MSDS). The contractor shall keep them onsite.			monthly report to the project proponent		
			Contractor shall provide trash bins within construction site so as to prevent littering in the project area and surrounding areas.		Daily		Current and complete records of regular waste pickup and disposal	I Contractor
			The contractor shall establish regular intervals for waste collection and disposal as per contractor's waste management procedure.					
		Improper waste effluent management practices will favor waste accumulation in nearby environment	Sewage will be disposed off through a system comprising of septic tanks and soak pits. At the end of operations the residual wastewater will be evaporated / transported off site for disposal at the nearest municipal drains	Check provision of septic tank and sumps	During construction & installation activities	Report to project proponent in case of any mismanagement	Compliance with waste management procedures	Contractor
6	<b>Visual Inspection</b>	Visual impacts from construction and installation activities such as materials lay down, excavation, backfilling, mounting structure and panels installation	The contractor shall ensure general cleanliness and good housekeeping practice at the project site at all.	Visual inspection of general housekeeping and cleanliness at site	Daily	N/A	Good housekeeping and tidiness of work areas within the project site	I Contractor
<b>BIOLOGICAL ENVIRONMENT</b>								
7	<b>Effects on Vegetation</b>	Potential to loss in vegetation	Clearing of thick vegetation patches will be minimized as much as possible	Visual inspection within the project site	During construction	N/A	N/A	Contractor
			The construction camp will be located in NFIP area. Access tracks will be avoided from passing			N/A	N/A	Contractor

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S. No	Aspect	Key Potential Impact	Mitigation Measures	Monitoring Requirements	Frequency	Reporting	Performance Indicator	Responsibility
			through patches of dense vegetation					
8	Effects on wildlife	Potential disturbance to wildlife	<p>Minimize human and vehicular contact with fauna, including their burrows / nests and feeding grounds</p> <p>Waste shall be stored on site within closed container, especially food remnants to avoid attraction of birds.</p> <p>All work operation should be limited to day time only, Night time travelling or working should be avoided</p> <p>No hunting and no trapping policy should be strictly enforced unless human life is under threat</p>	Visual inspection within the project site	During construction and installation	N/A	N/A	Contractor
<b>SOCIAL ENVIRONMENT</b>								
9	Local Employment	Avoiding merit for locals may affect working environment	<p>It should be ensured that workers must have adequate experience so that smooth working practice would be achieved.</p> <p>At the time of hiring the staff must consider impacts due to workers behavior. However, local workers will be given due preference.</p>	Inspect that the hiring process is on person capability basis	Before hiring of staff (Local employs)			Project Proponent
10	Sustenance income	<p>Improper restoration of Lease land</p> <p>Displacement of inhabitants</p>	<p>Compensation amounts will be settled based on prevailing market rates and will be settles after an agreement is reached between the local residents and the client</p> <p>Claims of land ownership will should be verified through the local administration</p>	Inspection of compensation transparency	Before construction and installation			Project Proponent

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S. No	Aspect	Key Potential Impact	Mitigation Measures	Monitoring Requirements	Frequency	Reporting	Performance Indicator	Responsibility
11	<b>Health &amp; Safety</b>	Exposure to health events during construction activities	Strict compliance should be observed with NFIP HSE guidelines	Environmental monitoring of noise and emissions during construction	During construction and installation		Compliance with NFIP HSE Guidelines	Proponent
			Ensure that all workers exposed to a risk are aware of the possible dangers. They should be given through training is how to protect themselves and there should be effective supervision to ensure that the correct methods are being used.					
12	<b>Infrastructure Development</b>	Development of access roads may cause disturbance to community, vegetation and wildlife	Access roads construction should be made at safe distance from wildlife and community to minimize the disturbance due to noise and air emissions.	Environmental Monitoring of noise and emissions during access roads construction	During construction and Installation		Compliance with NEQS limits for environmental noise and emissions at sensitive receptors	Project Proponent
13	<b>Community Grievances Complaints</b>	Conflicts between community and proponent during construction and installation activities	Grievances handling system must be established to address community grievances / complaints	Reports complaints received from locals or authorities	Daily			Project Proponent
			A social complaint register should be maintained on site by project proponent. All complaint received from local communities should be well recorded					
			Community complaints shall be duly addressed and appropriately resolved. The measures taken to mitigate these concerns shall also be recorded in the social complaint register.					
14	<b>Archaeological Resources and Cultural Heritage</b>	Only potential concern can be impacts on possible unseen Archaeological sites/	All construction works shall be ceased if any historical or archaeological sites are found during construction	Minimum of one site inspection immediately after chance find		In case any discover of archaeological sites, the same		

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S. No	Aspect	Key Potential Impact	Mitigation Measures	Monitoring Requirements	Frequency	Reporting	Performance Indicator	Responsibility
		remains (chance finds)				shall be immediately reported to project proponent and Archaeological Dept		
		In the event potential archaeological and cultural resources are discovered during construction activities, the department of Antiquities shall be invited for consultation and assessments of findings	Information personnel present on site in case any archaeological or cultural resources were encountered.					
		Work shall be resumed only after archaeological experts from department of antiquities and official authorities are consulted and appropriate mitigation measures are implemented.						

**Table - 8.5: Environmental Management Plan for Operational Activities**

S. No	Aspect	Key Potential Impact	Mitigation Measures	Monitoring Requirements	Frequency	Reporting	Performance Indicator	Responsibility
<b>PHYSICAL ENVIRONMENT</b>								
1	Soil	Potential spillage of oil or chemicals	Specific procedures shall be developed for the removal of waste or spilled fuel, oil and contaminated soil and at approved disposal facilities	Inspect the presence of any disturbed areas in and around the project site for erosion	Post rainfall event	To proponents top management	Maintain readily available records of all workers	Proponent's O & M Team



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S. No	Aspect	Key Potential Impact	Mitigation Measures	Monitoring Requirements	Frequency	Reporting	Performance Indicator	Responsibility
			Proper storage for chemicals and fuel with in confined areas on site and adopting proper safety measures when handling those chemicals to prevent their leakage and infiltration into the soil.	Visual inspection of Oil storage tanks, waste storage are for spills and leaks.	Weekly		training on spill response procedures	
2	<b>Waste Generation</b>	Improper management and handling of hazardous and non-hazardous waste during operation	Proponent shall provide trash bins within site so as to prevent littering in the project area and surroundings The Proponent shall establish regular intervals for waste collection and disposal as per waste management procedure.	Inspect the segregated waste disposal or storage areas are clearly marked	Weekly	Maintenance team shall prepare and submit monthly report to management	Compliance with waste management procedures	Proponent's O & M Team
	<b>Visual Inspection</b>	Improper effluent (domestic and wastewater generated from solar panels cleaning) management practices will favor waste accumulation in nearby environment	Domestic sewage and waste water generated from maintenance activities will be disposed off through a system comprising of septic tanks and soak pits. At the end of operation the residual wastewater will be evaporated / transported offsite for disposal at the nearest municipal drains	Check provision of septic tank and sumps	Weekly	To management in case of any mismanagement	Compliance with waste management procedures	Proponent's O & M Team
<b>BIOLOGICAL ENVIRONMENT</b>								
4	<b>Impacts on wildlife</b>	Potential disturbance and harm to birds	Waste shall be stored on site within closed container, especially food remnants to avoid attracting birds on site.	Visual inspection with in project site	Weekly	To top management	No reported harm to birds	Proponent's O & M Team
			Minimize human and vehicular contact with resident's birds including their					


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S. No	Aspect	Key Potential Impact	Mitigation Measures	Monitoring Requirements	Frequency	Reporting	Performance Indicator	Responsibility
			burrows/ nests and feeding grounds.					
<b>SOCIAL ENVIRONMENT</b>								
5	<b>Local Employment</b>	Avoiding merit for locals may affect working environment	It should be ensured that workers must have adequate experience so that smooth working practice would be achieved.	Inspect that the hiring process is on person capability basis.	Before hiring of staff (local employs)			Project proponent
6	<b>Community Grievances / complaints</b>	Potential disturbance to human community and wildlife due to vehicular movement	A social complaint register should be maintained on site by project proponent. All complaint received from local communities should be well recorded	Record complaints received from locals or authorities	Daily	All accidents reported to the proper authority	Number of traffic incidents due to vehicle movement	Proponent's O & M Team
			Implementation of a regulated entrance and exit into the facility	Monitoring of access around site			Number of complaints from road users.	Proponent's O & M Team

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## 9. CONCLUSIONS AND RECOMMENDATIONS

### 9.1. Conclusions

The NFIP, EIA Based on the Master Plan, Preliminary Design, environmental and social field surveys, and impacts assessment of the proposed NFIP Project, it may be concluded that although there are some significant negative impacts but would be of short term during the construction stage. However, there are a few negative impacts that would be expected during the operational stage as well but their intensity can be reduced by taking appropriate measures. The environmental issues related with the Project Activities are summarized asunder:

Physical impacts like soil erosion, soil contamination, water contamination, air pollution, high noise level, etc. are of temporary nature during the construction stages. However, during the operational stage by adopting abatement technologies such as treatment plants (activated sludge system), air bags, electrostatic precipitators, development of buffer zones and green areas the intensity of negative impacts could be minimized to acceptable thresholds. Detailed impacts and mitigation measures have been discussed in the Environmental Management Plan.


During operational stages, the disposal of wastewater will become a problem. Therefore, proper mitigations have been adopted in the preliminary design including wastewater treatment plant, safe and environmental friendly disposal of solid waste and control of gaseous emissions at source. The have been standards to be followed both for wastewater treatment and gaseous emissions discussed and reported. To reduce the impacts on air quality during / end of construction phase extensive tree plantation will be carried out in consultation with Sindh Forest department, which has been ensured during consultation with District Forest Officer. .

No forest area or wildlife sanctuary exists within the vicinity of the Project Area, which may be affected by the Project. Few reptiles like lizards and mammals like squirrel; and few birds like dove, Indian Roller, Shrike and house sparrows will be disturbed by the Project activities and may have to move into nearby areas. This will be a temporary insignificant impact.

The other social issues like safety of public and workers, security problems, community accessibility issue, women accessibility to fields for their daily routine life etc. will be of temporary nature and proper mitigations have been provided in EMP.

A comprehensive EMMP has been developed identifying the impacts, mitigation measures, agencies responsible for implementation, monitoring and auditing of the proposed measures.

EMMP also provides the roles and responsibilities of the agencies responsible for mitigation, monitoring and auditing of EMMP. The EMMP also provides the proposed institutional setup for effective implementation of the mitigation measures, monitoring parameters, and training of NFIP, Contractors and Supervisory Consultant staff, to enhance their capacity. As the EIA Study has been carried out at Master Planning and Preliminary Design Stage of the Project, so a change management plan has been provided in the EMMP to cater the changes that may occur at detailed design and even during construction and operation stages of the Project.

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Similarly, generic guidelines for HSE, EMS, Hazardous Waste Management, Waste Minimization, and etc. have also industrial park level which will help to prepare detailed management been provided in EMMP at plans for estate and individual units on later stage by the NFIP and private investors.

Individual investor are required obtain their NOC/ Approval / License / permission from relevant departments /authorities as per their nature of work. NFIP through their management committee may guide /support to obtain NOC.

It may be concluded that if proper mitigation measures as given in this report were implemented, the Industrial Park will cause the least effect on the area's existing environmental and social setting. On the other hand, it is expected that Project will generate large number of employment opportunities to the residents of the area.

## 9.2. Recommendations

Although comprehensive mitigation measures have been proposed in the report to minimize the negative impacts and to enhance the positive impacts of the Project, however, major recommended mitigation measures are summarized as under. Soil Erosion, Water Contamination, Air Pollution and High Noise Levels should be controlled with the use of good engineering practices including land management, selection of pollution abatement devices, and use of proactive measures, selection of proper sites, etc. The abatement technologies as mentioned in appropriate sections and chapters that should be adopted especially during the operational stage of the project. The use of cleaner production practices will also adopted by the investors,/ individual owners.

Contractor should take due care of the local community and its sensitivity towards local customs and traditions. EMMP proposed should be implemented in the true spirit. In order to address these issues formulation of laws and change in future plans of the relevant district administration will be required. Therefore, it is suggested that NFIP should coordinate with the relevant district administration of Naushahro Feroze District along with the department related with Planning and Development Department of Sindh at all stages of the project. This will provide awareness of issues to be dealt by relevant government departments and administration. This coordination will help relevant authorities to develop or mold their future strategies proactively to address the anticipated issues likely to arise in the vicinity of the Naushahro Feroze Industrial Park.

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Annexure - I: NFIP Sale Deed of Proposed Land

408132 Registration No. 2150 Sub Registrar Naushahro Feroze

Issued to M/S Pakistan Industrial Development Corporation (PIDC) Karachi, Declar All Kalthore DGN PIDC.

3487 Jul 2016 2138

Sub Registrar Naushahro Feroze

868555

**SALE DEED OF IMMOVABLE PROPERTY**

This Sale Deed is made & executed at Naushahro Feroze on this 14<sup>th</sup> day of July, 2016.

BETWEEN

- (1) Mr. Abdul Sattar Memon son of Dhani Buz Memon, Muslim, adult, holding CNIC No. 45301-5637405-8,
- (2) Mr. Ahful Inbbar Memon son of Dhani Buz Memon, Muslim, adult, holding CNIC # 45301-7474331-9,
- (3) Mr. Bisharat Ali Memon son of Dhani Buz Memon, Muslim, adult, holding CNIC No. 45301-9350011-5,

All residents of Village Kundha Khahi, Taluqa Bhiria District Naushahro Feroze (hereinafter severally and jointly referred to as the **VENDORS**), which expression wherever the context so permits, shall mean and include their respective legal, heirs, successors, executors, administrators, legal representatives, attorneys and for assigns) of the **FIRST PART**.

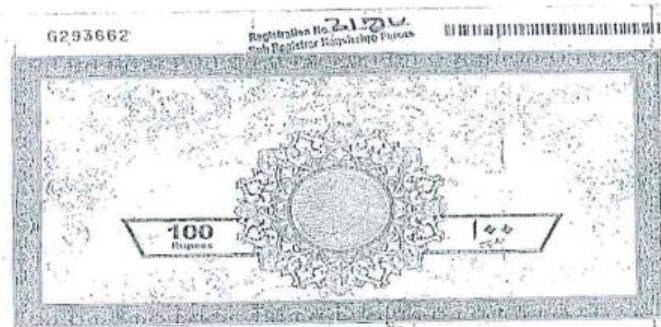
Sub Registrar Naushahro Feroze

To be continued to Page # 02

# Environmental Impact Assessment (EIA)

## Naushahro Feroze Industrial Park (NFIP)

Doc. No IEEC/2022/02/EIA



Issued to M/S Pakistan Industrial Development Corporation (PIDC), Karachi; Deedar Ali Kalhoro DGM PIDC.

31/8/2016



Signature  
SYAM WENDEE  
NATSIKUNO HIR-ONE

AND

M/s Pakistan Industrial Development Corporation (Pvt) Limited (PIDC), a Company incorporated under the Companies Ordinance, 1984 and having its office at 2<sup>nd</sup> floor, PIDC House, Dr. Zia-ud-din Ahmed Road, Karachi through its Deputy General Manager (Estate & Insurance), namely, Mr. Deedar Ali Kalhoro, son of Allah Dino Kalhoro CNIC No.42501-8059651-5 resident of House No.B-34, Block-7, Gullistan-e-Johar, Main University Road, Karachi (hereinafter referred to as the VENDEE) which expression wherever the context so permits shall mean and include, its legal heirs, successors, executors, administrators, legal representatives attorneys and for assigns) of the **SECOND PART.**

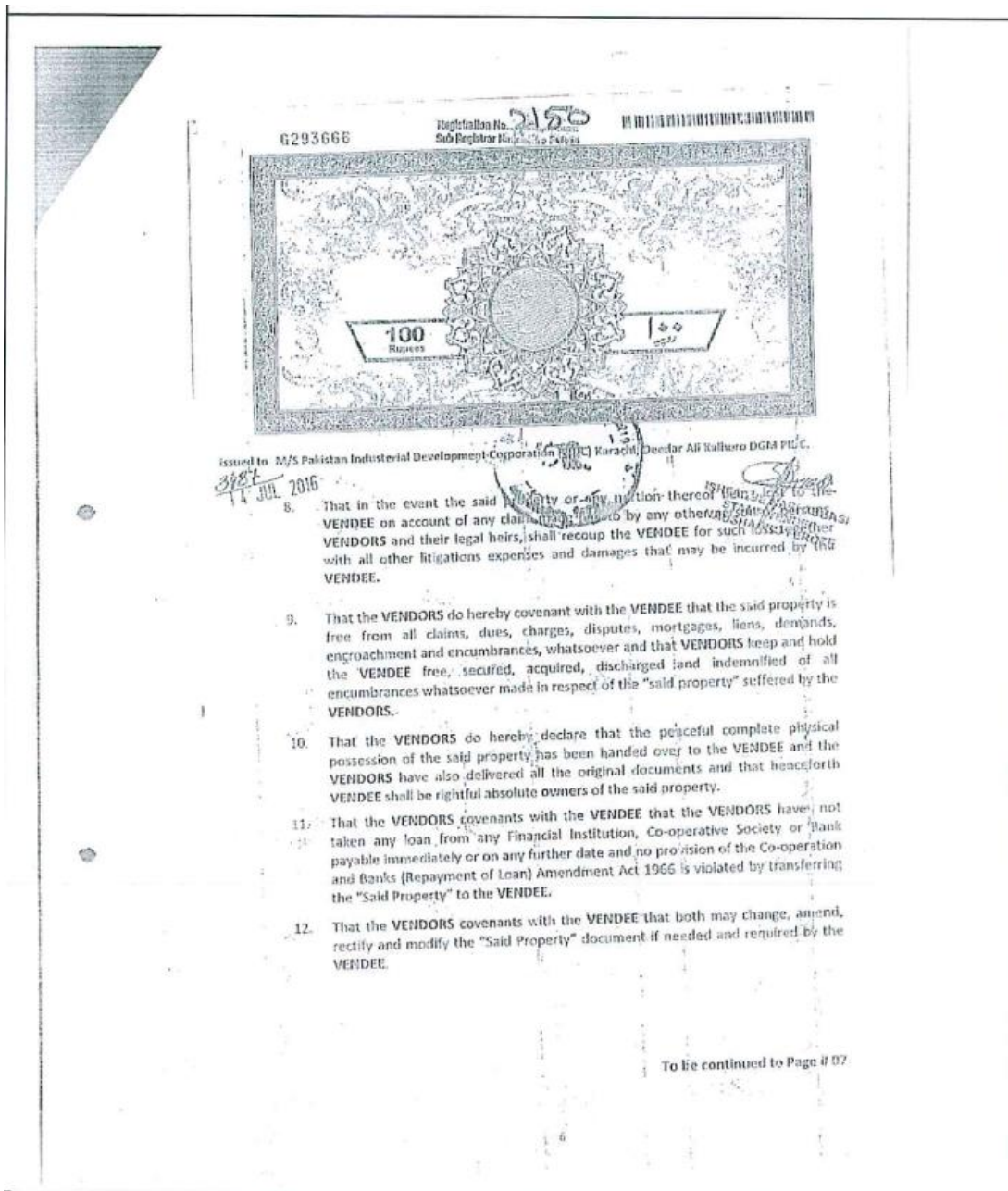
WHEREAS the VENDORS above named claimed to be seized, possessed of Land otherwise well, fully and sufficiently entitled to All That Piece & Parcel of Land bearing Survey No (1) 107 and 220/1 Measuring (04.19) Acres, (2) Survey No. 220/3,4 Measuring (8-00) Acres (3) Survey No. 221/1to4 Measuring (15.37) Acres, (4) Survey No. 222/1to4, Measuring (16-00) Acres (5) Survey No. 223 Measuring (01-24) Acres, (6) Survey No. 227/1,2,4, Measuring (10-14) Acres, (7) Survey No. 228/2,4, Measuring (06-37) Acres, (8) Survey No. 229/1,3, Measuring (05-18) Acres, (9) Survey No. 230/1,2,6, Measuring (05-33) Acres, (10) Survey No. 231/1,2 Measuring (06-07) Acres, **Total Measuring (80-29) Acres**, situated at Deh Izat Wagan, Taluka & District Naushahro Feroze, District Naushahro Feroze, province of Sindh, Pakistan (hereinafter called the "SAID PROPERTY"). The above named VENDORS have further claimed to be the legal and lawful owner of said property and have vacant peace full physical possession thereof.

To be continued to Page n.03

Environmental Impact Assessment (EIA)

Naushahro Feroze Industrial Park (NFIP)

Doc. No IEEC/2022/02/EIA








## Environmental Impact Assessment (EIA)

### Naushahro Feroze Industrial Park (NFIP)

Doc. No IEEC/2022/02/EIA



## Annexure - II: Sukkur Electric Power Company (SEPCO)

 **SUKKUR ELECTRIC POWER COMPANY**

Tel: 071-9310807  
PBX: 071-9310795-6  
Fax: 071-9310801

Office Of The  
Chief Technical Officer  
SEPCO, Sukkur

NO. CEO/SEPCO/SUK/M(P&D)/NFIP **3752-58** Dated **27/06-2021**

Project Manager,  
Naushahro Feroze Industrial Park (NFIP),  
@ Naushahro Feroze, Dist: N'Feroze.

Subject: **SANCTION FOR PROVISION OF 4000 KW LOAD UNDER TARIFF B-3 THROUGH DEDICATED 11 KV FEEDER FROM 132 KV GRID STATION NAUSHEHRO FEROZE FOR DEVELOPMENT OF NAUSHAHRO FEROZE INDUSTRIAL PARK, DEH IZAT WAGAN (ON COST DEPOSIT BASIS)**

Refnce: Your request/application NIP/NFIP/2020/07 dated 31/12/2020.

This has reference to your request captioned above, regarding approval of the subject work.

The Chief Executive Officer being competent authority, has acceded to your request for construction of dedicated 11KV feeder from 132KV Grid Station Naushehro Feroze, for provision of 4000 KW under tariff B-3, to be constructed on cost deposit basis for development of Naushahro Feroze Industrial Park at Deh izat Wagan, Taluka & District: N'Feroze, with following **terms & conditions:**

- The priority of other applications under process in this office shall not be affected by this case.
- The administrative approval and Technical Sanction of BOQ/Cost estimate amounting to Rs.5,41,10,296/- has been accorded by the Chief Executive Officer SEPCO.
- The new connection load i.e 4000 KW shall be provided through dedicated 11KV feeder/circuit, with ACSR Osprey Conductor on 144 No. of HT Steel Structures 45' (7.9 KM in length).
- The connected load, including stand by load if any, should not increase the total of 4000 KW.
- The transformers of appropriate capacity shall be purchase and installed by sponsor at its own cost.
- The metering shall be carried out on 11 KV at consumer end under Tariff B-3.
- HT Industrial panel and CTs shall be provided and installed by SEPCO at the cost of sponsor.
- The sponsor will construct an independent room as per drawing No. CEDD/3-7 (copy enclosed) at the location proposed for installation of requisite Industrial Panel.
- The installation of the all equipments, including T/Fs, shall be strictly according to PEPCO/SEPCO standard design & specifications with necessary protective earthing provision.
- If need arises, the Power Correction Equipment (Capacitor) shall be installed at the cost of sponsor so that the Power Factor shall not fall below 0.9.
- The installation shall be checked by the Committee before energisation of sanctioned load to ensure that the technical requirement have been duly met with as follows:
  - The room for Industrial Panel is as per PEPCO Specification/Drawing at the premises of the consumer.

## Environmental Impact Assessment (EIA)

### Naushahro Feroze Industrial Park (NFIP)

Doc. No IEEC/2022/02/EIA



#### **SANCTION FOR PROVISION OF 4000 KW LOAD UNDER TARIFF B-3 THROUGH DEDICATED 11 KV FEEDER FROM 132 KV GRID STATION NAUSHEHRO FEROZE FOR DEVELOPMENT OF NAUSHAHRO FEROZE INDUSTRIAL PARK, DEH IZAT WAGAN (ON COST DEPOSIT BASIS)**

- b. No Court case is pending neither in any court of law/forum/agency/authority regarding this connection nor against these premises.
- c. The premises are not defaulter of SEPCO.
- xii) The committee will comprise upon the following officers to ensure all the terms/conditions as laid down in sanction before interconnection/energisation of connection.
  - a. S.E Operation Circle SEPCO Dadu
  - b. Regional Manager (M&T) SEPCO
  - c. Executive Engineer Operation Division SEPCO Naushehro Feroze.
  - d. Executive Engineer SS&T Division SEPCO Dadu.
- xiii) XEN Operation Division SEPCO Naushehro Feroze shall strictly watch the maximum demand. Manager (M&T) shall also adjust the plug setting at the metering panel according to the sanctioned load to restrict consumer within limit.
- xiv) SEPCO has right to use line as per item No.8 under heading "Service Connection" of "Abridged Conditions of Supply" duly agreed by applicant.
- xv) The 11 KV installation shall be inspected and certified by the electrical inspector (Government of Sindh) for issuance of necessary NOC/Test report. The consumer shall furnish the same to this office immediately after depositing security amount.
- xvi) The sponsor will be found to install overhead distribution system inside the Naushahro Feroze Industrial Park as per his undertaking submitted to SEPCO and shall not ask SEPCO for 11 KV underground distribution system.
- xvii) In case of getting individual connections from SEPCO inside the said industrial park, SEPCO will entertain the applications of those prospectus consumers who are allotted plots and obtained NOC from the management of Naushahro Feroze Industrial Park @ N'Feroze.
- xviii) The load of individual prospectus consumers so applied as per para xvii above shall not exceed 4000 kW sanctioned load.
- xix) If ownership documents or any other is found fake at any stage, the sanction of (P&D) SEPCO shall stand revoked automatically and sponsor will be responsible for this or any other consequences.
- xx) In case of variation in prices of material due to escalation or additional material is required to be used or any other charges detected at later stage, the applicant/consumer will remain liable to deposit the same.
- xxi) Clearance of Right of way, if arises during execution of work shall be the responsibility of the sponsor of the project.
- xxii) All requirements dictated by NEPRA Consumer Service Manual, Standard design instructions, electricity rules, tariff applicable should be strictly met with according to the latest instructions by Operation formation as well as Construction formation of SEPCO.

**XEN (E) Operation Division SEPCO Naushehro Feroze shall monitor / pursue the implementation of all the above noted terms and conditions in true letter and spirit.**

In case agreed with above terms and conditions, the below mentioned amounts are required to be paid within **(30) days** from issue date of this letter.

S.No	Description	Amount
1.	Capital cost	Rs. 5,41,10,296/-
2.	Security Amount (@ Rs. 2980/- per KW under Tarrif B-3 for 4000 KW	Rs. 119,20,000 /-

## Environmental Impact Assessment (EIA)

### Naushahro Feroze Industrial Park (NFIP)

Doc. No IEEC/2022/02/EIA



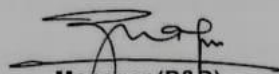
**SANCTION FOR PROVISION OF 4000 KW LOAD UNDER TARIFF B-3 THROUGH DEDICATED 11 KV FEEDER FROM 132 KV GRID STATION NAUSHEHRO FEROZE FOR DEVELOPMENT OF NAUSHAHRO FEROZE INDUSTRIAL PARK, DEH IZAT WAGAN (ON COST DEPOSIT BASIS)**

**NOTE:**

- Capital Cost (Rs. 5,41,10,296/-) and Security Deposit (Rs. 119,20,000 /-) are required to be deposited separately; either by Cash, Cheque or Bank Draft; in favour of the Chief Executive Officer SEPCO, Sukkur.
- You will also remain bound to pay the difference of costs, if any, pointed out at later stage.

After the confirmation of transfer of above amounts in SEPCO accounts, the scheme for construction of dedicated feeder will be forwarded to P.D Const: SEPCO, Larkana for execution of work, being a Cost Deposit scheme.

This is issued with approval of the C.E.O, SEPCO Sukkur.

  
Manager (P&D)  
SEPCO, Sukkur.

**C.c to:**

1. Finance Director, SEPCO, Sukkur.
  2. Manager (M.M) SEPCO, Sukkur. He is requested to arrange material for subject work.
  3. Superintending Engineer, GSO, SEPCO, Sukkur. He is requested to spare for installation of 01 No.11KV Outgoing Panel at 132KV Grid Station Naushehro Feroze.
  4. Superintending Engineer, Operation Circle, SEPCO, Dadu.
  5. Project Director Const: SEPCO, Larkana.
  6. Regional Manager (M&T) SEPCO
  7. Executive Engineer Operation Division SEPCO Naushehro Feroze.
  8. Executive Engineer SS&T Division SEPCO Dadu.
- Master file

## Environmental Impact Assessment (EIA)

### Naushahro Feroze Industrial Park (NFIP)

Doc. No IEEC/2022/02/EIA



#### Annexure - III: NOC for SSGCL

1555  
27-9-21

**SSGC** | Sui Southern Gas Company Limited  
Ref: Sales/IND-N/MIANS-21  
27 September 2021

Project Director  
M/s. National Industrial Park,  
National Highway near Nango Shah Dargah,  
District Naushero feroze.

**SUBJECT: SUPPLY OF GAS TO National Industrial Park District Naushero feroze.**

Dear Sir,

We refer to your application for supply of RLNG to National Industrial Park Nashero feroze, we would like to inform that gas main network extension along with TBS cost and other project relevant costs is required for the above project to meet gas load requirement. We are giving below our quotation as under:

Your contribution towards the cost of gas mains network to be extended (Payable in advance) Non-refundable.

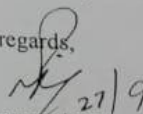
**For a sum of Rs. 105,748,415**

(Rupees One Hundred five Million Seven Hundred forty-Eight Thousand four Hundred Fifteen Only)

**CONDITIONS:**

1. RLNG tariff would be applicable.
2. RLNG would be supplied, on "as and when available basis".
3. You will provide NOC's / Permissions for crossing Railway, Provincial highway and canal Crossing at your own cost.
4. Distribution Mains will become part of our overall network, and will be SSGC property.
5. Space for TBS/ CMS would be provide by you at your cost.
6. 10% Service Charges will be deducted if the order is cancelled for any reason.
7. The above quotation is subject to completion of formalities / documents as per prevailing SSGC / GOP policy.
8. 10% service charges will be deducted if the order is cancelled by you for any reason.
9. The above amount is estimated only at current prices and in case of any revision of pipe and other allied material, additional amount will be paid by the customer.
10. This Quotation is Valid for 30 days only
11. After 30 days of issuance of quotation, if payment is not received, then case would technically be re-evaluated and cost of main extension may be revised, if required.
12. Please attach copy of this quotation at time of submission of pay order in SSGC Sales Department.

If the above quotation and condition are acceptable to you, kindly send us Pay Order for **Rs. 105,748,415** to enable us to proceed further.

Best regards,  
  
Muhammad Riaz  
DGM-I (Sales)

SSGC House: Sir Shah Suleman Road, Block-14, Gulshan-e-Iqbal, Karachi-75300, Pakistan.  
PABX: +92-21-99021000 | Fax: +92-21-99231550 | www.ssgc.com.pk



**Environmental Impact Assessment (EIA)**

**Naushahro Feroze Industrial Park (NFIP)**

Doc. No IEEC/2022/02/EIA



**Annexure - IV: NOC application to Irrigation Department**

 **PAKISTAN INDUSTRIAL DEVELOPMENT CORPORATION (PVT.) LTD.**  
MINISTRY OF INDUSTRIES & PRODUCTION, GOVERNMENT OF PAKISTAN 

**PIDC**

December 6, 2022

The Executive Engineer  
Irrigation Department District Naushahro Feroze  
Sindh

Subject: NOC/Permission for Disposal of Treated Sewerage of Naushero Feroze Industrial Park at Rohri Canal.


Dear Sir,

Reference to the above, please be stated that Pakistan Industrial Development Corporation (PIDC) under the administrative control of the Ministry of Industries & Production (MoIP), Government of Pakistan has been established to develop & manage modern industrial parks all over the Country to promote the much-needed industrialization in the Country for socio economic uplift of the area leading to employment opportunities for inhabitants


PIDC with its mandate is going to develop an Industrial Zone in your district located at by pass link road between Naushahro Feroze and Moro. In this regard for disposal of treated sewerage of industries at Rohri canal the NOC is requested from your good office.

We look forward to an early response to our request enabling us to proceed further without any hesitation.

We thank you & please let us know if you require any further information or clarification in this matter.

  
Project Manager  
Naushero Feroze Industrial Park. PIDC

Cc  
Manager Technical -PIDC

  
**Rohri Division Engineer**


<b>Head Office:</b> 2nd Floor, PIDC House, Dr. Ziauddin Ahmed Road, Karachi.75530-Pakistan. Phone : 021-35685041-9 Fax : 021-99204376 Email : pidc.khi@gmail.com	<b>Regional Office:</b> SEL House 56-Shahrah-e-Quld-i-Azam, Lahore-Pakistan. Phone : 042-36304879, 36372726 Fax : 042-36303453 Email : pidc.lhr@gmail.com	<b>Regional Office:</b> 5th Floor, IFC (New) Build Constitution Avenue, F-15 A, Islamabad. Phone : 051-9201271 Fax : 051-9215961 Email : pidc.isb@gmail.com
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[www.pidc.com.pk](http://www.pidc.com.pk)

<b>Environmental Impact Assessment (EIA)</b>		
<b>Naushahro Feroze Industrial Park (NFIP)</b>		
Doc. No	IEEC/2022/02/EIA	

### Annexure - V: Screening Criteria to Determine Env. Category of the proposed Project

<b>Title of Project:</b> Naushahro Feroze Industrial Park (NFIP)			
<b>Scope of Works:</b> Civil works includes Earthworks, road, drainage line, plot cutting, parks, etc			
<b>Duration:</b> 24 Months			
<b>Client Project:</b> Pakistan Industrial Development Corporation			
<b>Section: B Assessment</b>			
<b>Environmental Issues</b>			
No Tree cutting involved			
Land acquisition has been already completed and land has been transferred in the name of PIDC			
Most of the impact is during the construction stage and particularly during plot cutting or establishment of social amenities but for short period and reversible nature as well as localized.			
<ul style="list-style-type: none"> <li>· There are also no physical cultural resources at or near the proposed site, which may likely be affected by construction activities. The nearest shrine is Nago Shah, which is located 300 meters another side of the road (N bound of N5).</li> <li>· No forests were observed near the site.</li> <li>· Ambient Air quality is clear and noise levels are under SEPA standards.</li> </ul>			
<b>Section C: The categories are defined in the Sindh Environmental Protection Agency (SEPA) IEE and EIA Regulations, 2014.”</b>			
<b>Type of Project: Manufacturing &amp; Processing</b>			
<b>Type of Project</b>	<b>Category</b>	<b>Applicable (Yes/No)</b>	<b>Comments</b>
The proposed project is categorized based on the serving areas in Schedule III, Category ‘C’ of Manufacturing and processing, 6. Establishment of Industrial estates & Export processing zones.”	Schedule-III	The project spread over 80 acres	The project is falling in schedule III. Hence EIA envisages
<b>Section D: World Bank Operational Policies that might Apply</b>			
<b>Safeguard Policies</b>	<b>Triggered (Yes/No)</b>		<b>Explanation</b>
Environmental Assessment OP/BP/GP 4.01	Yes		
Natural Habitats OP/BP 4.04	No		
Forest OP/BP 4.36	No		
Pest Management OP/BP/4.09	No		
Physical Cultural Resources OP/BP 4.09	No		
Involuntary resettlement OP/BP 4.12	No		
Project in International Waterways OP/BP 7.50	No		
Projects in Disputed Areas OP/BP 7.60	No		

<b>Environmental Impact Assessment (EIA)</b>		
<b>Naushahro Feroze Industrial Park (NFIP)</b>		
Doc. No	IEEC/2022/02/EIA	

## Annexure - VI: Scan Reports of Baseline Monitoring



Address: Ducom Building No. 81-C,  
Zulfiqar Commercial, Street No 5,  
DHA Phase VIII, Karachi-Pakistan.  
Contact No. 0300-3589664

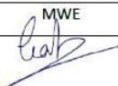
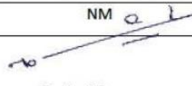

### Analysis Report

#### Sample Information:

Lab. Report Number	DLR-1012-22	Customer Sample ID	IND-03
Sample Type	Drinking Water	Company Name	Indus Environmental Engineering Consultant
Sampling location	Naushahra Feroze Industrial Park	Sampling Date	18-November-2022

#### (a) Drinking Water:

Sr.#	Test Parameters	Method	Limit	Unit	Results
1	Total Coli form count	EPA 1604	CSND	CFU/100ml	Nil
2	Color	Pt-Co color	< 15	TCU	2
3	Taste	Physical	--	--	No Objection
4	Odor	Physical	--	--	Odorless
5	Turbidity	EPA180.1	<5	NTU	3
6	Total Hardness	Titration	<500	mg/L	436
7	Total dissolved solids	Filtration	<1000	mg/L	893
8	pH	EPA150.3	6.5-8.5	--	7.89
9	Arsenic(As)	Atomic Absorption	<0.05	mg/L	<0.05
10	Chromium(Cr)	Atomic Absorption	<0.05	mg/L	<0.05
11	Nickel (Ni)	Atomic Absorption	<0.02	mg/L	0.01
12	Copper(Cu)	Atomic Absorption	<2	mg/L	0.04
13	Zinc(Zn)	Atomic Absorption	<2	mg/L	0.15
14	Aluminum	Atomic Absorption	<0.2	mg/L	0.03
15	Antimony	Atomic Absorption	<0.02	mg/L	<0.02
16	Barium	Atomic Absorption	0.7	mg/L	0.06
17	Boron	Atomic Absorption	0.3	mg/L	0.18
18	Cadmium	Atomic Absorption	0.01	mg/L	<0.01
19	Chloride	Method 811	<250	mg/L	185
22	Cyanide	Method 8171	<0.05	mg/L	<0.05
23	Fluoride	Method 8029	<1.5	mg/L	0.08
24	Lead	Atomic Absorption	<0.05	mg/L	<0.05
25	Manganese	Atomic Absorption	<0.5	mg/L	<0.02
28	Nitrite	Method 8507	<0.5	mg/L	0.13
29	Nitrate	Method 8171	<0.3	mg/L	0.10
30	Selenium	Atomic Absorption	0.01	mg/L	<0.01
31	Residual Chlorine	Method 8171	0.2-0.5	mg/L	0.2

Analysed, Chemist	Reviewed, Sr. Chemist	Approved Lab. Head
MWE 	NM 	SEA 



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# Environmental Impact Assessment (EIA)

## Naushahro Feroze Industrial Park (NFIP)

Doc. No IEEC/2022/02/EIA



Address: Ducom Building No 81-C,  
Zulfiqar Commercial, Street No 5,  
DHA Phase VIII, Karachi-Pakistan.  
Contact No. 0300-3589664

### Analysis Report

#### Sample Information:

Lab. Report Number	DLR-1011-22	Customer Sample ID	IND-02
Sample Type	Ground Water	Company Name	Indus Environmental Engineering Consultant
Sampling Location	Naushahra Feroze Industrial Park	Sampling Date	18-November-2022

#### (a) Ground Water:

Sr.#	Test Parameters	Method	Limit	Unit	Results
1	Color	Pt-Co color	< 15	TCU	12
2	Odor	Physical	--	--	Odorless
3	Turbidity	EPA180.1	<5	NTU	3
4	Total Hardness	Titration	<500	mg/L	486
5	Total dissolved solids	Filtration	<1000	mg/L	594
6	pH	EPA150.3	6.5-8.5	--	8.1
7	Arsenic(As)	Atomic Absorption	<0.05	mg/L	<0.05
8	Chromium(Cr)	Atomic Absorption	<0.05	mg/L	<0.05
9	Nickel (Ni)	Atomic Absorption	<0.02	mg/L	<0.05
10	Copper(Cu)	Atomic Absorption	<2	mg/L	1.3
11	Zinc(Zn)	Atomic Absorption	<2	mg/L	1.8
12	Aluminum	Atomic Absorption	<0.2	mg/L	0.14
13	Antimony	Atomic Absorption	<0.02	mg/L	<0.05
14	Barium	Atomic Absorption	0.7	mg/L	0.3
15	Boron	Atomic Absorption	0.3	mg/L	0.1
16	Cadmium	Atomic Absorption	0.01	mg/L	<0.05
17	Chloride	Method 811	<250	mg/L	248
18	Cyanide	Method 8171	<0.05	mg/L	<0.05
19	Fluoride	Method 8029	<1.5	mg/L	0.7
22	Lead	Atomic Absorption	<0.05	mg/L	<0.05
23	Manganese	Atomic Absorption	<0.5	mg/L	<0.05
24	Nitrite	Method 8507	<0.5	mg/L	0.44
25	Nitrate	Method 8171	<0.3	mg/L	0.26
28	Selenium	Atomic Absorption	0.01	mg/L	<0.05
29	Residual Chlorine	Method 8171	0.2-0.5	mg/L	0.3

Analysed, Chemist	Reviewed, Sr. Chemist	Approved Lab. Head
MWE	NM	SEA



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## Environmental Impact Assessment (EIA)

### Naushahro Feroze Industrial Park (NFIP)

Doc. No IEEC/2022/02/EIA



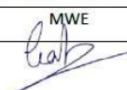
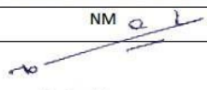
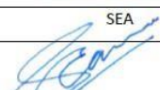
Address: Ducom Building No. 81-C,  
Zulfiqar Commercial, Street No. 5,  
DHA Phase VIII, Karachi-Pakistan.  
Contact No. 0300-3589664

### Analysis Report

Lab. Report Number	DLR-1010-22	Customer Sample ID	IND-01
Sample Type	Surface Water	Company Name	Indus Environmental Engineering Consultant
Sampling Location	Naushahra Feroze Industrial Park	Sampling Date	18-November-2022

**(a) Surface Water:**

Sr.#	Test Parameters	Method	Limit	Unit	Results
1	Color	Pt-Co color	< 15	TCU	22
2	Odor	Physical	--	--	Odor present
3	Turbidity	EPA180.1	<5	NTU	16
4	Total Hardness	Titration	<500	mg/L	1236
5	Total dissolved solids	Filtration	<1000	mg/L	1690
6	pH	EPA150.3	6.5-8.5	--	8.4
7	Arsenic(As)	Atomic Absorption	<0.05	mg/L	18
8	Chromium(Cr)	Atomic Absorption	<0.05	mg/L	1285
9	Nickel (Ni)	Atomic Absorption	<0.02	mg/L	3564
10	Copper(Cu)	Atomic Absorption	<2	mg/L	8.4
11	Zinc(Zn)	Atomic Absorption	<2	mg/L	18
12	Aluminum	Atomic Absorption	<0.2	mg/L	2
13	Antimony	Atomic Absorption	<0.02	mg/L	1.6
14	Barium	Atomic Absorption	0.7	mg/L	3.5
15	Boron	Atomic Absorption	0.3	mg/L	2.4
16	Cadmium	Atomic Absorption	0.01	mg/L	6.8
17	Chloride	Method 811	<250	mg/L	1354
18	Cyanide	Method 8171	<0.05	mg/L	0.56
19	Fluoride	Method 8029	<1.5	mg/L	3.2
22	Lead	Atomic Absorption	<0.05	mg/L	6.7
23	Manganese	Atomic Absorption	<0.5	mg/L	9.1
24	Nitrite	Method 8507	<0.5	mg/L	16.2
25	Nitrate	Method 8171	<0.3	mg/L	12.4
28	Selenium	Atomic Absorption	0.01	mg/L	3.7
29	Residual Chlorine	Method 8171	0.2-0.5	mg/L	1.9

Analysed, Chemist	Reviewed, Sr. Chemist	Approved Lab. Head
MWE 	NM 	SEA 



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<b>Environmental Impact Assessment (EIA)</b>		
<b>Naushahro Feroze Industrial Park (NFIP)</b>		
Doc. No	IEEC/2022/02/EIA	



Address: Ducom Building No. 81-C,  
Zulfiqar Commercial, Street No 5,  
DHA Phase VIII, Karachi-Pakistan.  
Contact No. 0300-3589664


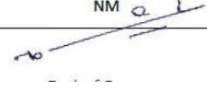

## Analysis Report

### Sample Information:

Lab. Report Number	DLR-1014-22	Customer Sample ID	IND-05
Sample Type	Noise Level	Company Name	Indus Environment Engineering Consultants
Location Detail	Naushahra Feroze Industrial Park	Sampling Date	18-November-2022

### Results:

S.No	Description	Co-ordinates	Unit	Limit	Result
1	Noise Level	Lat 26.790349 Long 68.093784	Decibel (db)	85	56.7
2	Noise Level	Lat 26.790362 Long 68.09375	Decibel (db)	85	55.9
3	Noise Level	Lat 26.790166 Long 68.094088	Decibel (db)	85	63.2
4	Noise Level	Lat 26.790673 Long 68.093885	Decibel (db)	85	65.8
5	Noise Level	Lat 26.79007 28.094729	Decibel (db)	85	53.3

Analysed, Chemist	Reviewed, Sr. Chemist	Approved Lab. Head
MWE 	NM 	SEA 



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### Analysis Report


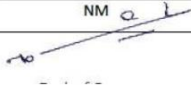

**Sample Information:**

Lab. Report Number	DLR-1013-22	Customer Sample ID	IND-04
Sample Type	Ambient Air	Company Name	Indus Consultancy
Sampling Location	Naushahra Feroze Industrial Park	Sampling Date	18-November-2022

**Sample Results:**

**(a) Ambient Air**

Sr.#	Test Parameters	Method	Limit	Unit	Results
1	Sulfur Dioxides(SiO2)	UV fluorescence	120	µg/m3	36
2	Oxides of Nitrogen as NO	Gas Phase Chemiluminescence	40	µg/m3	12
3	Oxides of Nitrogen as NO2	Gas Phase Chemiluminescence	80	µg/m3	22
4	Ozone(O3)	Non Dispersive UV absorption method	130	µg/m3	32
5	Suspended Particulate matter	B ray absorption method	500	µg/m3	210
6	Particulate matter(PM10) Repirable	B ray absorption method	150	µg/m3	54
7	Particulate matter(PM2.5) Repirable	B ray absorption method	75	µg/m3	43
8	Carbon Monoxide(CO)	Non Dispersive Infra Red method	10	µg/m3	2

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# Environmental Impact Assessment (EIA)

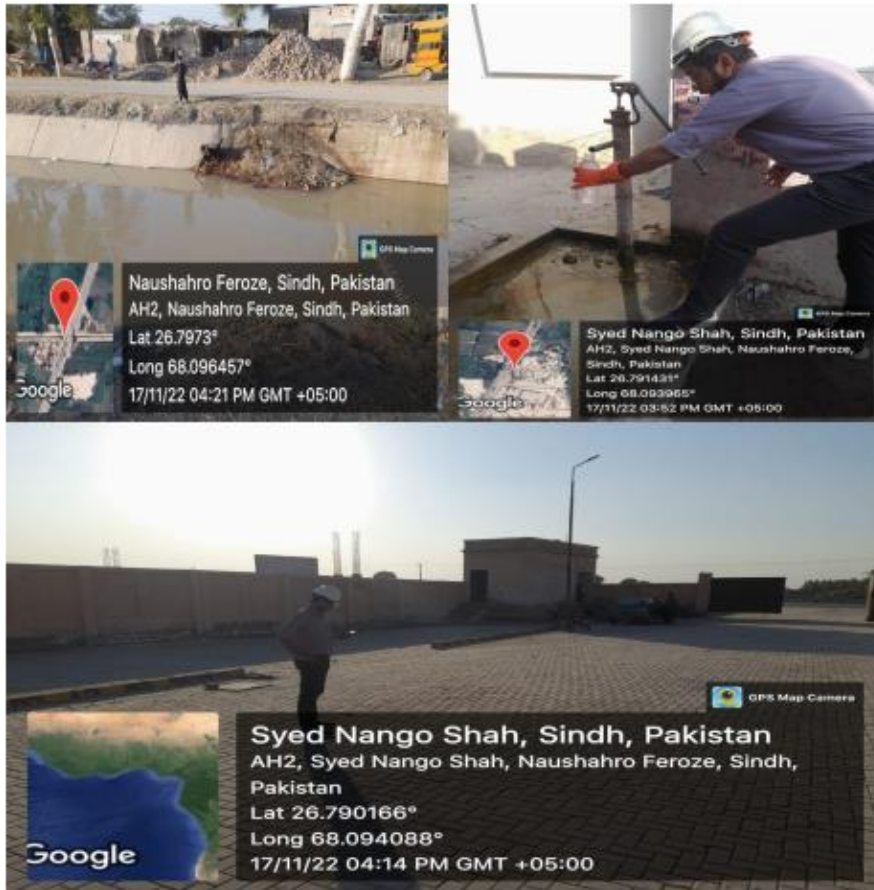
## Naushahro Feroze Industrial Park (NFIP)

Doc. No IEEC/2022/02/EIA



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### Analysis Report



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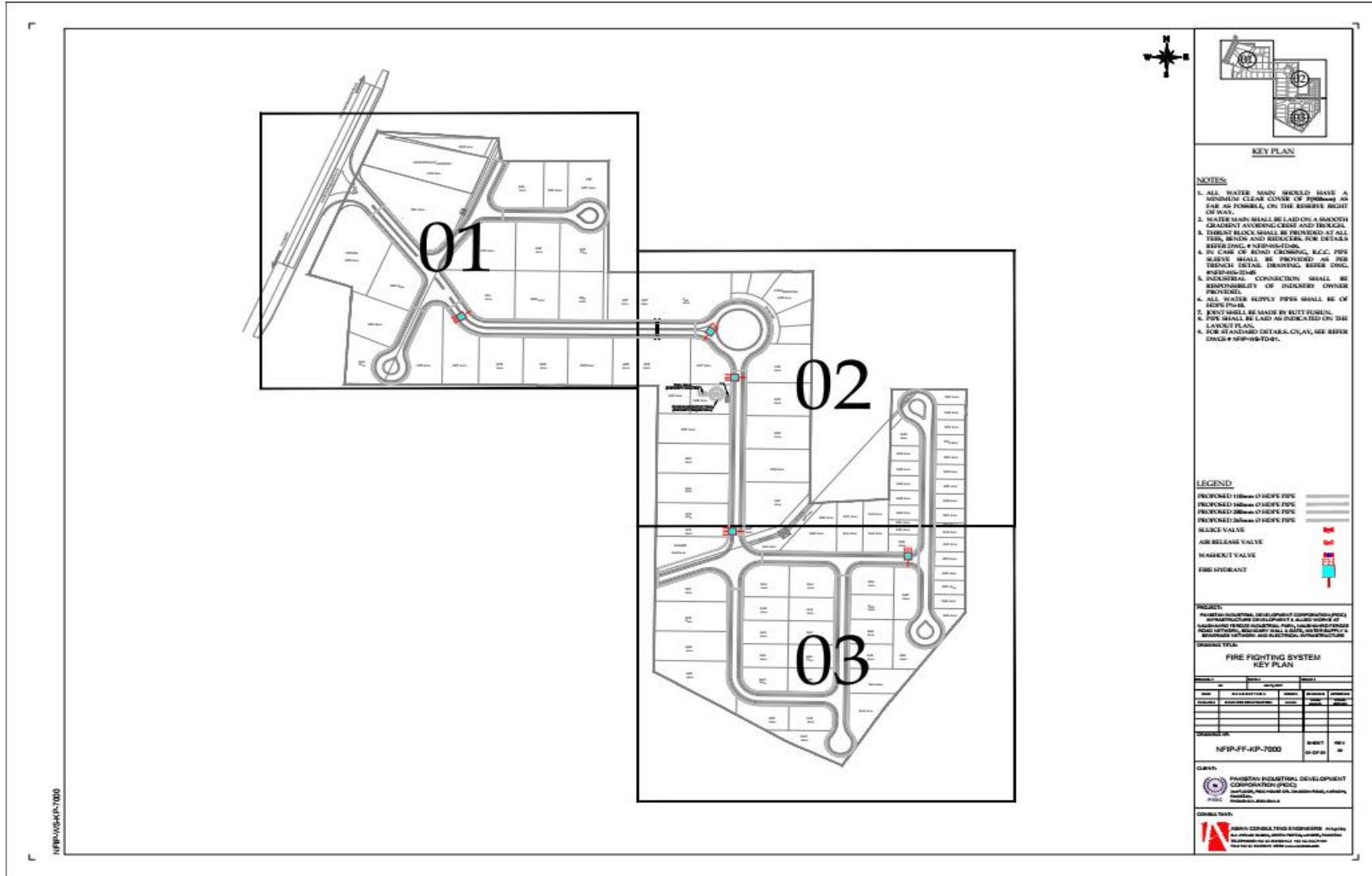
# Environmental Impact Assessment (EIA)

## Naushahro Feroze Industrial Park (NFIP)



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## Naushahro Feroze Industrial Park (NFIP)



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