



KOH E NOOR BUILDERS & DEVELOPERS

NOVEMBER 2022

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

**NOOR GREEN VALLEY
HOUSING SCHEME**



**EMC Pakistan
Private Limited**



Koh-e-Noor
BUILDERS & DEVELOPERS

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Executive Summary

Presented in this report are the findings of the Environmental Impact Assessment (EIA) study submitted to the Sindh Environmental Protection Agency for the approval of construction in Noor Green Valley housing scheme located on Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh, having total area of 45 Acre – 25 Ghunta. The assessment was conducted with the following objectives:

- Identify the regulatory requirements that apply to project activities in the proposed project area, in the context of environmental protection, health and safety;
- Assess proposed project activities in terms of their likely impacts on the environment during the construction & operation phases of the project, in order to identify issues of environmental concern; and
- Recommend appropriate mitigation measures that can be incorporated into the design of the project to minimize any adverse environmental impacts identified.

Koh-e-Noor Builders & Developers started in 1985 as modest but strong, Consistent, multi-faceted organization committed to customers satisfaction. They have always banked on innovation, teamwork, a high degree of technical excellence and maintaining the highest standards of business practices. Long term relationship and repeat orders with many of the reputed clients are testimony to the quality to the quality and value of services offered by Koh-e-Noor.

Following are the salient features of the project;

Table ES.1: Project Details	
Project Name	Noor Green Valley
Project Address	Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh
Proponent Name	Koh e Noor Builders & Developers
Total Land Area	45 Acre – 25 Ghunta
Type A	
Residential Area	A1 – A9
Type B	
Residential + Commercial Area	B1 + B289 (including School for handicap, Amenity area, Commercial (02) Area)

Type C	
Residential + Commercial Area	C1 – C152 (including park, school, commercial (02) Area) + Grid Station
Type F	
Residential + Commercial Area	F1 – F198 (Including Masjid & Park)
Type S	
Residential Area	S1 – S9 + Green Belt Area

Project Location

The proposed housing scheme is located at Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh. The major roads nearby project area are Moenjodaro- Radhan Road and Moen-Jo-Daro Road.

The nearest landmarks include Mandioon Bus Station, Shaheed Benazir Bhutto Girls Cadet College Larkana, Sports complex and Dadu Canal.

The housing scheme will be comprising of five main categories of plot (Type A, Type B, Type C, Type F & Type S), residential houses and the project area will also serve as commercial plots and amenities which include; Educational enclave, Mosques, Parks and Green belt. Location of the proposed housing scheme is depicted in figure Ex.1.

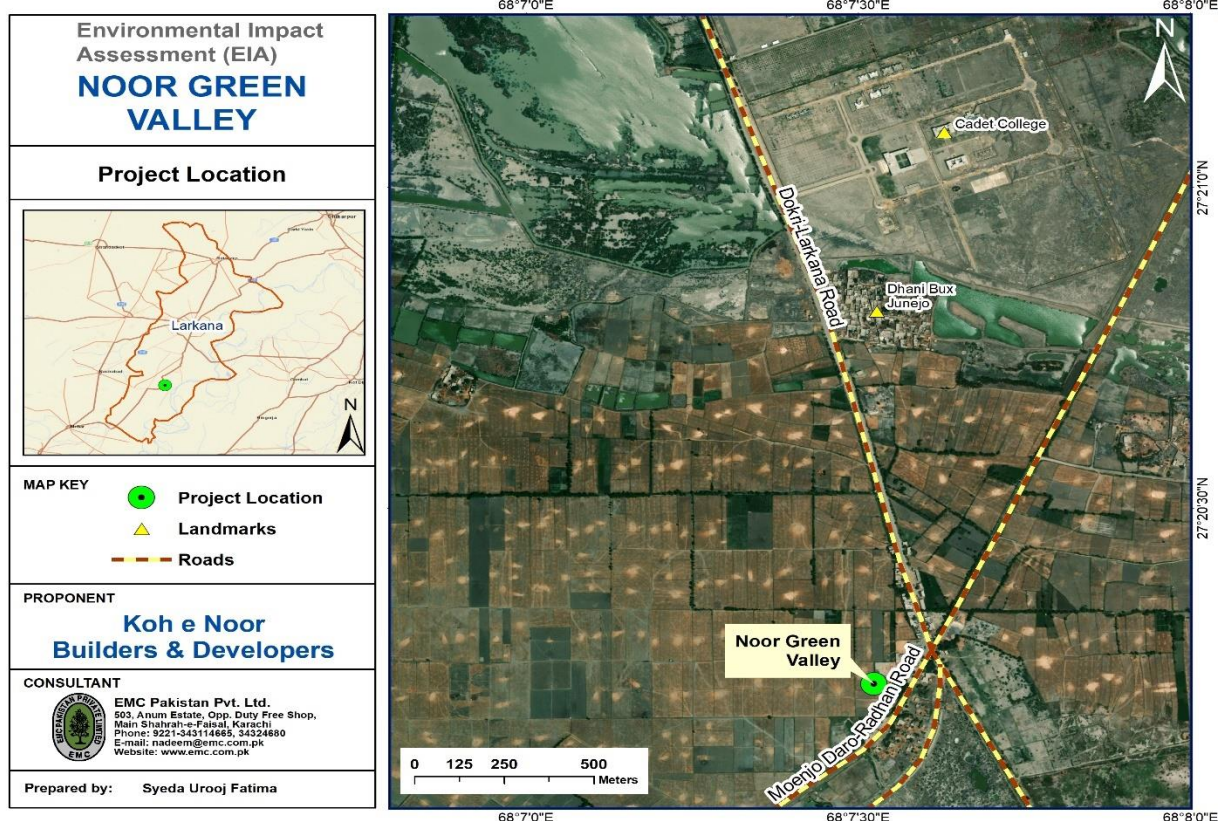


Fig Ex-1: Location of Project Site

- The Project will be located on Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh; the Project site falls in the appropriate category that permits the designated land-use by the relevant authority. The site is thus the only and hence the preferred alternative for siting the Project.
 - The microenvironment of the project site is rather thinly populated area of Larkana. Area is dominated by farmlands and villages (Goth) and some housing societies are being developed.
 - The comments, concerns and suggestions received from stakeholders during the neighborhood survey have been collated. The comments solicited from stakeholders were helpful in the screening of the potential environmental & social aspects of the project.
- ⇒ *All the stakeholders consulted were of the opinion that the development of the housing society will bring many positive outcomes. They said that project would improve the general outlook of the area. They were also of the view that the housing society will improve the security situation in the area and will therefore boost the local economy.*
- ⇒ *Villagers said that employment opportunities for locals will increase. Business in the project areas will increase since locals will be able to open small shops on both sides of road.*
- ⇒ *Education opportunities are available only up to the primary level in the area, with only few villages having middle schools. This project has planned to open good private schools in the area where children will get quality education. Villagers said that local people should allow sending their children in schools and parks in the project area, as children get proper and quality education in their vicinity.*
- The site is free from any encumbrances and therefore would least likely cause displacement of population, loss of business and annoyance to the living environment, or disturb the peace and tranquility of its surroundings. The Project also responds to the need of the segment of population that is seeking affordable housing. Advantage of this aspect has already been taken by other builders and developers who have gone ahead with the construction of such schemes in the city and outskirts.
 - The microenvironment has no sensitive areas such as protected sites including wildlife sanctuaries, game reserves or national parks, or any archaeological, historical or cultural heritage in its immediate neighborhood; as such its siting would have no sensitivity in this regard. No significant flora and fauna will be disturbed.
 - The proposed project is expected to be a self-contained housing having its own back-up power generation, water supply supplemented by filtration system and sewage treatment and disposal system in addition to provision of parking space.
 - Vehicular traffic management will be undertaken seriously to restrain unnecessary traffic jams that may cause annoyance to the commuters travelling on the roads surrounding the project.

- Fire Fighting System will be designed in accordance with Building Code of Pakistan – Fire Safety Provisions and NFPA codes.
- Realizing that the city has overgrown its sustainability limits, it is imperative that the Builders and Developers take cognizance of the cumulative effect of the current pace of rapid development. Consequently, each project is required to keep the sustainability principles in view and go an extra mile beyond the present approach which is confined to bare survival. Their projects have so far been profited oriented, now they will have to share the profit with net zero energy and net zero discharge approach in the project design.
- Based on the findings of the environmental impact assessment it is concluded that the environmental impacts of the construction and operation of the project are manageable and can be mitigated by implementing the Environmental Management and Monitoring Plan which forms an integral part of EIA document. The screening process has through review of literature, primary as well as secondary baseline data, and expert judgment, made assessment of the potential impacts of said activities on the physical, biological, and socioeconomic environment of the Project. Mitigation measures have been proposed to reduce, minimize or compensate for the identified potential negative impacts and their adoption has been recommended. The study therefore recommends that the Environmental Impact Assessment (EIA) report should be approved with the provision that the suggested mitigation measures will be adopted and the Environmental Management Plan will be followed in letter and spirit.

Chapter 1 Introduction

Name of the Project:	Noor Green Valley
Location of the Project:	Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh.
Nature of Project:	Housing Scheme
Name of the Proponent:	Koh – e – Noor Builders & Developers
Name of Environmental Consultant:	EMC Pakistan Pvt. Ltd
Contact:	Syed Nadeem Arif Managing Director EMC Pakistan Private Limited Office # 503, Anum Estate Building, Main Shahrah-e-Faisal, Opp. Duty Free Shop, Karachi Tel: (+92-21) 34311466; Fax: (+92-21) 34311467 E-mail: nadeem@emc.com.pk

Presented in this report are the findings of the Environmental Impact Assessment (EIA) study submitted to the Sindh Environmental Protection Agency for its approval for construction of housing scheme at Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh.

1.1 Project Overview

The project is aimed to become the pioneering sustainable development of Larkana. It has been planned to provide the best lifestyle to its residents, with quality infrastructure, safe surroundings offering peace of mind, proximity to all necessary facilities and emphasizing on environmentally sustainable opportunities. The housing scheme will have residential and commercial units. It will also have Masjid, Park, Education Center, Amenity Area & Green Belt Area.

The project details are described with the following facilities in the table below:

Table 1.1: Project Details	
Project Name	Noor Green Valley
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Proponent Name	Koh e Noor Builders & Developers
Total Land Area	45 Acre – 25 Ghunta
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Type C	
Residential + Commercial Area	C1 – C152 (including park, school, commercial (02) Area) + Grid Station
Type F	
Residential + Commercial Area	F1 – F198 (Including Masjid & Park)
Type S	
Residential Area	S1 – S9 + Green Belt Area

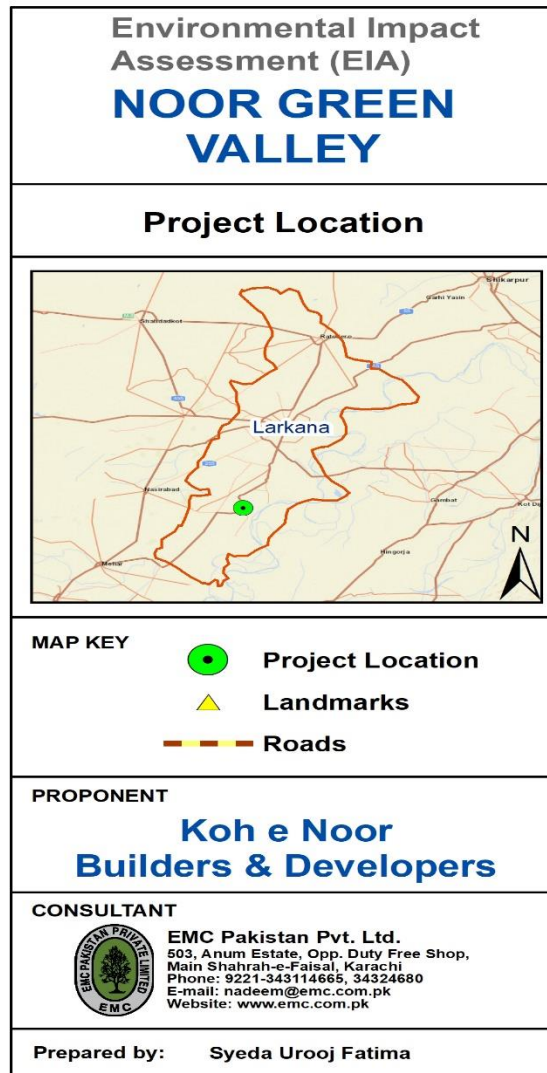


Figure 1.1: Location of Project Site

1.2 Objectives of Project

In launching the Project, the proponent aims to achieve the following objectives:

- To provide an organized housing structure conducive to the current demand of fast degrading environment;
- To promote development in the Housing Sector which at present is among the worthwhile contributors to the growth of GDP;
- To meet the increasing demand of residential accommodation in Larkana

1.3 Need for EIA

The EIA study is a mandatory requirement under the provisions of Sindh Environmental Protection Act 2014 and the rules made thereunder. Sindh Environmental Protection Act, 2014 under section 17 (1) mandatorily requires proponent of project to file an IEE or EIA, as the case may be, and obtain approval from the SEPA before commencing construction or operation of the project. Section 17 (1) of the 2014 Act is reproduced herein under for reference:

“17. (1) 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.”

Sindh EPA Environmental Assessment Regulations, 2021 categorize projects into three separate schedules depending on whether a project requires an Environmental Checklist (Schedule-I) or an IEE (Schedule-II) or EIA (Schedule III). The Regulations also require that all projects located in environmentally sensitive areas need submission of an EIA.

On the basis of the court order, it has been accordingly categorized into Schedule III, i.e., EIA. A court order has been attached as an annexure.

This Environment Impact Assessment (EIA) report presents the evaluation of environmental impacts of the construction and operation of the facility.

It is therefore necessary to prepare a detailed account of environmental impact of the proposed high-rise development so that appropriate interventions could be taken. This assessment focuses on various parameters covering all environmental & social issues including building stability, water & waste water management, sewage treatment plant, source of water, depth of ground water, solid waste management, traffic management, adequacy of parking area, safety & security, nearest sensitive zones/receptors and overall settlement density. The plan seeks to define the project in a holistic manner and suggest possible mitigation measures for development. It has been learnt that through early planning before the start of the project as well as through all phases of the project's development, if environmental concerns are considered simultaneously with other technical and economic criteria, it may be

possible to develop the housing projects with the safeguard of environmental & socioeconomic resources of the area.

The assessment was conducted with the following objectives:

- Identify the regulatory requirements that apply to project activities in the proposed area, in the context of environmental protection, health and safety;
- Assess proposed project activities in terms of their likely impacts on the environment during the construction & operation phases of the project, in order to identify issues of environmental concern; and
- Recommend appropriate mitigation measures that can be incorporated into the design of the project to minimize any adverse environmental impacts identified.

1.4 Methodology Adopted for EIA

This Environmental Impact Assessment (EIA) was conducted in the following manner:

1. Scoping

A scoping exercise was undertaken to identify the potential issues that are to be considered in the environmental impact assessment.

The scoping exercise included the following tasks:

- **Data Compilation:** A generic description of the proposed activities relevant to this environmental assessment was compiled with the help of the Project Proponent.
- **Review of Published literature:** All available published and unpublished information pertaining to the micro and macro environment of the study area was obtained and reviewed. It included the earlier studies conducted in the study area, environmental & social baseline and impact assessment studies conducted by different consultants in past. Secondary data was very helpful in understanding the issues that were identified by other consultants.
- **Review of applicable Legislation:** Information on relevant legislation, regulations, guidelines, and standards was reviewed and compiled.
- **Identification of potential impacts:** The information collected in the above procedures was reviewed and potential environmental issues identified.
- **Initial site visit:** An initial site visit was conducted to get an overview of site conditions and the surrounding areas.
- **Stakeholder consultation:** A stakeholder consultation was undertaken to document the concerns of the local community & other stakeholders, and to identify issues that may require additional assessment in order to address these concerns.

2. Review of Legislation and Guidelines

National & Provincial legislations, environmental guidelines, and best industry practices were reviewed to set environmental standards that the project will be required to follow during different stages of the project. Sindh Environmental Protection Act 2014, Sindh EIA



Regulations 2014 and Sectoral Guidelines for Housing were the basic guiding documents used during the study.

3. Baseline Data Collection

Detailed environmental baseline surveys were conducted to collect primary data on the Project Area to help identify sensitive receptors. The primary data were examined and compared with secondary data available from earlier environmental studies in the region. The scope of survey included collection of information on following key aspects:

- Climate and Rainfall
- Air Quality
- Noise Quality
- Topography
- Soil
- Geology
- Hydrology
- Vegetation
- Fauna
- Socioeconomic resources

4. Identification of Aspects

Identification of environmental aspects and their significance is fundamentally important for determination of severity of incidence of impacts at different stages of the project. This step is aimed at obtaining an inventory of the aspects. The aspects identified during this step cover all activities during construction and operation, in order to determine those which, have or can have significant impact on the environment.

5. Impact Assessment & EMP

Environmental experts at EMC analyzed and assessed the anticipated impacts that are likely to arise due to the identified aspects. Each of the potential impacts identified during the scoping session was evaluated using the environmental, socioeconomic, & project information collected. In general, the impact assessment discussion covers the following aspects:

- Present baseline conditions
- Potential change in environmental parameters likely to be affected by Project related activities
- Prediction of potential impacts
- Evaluation of the likelihood and significance of potential impacts
- Defining of mitigation measures to reduce impacts to as low as practicable
- Prediction of any residual impacts, including all long and short-term, direct and indirect, and beneficial and adverse impacts
- Monitoring of residual impacts.

Environmental Management Plan (EMP) was compiled and included in the environmental assessment report to make it more comprehensive & self-sustaining with the specific purpose of providing working guidelines for the project Proponent and Management personnel who shall be responsible for the construction and operations of the project, so as to enable them to maintain the environmental and social conditions in conformity with the SEPA regulations.

The management plan outlines the details required to manage environmental, safety and community risks arising from the project activities as well as social issues. It also gives the



details of monitoring that would be required during the operation phase of the project in order to comply with the requirements of sustainable development.

6. Preparation of Report

This EIA report has been prepared in accordance with the guidelines of the Pakistan Environmental Protection Agency (PEPA) and Sindh Environmental Protection Agency (SEPA). All pre-requisites of report writing in structural format, contents and presentation have been considered and met as per the standard format of the EIA document.

1.5 Structure of EIA Report

The EIA report has been structured on the standard format, prescribed by the Sindh Environmental Protection Agency (SEPA). The report has been presented in the following sections:

- Section 1 – Introduction to Project and EIA Processes
- Section 2 – Overview of National and Provincial Legislation & Guidelines relevant to the project
- Section 3 – Description of Project
- Section 4 – Description of Environment of Project Area
- Section 5 - Stakeholders Consultation
- Section 6 – Screening of Environmental and Proposed Mitigation Measures
- Section 7 – Environmental Management and Monitoring Plan (EMP)
- Section 8 - Conclusion and Recommendations

1.6 EIA Study Team

The study was assigned to EMC Pakistan Private Limited. EMC organized the following team to carry out the study:

Table 1.2: EIA Study Team		
S.#	Name	Position
1.	Engr. Syed Nadeem Arif	Project Director
2.	Engr. Ahmed Zohair	Deputy Team Leader / Environmental Engineer
3.	Mr. Muhammad Haseeb	Environmental Specialist
4.	Ms. Samita Nadeem	Senior Environmental Engineer
5.	Mr. Tanveer Arif	Sr. Sociologist
6.	Mr. Syed M. Omer Arif	Environmental Engineer
7.	Ms. Saira Tariq	Environmental Scientist
8.	Mr. Wajai Kumar	Sociologist

Chapter 2 Policy, Legal & Administrative Framework

The Constitution of Pakistan contains provisions for environmental protection & resource conservation. There are two fundamental rights that are directly relevant for environmental issues.

The first is Article 9 of the Constitution, which provides:

“No person shall be deprived of life or liberty save in accordance with law”.

The second is Article 14, which makes the dignity of a man a fundamental right.

The Supreme Court in landmark judgment in the case of *Shehla Zia and others vs WAPDA (1994)* referred to both these Articles and laid down the foundation of modern environmental law in Pakistan in the following terms:

“The word ‘life’ in the constitution has not been used in a limited manner. A wide meaning should be given to enable a man not only to sustain life but to enjoy it. Under our Constitution, Article 14 provides that the dignity of man and subject to law the privacy of home shall be inviolable. The fundamental right to preserve and protect the dignity of man under Article 14 is unparalleled and could be found only in few Constitutions of the world. The Constitution guarantees dignity of man and also right to ‘life’ under Article 9 and if both are read together, question will arise whether a person can be said to have dignity of man if his right to life below bare necessity is like without proper food, clothing, shelter, education, health care, clean atmosphere and unpolluted environment.”

This Chapter provides synopsis of policies, legislation, and guidelines that may have relevance to the proposed project & administrative framework as well as institutional set-up relevant to the environmental assessment of the proposed project.

After the Eighteenth amendment in the constitution of Pakistan, 1973 many federal subjects devolved to provincial legislation. The Concurrent List in fourth schedule of the constitution containing entries of subjects wherein federal and provincial legislation could legislate has been abolished. The subject of “Environmental Pollution and Ecology” the entry No.24 of the concurrent legislative list has also devolved to provincial legislations. Since project is in province of Sindh; therefore, only those national laws, rules and regulations are discussed here which have application in the project. Between 1993 and 2010, the Pak-EPA promulgated several rules, regulations, standards, and guidelines to implement the provisions of the PEPA 1997. The provincial government has yet to draft its own complete instruments, for instance, sectorial guidelines; therefore, as provided under Article 270A of the Constitution, rules, regulations, standards, and guidelines made under PEPA 1997 can still be benefited from where these are not made under the provincial law. SEPA has, however, notified the Sindh

Provincial rules, regulations and standards. The discussion on regulatory requirements applicable to this Project is, therefore, based on the Sindh law, the SEPA 2014, the Regulations; and, the rules, regulations, standards, and guidelines developed under the SEPA 2014. There are provincial laws which come under the umbrella of environmental protection; for instance, Forest Act 1927, but due to irrelevance with the project setting such laws are not reviewed here.

The Sindh Environmental Protection Act 2014 requires proponents to follow the rules, regulations, guidelines and standards pertaining to the objectives of the development initiative. The proponent is required to follow all applicable policy, legal and administrative frameworks. These include legal provisions relevant to environmental & social protection applicable to the planning, construction & operation phases, which must be considered as well to ensure that the activities of the proposed project are aligned with sustainability principles.

The laws and regulations relevant to the proposed project are briefly reviewed below.

2.1 Sindh Environmental Protection Act, 2014

The Sindh Environmental Protection Act, 2014 was passed by the Sindh Assembly on February 24, 2014. The 2014 Act is the basic legislative tool empowering the provincial government to frame regulations for the protection of the environment. The 2014 Act envisages protection, improvement, conservation & rehabilitation of environment of Sindh with the help of legal action against polluters and green awakening of communities. It equally lays emphasis for the preservation of the natural resources of Sindh and to adopt ways and means for restoring the balance in its eco-system by avoiding all types of environmental hazards. The 2014 Act is applicable to a broad range of issues and extends to air, water, industrial liquid effluent, marine, and noise pollution, as well as to the handling of hazardous wastes.

The following provisions of the SEPA 2014 have a direct bearing on the proposed Project:

- Section 11(1): 'Subject to the provisions of this Act and the rules and regulations therein, no person shall discharge or emit or allow the discharge or emission of any effluent, waste, pollutant, noise or any other matter that may cause or likely cause pollution or adverse environmental effects, as defined in Section 2 of this Act, in an amount, concentration or level which is in excess to that specified in Sindh Environmental Quality Standards...'
- Section 11(2): 'All persons, in industrial or commercial or other operations, shall ensure compliance with the Environmental Quality Standards for ambient air, drinking water, noise or any other Standards established under section 6(1)(g)(i); shall maintain monitoring records for such compliances; shall make available these records to the authorized person for inspection; and shall report or communicate the record to the Agency as required under any directions issued, notified or required under any rules and regulations.'
- Section 14 (1): 'Subject to the provisions of this Act and the rules and regulations, no person shall cause any act, deed or any activity', including;
 - (b) disposal of solid and hazardous wastes at unauthorized places as prescribed;

- (c) dumping of wastes or hazardous substances into coastal waters and inland water bodies; and
- (d) release of emissions or discharges from industrial or commercial operations as prescribed.
- Section 15 (1): 'Subject to the provisions of this Act, no person shall operate or manufacture a motor vehicle or class of vehicles from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the Sindh Environmental Quality Standards or, where applicable, the standards established under sub-clause (i) of clause (g) of sub-section (1) of section 6'.
- Section 17(1): '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 respect thereof'
- Section 17(2): The agency shall;
 - a) review the initial environmental examination and accord its approval, subject to such terms and conditions as it may prescribe, or require submission of an environmental impact assessment by the proponent; or
 - (b) review the environmental impact assessment and accord its approval subject to such terms and conditions as it may deem fit to impose or require that the environmental impact assessment be re-submitted after such modifications as may be stipulated or decline approval of the environmental impact assessment as being contrary to environmental objectives.
- Section 17(3): 'Every review of an environment impact assessment shall be carried out with public participation and, subject to the provisions of this Act, after full disclosure of the particulars of the project'.
- Section 17(4): 'The Agency shall communicate its approval or otherwise within a period of two months from the date that the initial environmental examination is filed, and within a period of four months from the date that the environmental impact assessment is filed complete in all respects in accordance with the regulations, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations'.
- Section 20(1): 'The Agency shall from time to time require the person in charge of a project to furnish, within such period as may be specified, an environmental audit or environmental review report or environmental management plan containing a comprehensive appraisal of the environmental aspects of the project'.
- Section 20(2): The report of a project prepared under sub-section (1) shall include:
 - (a) analysis of the predicted qualitative and quantitative impact of the project as compared to the actual impact;
 - (b) evaluation of the efficacy of the preventive, mitigation & compensatory measures taken with respect to the project; and
 - (c) Recommendations for further minimizing or mitigating the adverse environmental impact of the project.

- Section 20(3): 'Based on its review of the environmental audit report, the Agency may, after giving the person in charge of the project an opportunity of being heard, direct that specified mitigation and compensatory measures be adopted within a specified time period and may also, where necessary, modify the approval granted by it under section 17'.
- Section 31(1): 'The Agency shall cause relevant details of any proposed project regarding which an Environmental Impact Assessment has been received to be published, along with an invitation to the publish to furnish their comments thereon within a specified period'.
- Section 31(3): 'All comments received under sub-section (1) and (2) shall be duly considered by the Agency while reviewing the environmental impact assessment or strategic impact assessment, and decision or action taken thereon shall be communicated to the persons who have furnished the said comments.'

2.2 Sindh EPA Environmental Assessment Regulations, 2021

Sindh EPA Environmental Assessment Regulations, 2021 categorize projects into three separate schedules depending on whether a project requires an Environmental Checklist (Schedule-I) or an IEE (Schedule-II) or EIA (Schedule III). The Regulations also require that all projects located in environmentally sensitive areas need submission of an EIA.

2.3 Guidelines for Public Consultation

Public consultation is mandated under 2014 Act. Regulation 11 of the 2014 Regulations provides the general requirements whereas the sectoral guidelines indicating specific assessment requirements are provided in the Guidelines for Public Consultation 1997 (the 'Guidelines'). These are summarized below:

Objectives of Public Involvement: 'To inform stakeholders about the proposed project, to provide an opportunity for those otherwise unrepresented to present their views and values, providing better transparency and accountability in decision making, creating a sense of ownership with the stakeholders';

Stakeholders: '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 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';

Mechanism of consultations: 'Provide sufficient relevant information in a form that is easily understood by non-experts (without being simplistic or insulting), allow sufficient time for stakeholders to read, discuss, consider the information and its implications and to present their views, responses should be provided to issues and problems raised or comments made by

stakeholders, selection of venues and timings of events should encourage maximum attendance’;

Timing and Frequency: Planning for the public consultation program needs to begin at a very early stage; ideally it should commence at the screening stage of the proposal and continue throughout the EIA process;

Consultation Tools: Some specific consultation tools that can be used for conducting consultations include; focus group meetings, needs assessment, semi-structured interviews; village meetings & workshops;

Other Important Considerations: The development of a public involvement program would typically involve consideration of the following issues; objectives of the proposal and the study; identification of stakeholders; identification of appropriate techniques to consult with the stakeholders; identification of approaches to ensure feedback to involved stakeholders; and mechanisms to ensure stakeholders’ consideration are taken into account’.

As above, the Guidelines for Public Consultation introduces effective ways to inform the contents of the project to the general public during the planning stage and that eventually consensus building toward the implementation of project is reached. However, there are instances where in middle of a project on direction of tribunal or court environmental assessment carried out with public consultation.

Incorporating public involvement into the stages of environmental assessment is explained in the guidelines that public consultation meeting has to be carried out after the works on "developing options and assessing and mitigating impacts" for comments and assessment.

2.4 Sindh Environmental Quality Standards

On January 28, 2016, the Sindh Environmental Industrial Waste Water, Effluent, Domestic, Sewerage, Industrial Air Emission and Ambient Air, Noise for Vehicles, Air Emissions for Vehicles and Drinking Water Quality Standards, 2015 have been notified by Sindh EPA.

Table 2.1 shows SEQS for ambient air.

Table 2.1: Sindh Environmental Quality Standard for Ambient Air			
Pollutant	Time-weighted average	Concentration in Ambient Air	Method of Measurement
Sulfur Dioxide (SO ₂)	Annual Average*	80 µg/m ³	Ultraviolet Fluorescence Method
	24 hours**	120 µg/m ³	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m ³	Gas Phase Chemiluminescence
	24 hours**	40 µg/m ³	
Oxides of Nitrogen as (NO ₂)	Annual Average*	40 µg/m ³	Gas Phase Chemiluminescence
	24 hours**	80 µg/m ³	
O ₃	1 hour	130 µg/m ³	Non dispersive UV

Table 2.1: Sindh Environmental Quality Standard for Ambient Air

Pollutant	Time-weighted average	Concentration in Ambient Air	Method of Measurement
			absorption method
Suspended Particulate Matter (SPM)	Annual Average*	360 µg/m ³	High volume Sampling, (Average flow rate not less than 1.1m ³ /minute)
	24 hours**	500 µg/m ³	
Respirable Particulate Matter (PM ₁₀)	Annual Average*	120 µg/m ³	B Ray absorption method
	24 hours**	150 µg/m ³	
Respirable Particulate Matter (PM _{2.5})	Annual Average*	40 µg/m ³ ***	B Ray absorption method
	24 hours**	75 µg/m ³	
	1 hour	15 µg/m ³	
Lead (Pb)	Annual Average*	1 µg/m ³	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5 µg/m ³	
Carbon Monoxide (CO)	8hours**	5 mg/m ³	Non Dispersive Infra Red (NDIR) method
	1hours	10 mg/m ³	

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

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

*** or 9 µg/m³ plus baseline, whichever is low

Table 2.2 shows the standards for motor vehicle noise.

Table 2.2: The Motor Vehicle Ordinance (1965) and Roles (1969)

Parameter	Standards (maximum permissible limit)	Measuring method
Noise	85dB(A)	Sound-meter at 7.5meter from the source

Table 2.3 shows the proposed national environmental quality standard for noise.

Table 2.3: Sindh Environmental Quality Standard for Noise

S. No.	Category of Area / Zone	Effective from 1 st January, 2015	
		Limit it in dB(A) Leq*	
		Day Time	Night Time
1	Residential area (A)	55	45
2	Commercial area (B)	65	55
3	Industrial area (C)	75	65
4	Silence Zone (D)	50	45
Note: 1	Day time hours: 6.00 a. m to 10.00 p. m		
2	Night time hours: 10.00 p. m to 6.00p. m		
3	Silence zone; Zone which are declared as such by competent authority. An area comprising not less than 100 meters around hospitals, educational institutions		

	and courts.
4	Mixed categories of areas may be declared as one of the four above-mentioned categories by the competent authority.
*dB(A)Leq	Time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

The SEQS for effluents are shown in Table 2.4.

Table 2.4: Sindh Environmental Quality Standard for Municipal & Liquid Industrial Effluents					
S. #	Parameter	Into Inland Waters	Into Sewage Treatment	Into Sea	unit
1	Temperature or Temp. increase	<3	<3	<3	°C
2	pH value (H ⁺)	6-9	6-9	6-9	
3	Biological Oxygen Demand (BOD) ₅ at 20°C	80	250	80	mg/l
4	Chemical Oxygen Demand (COD)	150	400	400	mg/l
5	Total Suspended Solids (TSS)	200	400	200	mg/l
6	Total Dissolved Solids (TDS)	3500	3500	3500	mg/l
7	Oil and Grease	10	10	10	mg/l
8	Phenolic Compounds (as Phenol)	0.1	0.3	0.3	mg/l
9	Chloride (as Cl ⁻)	1000	1000	SC	mg/l
10	Fluoride (as F ⁻)	10	10	10	mg/l
11	Cyanide (as CN ⁻) total	1.0	1.0	1.0	mg/l
12	An-ionic detergents (as MBAS)	20	20	20	mg/l
13	Sulphate (SO ₄ ²⁻)	600	1000	SC	mg/l
14	Sulphide (S ²⁻)	1.0	1.0	1.0	mg/l
15	Ammonia (NH ₃)	40	40	40	mg/l
16	Pesticides	0.15	0.15	0.15	mg/l
17	Cadmium	0.1	0.1	0.1	mg/l
18	Chromium (trivalent and hexavalent)	1.0	1.0	1.0	mg/l
19	Copper	1.0	1.0	1.0	mg/l
20	Lead	0.5	0.5	0.5	mg/l
21	Mercury	0.01	0.01	0.01	mg/l
22	Selenium	0.5	0.5	0.5	mg/l
23	Nickel	1.0	1.0	1.0	mg/l
24	Silver	1.0	1.0	1.0	mg/l
25	Total toxic metals	2.0	2.0	2.0	mg/l
26	Zinc	5.0	5.0	5.0	mg/l
27	Arsenic	1.0	1.0	1.0	mg/l
28	Barium	1.5	1.5	1.5	mg/l
29	Iron	8.0	8.0	8.0	mg/l
30	Manganese	1.5	1.5	1.5	mg/l

31	Boron	6.0	6.0	6.0	mg/l
32	Chlorine	1.0	1.0	1.0	mg/l

The SEQs for drinking water are shown in Table 2.5.

Table 2.5: Sindh Environmental Quality Standards for Drinking Waters (mg/l)					
S.#	Properties / Parameters	Standard Values for Pakistan	S.#	Properties / Parameters	Standard Values for Pakistan
Bacterial			Chemical		
1	All water intended for drinking (E. coli or Thermo tolerant Coliform bacteria)	Must not be detectable in any 100-ml sample	Essential Inorganics (mg/liter)		
			13	Aluminum (Al) mg/l	≤ 0.2
			14	Antimony (Sb)	≤ 0.005
2	Treated water entering the distribution system (E. coli or thermo tolerant coliform and total coliform bacteria)	Must not be detectable in any 100-ml sample	15	Arsenic (As)	≤ 0.05
			16	Barium (Ba)	0.7
			17	Boron (B)	0.3
3	Treated water in the distribution system (E. coli or thermo tolerant coliform and total coliform bacteria)	Must not be Detectable in any 100-ml sample. In case of large supplies, where sufficient samples are examined, must not be resent in 95% of the samples taken throughout any 12-month period.	18	Cadmium (Cd)	0.01
			19	Chloride (Cl-)	< 250
			20	Chromium (Cr)	≤ 0.05
			21	Copper (Cu)	2
			Organic (mg/L)		
			22	Phenolic compounds	<0.0002
			Toxic Inorganics (mg/liter)		
			23	Cyanide (CN)-	≤ 0.05
			24	Fluoride (F)	≤ 1.5
			25	Lead (Pb)	≤ 0.05
Physical			26	Manganese (Mn)	≤ 0.5
			27	Mercury (Hg)	≤ 0.001
4	Color	< 15 TCU	28	Nickel (Ni)	≤ 0.02
5	Taste	Non-objectionable/ Acceptable	29	Nitrate (NO ₃)-	≤ 50
6	Odor	Non-objectionable/ Acceptable	30	Nitrite (NO ₂)-	≤ 3
7	Turbidity	< 5 NTU	31	Selenium (Se)	≤ 0.01
8	Total Hardness as CaCO ₃	< 500 mg/l	32	Residual Chlorine	0.2-0.5 At consumer end 0.5-1.5 at source
9	TDS	<1000			
10	pH	6.5-8.5			
Radioactive					

11	Alpha Emitters bq/L	0.1	33	Zinc (Zn)	5.0
12	Beta emitters	1			

2.5 Sindh Prohibition of Child Employment Act, 2017

Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any factory, mines or any other hazardous employment. In accordance with this Article, the Prohibition of Child Employment Act (PCEA) 2017 disallows the child labor in Sindh. The PCEA defines a child as a person who has not completed his/her fourteenth years of age, and an adolescent means a person who has completed fourteenth year of age but has not completed eighteenth years of his age. No child shall be employed or permitted to work in any establishment including construction but an adolescent can be employed or permitted to work under strict guidelines provided in the PCEA and rules. An adolescent shall not be employed in any hazardous work included in the schedule to the PCEA.

2.6 Archaeological Relics

After the Eighteenth amendment in the constitution the subject of “Ancient and historical monuments, archaeological sites and remains” the entry No.37 of the concurrent legislative list has also devolved to provincial legislations. There are two laws that are directly relevant for archaeological relics. The first is The Antiquities Act, 1975, which ensures the protection of Pakistan’s cultural resources. The Act defines “antiquities” as ancient products of human activity, historical sites or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the GoP to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the Project proponents are obligated to ensure that no activity is undertaken within 61 m (200 ft.) of a protected antiquity, and to report to the GoP’s Department of Archaeology any archaeological discovery made during the course of the project. The second is The Sindh Cultural Heritage (Preservation) Act, 1994, which is the provincial law for the protection of cultural assets. Its objectives are similar to those of the Antiquity Act. Heritage Foundation has catalogued 600 historic buildings declared heritage sites under the Sindh Cultural Heritage (Preservation) Act, 1994.

2.7 Pakistan Penal Code, 1860 (PPC)

Chapter XIV of the PPC deals with the offences affecting the public health, safety, convenience, decency and morals. Person may be guilty of public nuisance if his act or omission causes common injury, danger or annoyance to the public or results in spread of infection of disease dangerous to life. The chapter also deals with environmental pollution.

2.8 Sindh Local Government (Amendment) Act, 2021

The Provincial Assembly of Sindh in Its sitting held on 26th November, 2021 passed the Sindh Local Government (Amendment) Bill, 2021 and was sent to the Governor for accord his assent

as required under clause (2)(0) of Article 116 of Constitution of the Islamic Republic of Pakistan, 1973 but he, instead of accord assent to the Bill, returned the same with message in exercise of powers vested upon him under clause 2(b) of Article 116 of the Constitution.

The Provincial Assembly of Sindh in its sitting held on 11th December, 2021 reconsidered the Bill under clause (3) of Article 116 and passed the same with amendments thereof which was again sent to the Governor for assent.

The period of ten days has been elapsed and the subject bill shall be deemed to have been assented by the Governor under clause (3) of Article 116 of the Constitution and is hereby published as an Act of the Legislature of Sindh.

According to the provisions of the amendment bill, towns will be set up in 6 divisional headquarters of Sindh including Karachi. The chairmen of towns and municipal committees will be elected through a show of hands. Clause to hold election of chairpersons of local body councils by secret ballot was withdrawn.

In the Local Government Amendment Bill, local body councils have been given powers in the affairs of 9 provincial departments and local government councils will also be included in the affairs of Sindh Police.

According to the bill, the SSP will be bound to liaise with the concerned local body chairman and police officers will report to the local council on police matters and law and order. Local government representatives will not have the power in prosecution, police administration and criminal cases.

2.9 Disaster Management Act, 2010

This Act was enacted to provide for the establishment of a National Disaster Management System for Pakistan. Sindh Disaster Management Authority enforces the Act. The Act defines 'disaster' as a catastrophe or a calamity in an affected area, arising from natural or man-made causes or by accident which results in a substantial loss of life or human suffering or damage to, and destruction of, property. Disaster management includes preparedness and response. The Act provides establishment of disaster management authorities at national, provincial and district levels. The authorities require preparing and implementing disaster management plan for their area.

2.10 Sindh Drinking Water Policy, 2017

Public Health Engineering & Rural Development Department, Government of Sindh, with the approval of Chief Minister Sindh issue the drinking water policy on 3rd May 2017.

Principles: The main principles of Sindh Drinking Water Policy, adopted from the National Drinking Water policy 2009, and aligned with the Sustainable Development Goals, are as follows:

- Access to safely managed drinking water is a fundamental right of every citizen and that it is the responsibility of the Government to ensure its provision to all citizens,
- Water allocation for drinking purpose shall be given priority over other uses,
- In order to ensure equitable access, special attention shall be given to removing the existing disparities in coverage of safe drinking water and for addressing the needs of the poor and the vulnerable on priority basis.
- Recognizing that inadequate and unsafe water supply and sanitation are a major cause of diarrhea and nutritional deficiency in children, which as a consequence contribute towards child mortality. Safely managed drinking water supply and sanitation shall be integrated in health, nutrition and school health programs.
- Access shall be increased to high quality nutrition-sensitive services, including access to water, sanitation facilities, and hygiene.
- Key hygiene actions (safe drinking water, hand washing with soap, safe disposal of excreta, food hygiene) shall be integrated as essential components in all nutrition programs.
- Realizing the fact that access and availability of safe drinking water affects all aspects of life of a citizen, a multi sectoral approach, involving different departments of the government, shall be adopted to address the issues related to safe drinking water.
- Being cognizant of the fact that women are the main providers of domestic water supply and maintainers of hygienic household environment, their participations in planning, implementation, monitoring and operation & maintenance of water supply systems shall be ensured, and WASH shall be integrated in maternal and neonatal health programs.
- Responsibilities and resources shall be delegated to local authorities to enable them to discharge their assigned functions with regard to provision of safe water supply.
- A supportive policy framework shall be developed that encourages alternate options through private provision, public private partnerships, the role of NGOs and community organizations
- The execution of component-sharing model for government programs and projects shall be promoted to ensure financial sustainability and community and private sector involvement in development and O&M.
- Low-cost technologies in water and sanitation, that are easy and cost-effective to maintain shall be developed and used.

2.11 Sindh Sanitation Policy, 2017

The goal of the Provincial Sanitation policy is to ensure that the entire population of Sindh has access to a safely managed sanitation service and sanitary environment that is also nutrition-sensitive and hygienic. The motto of the policy was 'Saaf Suthee Sindh' (Neat and Clean Sindh).

The key targets of this policy are:

1. To eradicate open defecation from Sindh province by 2025, while 70% villages of 13 high priority districts achieve the status of open defecation free by 2020.

2. That 100% household in Sindh have access to and use sanitary latrines by 2025, while 70% of rural households in high priority districts will achieve this by 2020.
3. To strengthen and implement liquid waste management with sewer lines and covered/improved drains with 85% coverage of urban areas and 60% coverage in rural areas.
4. To create and develop wastewater treatment mechanisms to cover 75% of urban areas and 40% rural areas by 2025.
5. To implement integrated solid waste management with 100% coverage in urban area and 60% in rural areas by 2025.

2.12 Laws and Regulations on Urban Development

Sindh Government also has some laws and regulations for building control:

- 1) Buildings Control Ordinance, 1979
- 2) Sindh Regulation & Control (Use of Plots & Construction of Buildings) Ordinance, 2002

2.13 Building Code of Pakistan, Fire Safety Provisions 2016

The Building Code of Pakistan-Fire Safety Provisions-2016 provide rules for fire prevention, life safety in relation to fire and fire protection of building and structures as prescribed. All the federal and provincial governments, organizations, authorities, both public and private are mandated to adopt and implement Building Code of Pakistan-Fire Safety Provisions-2016, as notified. Any construction and modification of buildings in violation of Building Code of Pakistan (Fire Safety Provisions-2016) shall be considered as violation of professional engineering works as specified under clause (xxv) of section 2 of the Act.

The implementation and enforcement of this bye-law shall vest with the Authority Having Jurisdiction (AHJ) within their respective jurisdictions and circles as follow:

- 1) Building Control, Housing and Development Authorities
- 2) District Administration
- 3) Tehsil or Town Administration
- 4) Municipal Administration
- 5) Station Headquarters (Army, Air Force and Navy)
- 6) Cantonment Administration
- 7) Union Council Administration
- 8) Autonomous Bodies
- 9) Industrial Estates
- 10) Directorates of Civil Defense
- 11) Export Processing Zones
- 12) Other Federal/Provincial Authorities as and when notified

This Bye-law shall come into force upon being notified and all the concerned AHJs shall implement the same immediately in the prescribed manner.

All relevant AHJs shall ensure compliance and implementations of this Code and accordingly adopt or amend their relevant regulations, Bye-laws or rules as the need be.

This Bye-law shall apply to both new and existing buildings.

- a. Buildings permitted for construction after the adoption of these Provisions shall comply with the provisions stated herein for new buildings forthwith.
- b. existing buildings constructed prior to adoption of these provisions shall comply with the provisions stated herein as soon as possible but not later than three years of notification of these provisions; and
- c. minimum fire protection requirements such as provision of fire alarm and detection system, fire extinguishers, emergency response plans and fire drills shall however be in place as soon as possible but not later than one year of notification of these provisions.

Any person who fails to comply with this Bye-law or fails to carry out an order made pursuant to these provisions, or violates any condition attached to a permit, approval, or certificate shall be subject to the penalties in accordance with the regulations of AHJ.

2.14 The Sindh Occupational Safety and Health Act, 2017

The Sindh Occupational Safety and Health Bill 2017 has been approved by the Provincial Assembly of Sindh (Ref. Sindh Bill No. 27 of 2017) and enacted as the Sindh Occupational Safety and health Act, 2017. The Act makes provision for Occupational Safety and Health conditions at all workplaces for the protection of persons at work places against risk of injury arising out of the activities at work places and the promotion of safe, healthy and decent working environment adapted to the physical, physiological and psychological needs of all persons at work. The Rules under the act were also notified in 2019.

2.15 IFC General EHS Guidelines

The EHS guidelines published by IFC are technical reference documents that address IFC's expectations regarding the industrial pollution management performance of its projects; however, these guidelines have been benefited from for other projects as well. They are designed to assist managers and decision makers with relevant industry background and technical information. This information supports actions aimed at avoiding, minimizing, and controlling EHS impacts during construction, operation, and decommissioning phase of a project or facility. Environmental issues associated with the construction and maintenance activities may include, among others, noise and vibration, soil erosion, and threats to biodiversity including habitat alteration and impacts to wildlife.

Examples of the impacts addressed in the General EHS Guidelines include:

- Construction site waste generation;
- Soil erosion and sediment control from materials sourcing areas and site preparation activities;

- Fugitive dust & other emissions (e.g., from vehicle traffic, land clearing activities, & materials stockpiles);
- Noise from heavy equipment and truck traffic;
- Potential for hazardous materials and oil spills associated with heavy equipment operation and fueling activities.

Chapter 3 Description of Project

3.1 The Project

The proposed project “**Noor Green Valley**” is planned to be infrastructure development on Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh, having total area of **45 Acre – 25 Ghunta**.

The project is aimed to become the pioneering sustainable development of Larkana. It has been planned to provide the best lifestyle to its residents, with quality infrastructure, safe surroundings offering peace of mind, proximity to all necessary facilities and emphasizing on environmentally sustainable opportunities. The housing scheme will have residential and commercial units. It will also have Masjid, Park, Education Center, Amenity Area & Green Belt Area.

The project details are described with the following facilities in the table below:

Table 3.1: Project Details	
Project Name	Noor Green Valley
Project Address	Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh
Proponent Name	Koh e Noor Builders & Developers
Total Land Area	45 Acre – 25 Ghunta
Type A	
Residential Area	A1 – A9
Type B	
Residential + Commercial Area	B1 + B289 (including School for handicap, Amenity area, Commercial (02) Area)
Type C	
Residential + Commercial Area	C1 – C152 (including park, school, commercial (02) Area) + Grid Station
Type F	
Residential + Commercial Area	F1 – F198 (Including Masjid & Park)
Type S	
Residential Area	S1 – S9 + Green Belt Area

3.2 Status of Approvals

All necessary formalities will be fulfilled and NOCs from different departments will be obtained and submitted in due time. The proponent has obtained approvals from relevant authorities which include:

- NOC from Sindh Building Control Authority (SBCA)
- NOC from Sukkur Electric Supply Company (SEPCO)
- NOC from Sui Southern Gas Company Limited (SSGC)

Approval from Sindh Environmental Protection Agency will be a major milestone for project because SBCA has made it mandatory for all the builders and developers to obtain approval of EIA under Section 17 of SEP Act 2014 from Sindh EPA as a pre-requisite of getting final approval of the housing scheme plan.

3.3 Project Location

The proposed housing scheme is located at Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh. The major roads nearby project area are Moenjodaro- Radhan Road and Moen-Jo-Daro Road.

The nearest landmarks include Mandioon Bus Station, Shaheed Benazir Bhutto Girls Cadet College Larkana, Sports complex and Dadu Canal.

The housing scheme will be comprising of five main categories of plot (Type A, Type B, Type C, Type F & Type S), residential houses and the project area will also serve as commercial plots and amenities which include; Educational enclave, Mosques, Parks and Green belt.

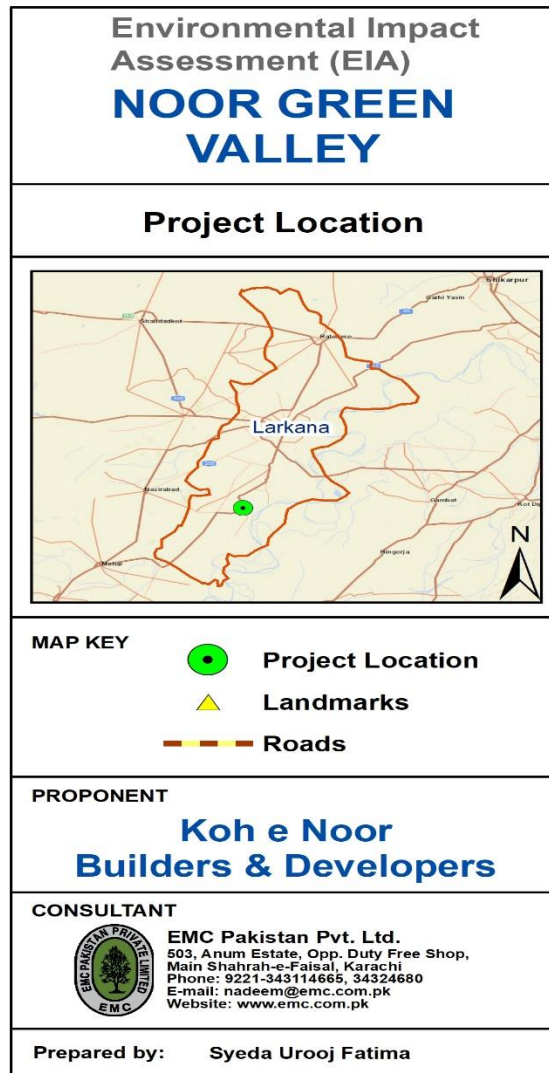


Figure 3.1: Location of Project Site

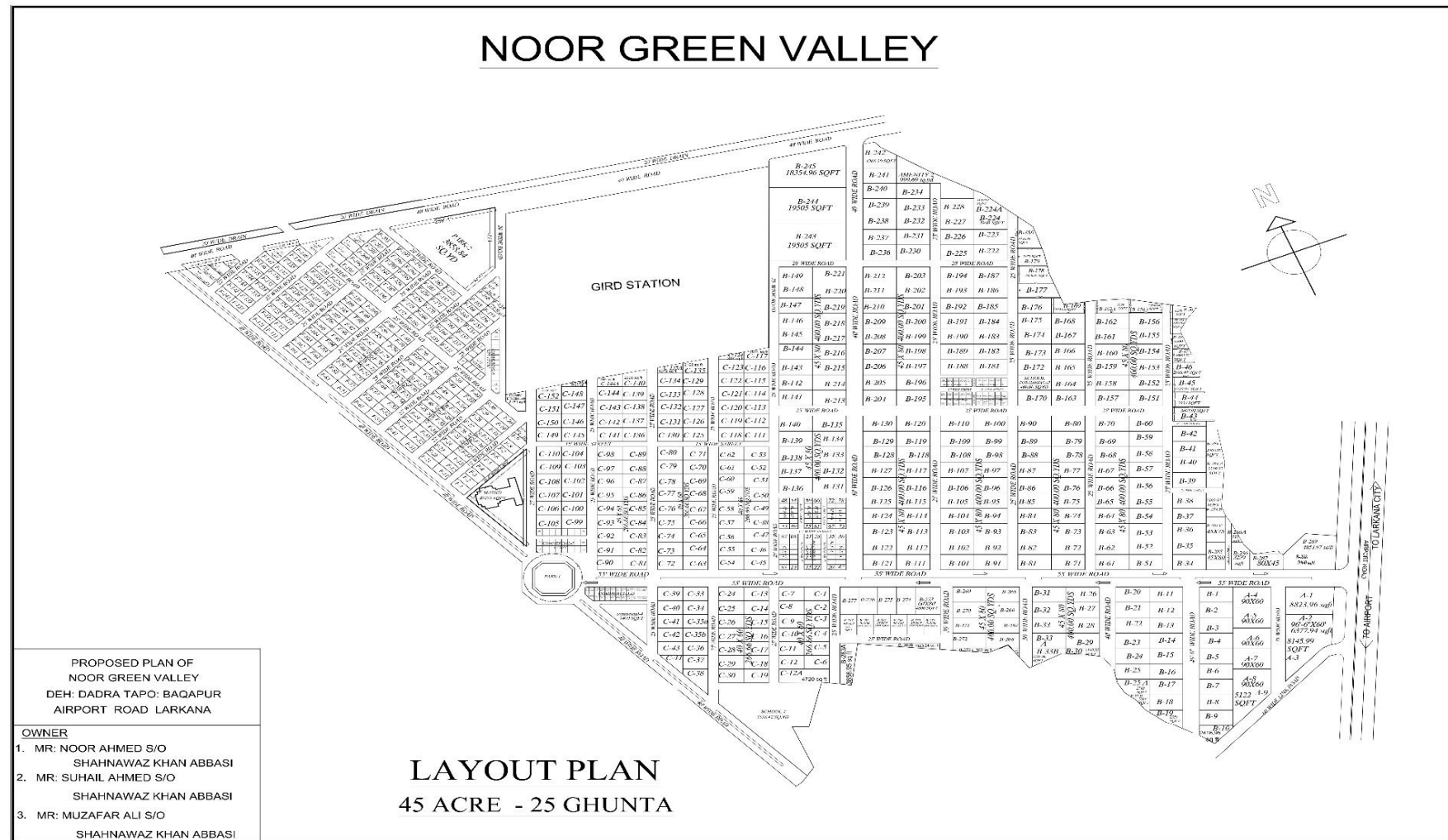


Figure 3.2: Project Layout Plan

3.4 Construction & Commissioning

3.4.1 Construction Schedule

The construction & commissioning phase will consist of following major activities:

- Construction of campsite including facilities and mobilization of contractors
- Construction of foundations and auxiliary structures (piling, civil works etc.)
- Internal and External finishing
- Mechanical, electrical and other works
- Demobilization and site restoration

3.4.2 Pre-Construction/Design Phase

This, the essential phase provides the basis for the construction program, the methodology to be adopted and the technologies to be involved. The project site has been assessed in terms of its geology, seismicity and seismo-tectonics.

3.4.3 Construction Activities

The sequence of construction should be as follows:

- Construction of earth retaining structure (secant pile wall, contiguous pile etc.)
- Drilling and installation of dewatering wells
- Excavation of plot upto groundwater level
- Dewatering
- Excavation upto Raft bottom level
- Construction of raft foundation followed by construction of substructure.

Standard and environmentally compatible construction materials (cement, sand, steel reinforcement, bricks etc.) & techniques/construction practices will be employed besides adopting Standard Operating Procedures (SOPs) set-out in the Environmental Management Plan.

(1) Construction office & Camp

The construction contractor will develop his own camp & offices for construction purposes within the project site. Development of campsite will include the following activities:

- Leveling and compaction of the area for office and campsite
- Provision of drainage works in and around the campsite
- Laying and compaction of the gravel topping in the office and campsite
- Construction of fuel storage tank area and water tank
- Provision of fence, access and emergency gates
- Construction of septic tanks
- Installation of membrane liner for fuel storage
- Installation of security guard cabins

- Installation of sewerage pipeline with manholes for the septic system & connecting it with Sewer line
- Provision of signage for each activity center

(2) Foundations

Excavation for the foundations work will be made in accordance with recommendation of Geotechnical investigation. Excavated material will be disposed of off-site via trucks and sent to approve sites. The excavated soil will be sent to road construction contractors for appropriate utilization.

(3) Building Shell and Core Construction

Construction of the exterior enclosure or “shell” of the building include construction of the building’s framework (installation of beams and columns), floor decks, facade (exterior walls and cladding), and roof construction. These activities require the use of tower cranes, compressors, personnel and material hoists, front-end loaders, concrete pumps, on-site bending jigs and a variety of hand-held tools, in addition to the delivery trucks bringing construction materials to the site. At the same time, infrastructure connections are built. These include lines for water, sewer, storm water, electricity & telecommunications.

(4) Interior Construction and Finishing

This stage includes the construction of interior walls, installation of lighting fixtures and interior finishes (flooring, painting, etc.), as well as mechanical & electrical works such as the:

- Installation of elevators
- Internal and external pipe works
- Fire protection & Life safety systems
- Car Park Ventilation
- Electrical Distribution
- Emergency Lighting installations
- Lightning Protection

(5) Civil Works

Civil works involves excavation, piling, formwork, reinforcement, concreting, masonry, plastering, painting, tinsmith’s, and also waterproofing work with gas-flame sticking, construction of light separating walls, hung ceilings, flooring, lining and facing.

(6) Construction Equipment & Machinery

Conventional machinery and equipment will be used for construction activities. The equipment and machinery may include dozers, excavators, loaders, mobile crane, lorry, dump trucks, back hoe, bar bending machine, water bowzers, material hoist, passenger hoist, concrete placement booms & power generators.

(7) Construction Material and other Supplies

Main construction material to be used during the construction phase will include ready mix concrete that will be sourced through reputable companies. Additionally, paints, glass, wood, tiles, aluminum, PVC/GI pipes, concrete/cement pipes, electric cables, etc. will be used during the different phases of construction. The materials will be transported by trucks to the project site, where they will be stored until moved to different locations as and when required. Materials including paving stone, crush, gravel and sand will be brought from commercial quarries located in the Sindh Province.

(8) Site Restoration

On the completion of the construction phase, the entire site will be built-up thus no site restoration to original condition is required. External sites are not being used.

3.5 Plumbing & Electrical System

3.5.1 Plumbing System

Design Codes & Standards: All plumbing work designed and installed as per SBCA Byelaws, International Plumbing Code 2012, National Plumbing Code, International Fuel Gas Code, American Society for Plumbing Engineers (ASPE) Handbook (2010) and relevant British Standard Institute. Best quality available plumbing fixtures and materials will be specified.

Plumbing Fixtures Requirements: The plumbing system has been designed to meet the minimum plumbing fixture requirements for space occupancy as per International Plumbing Code.

Scope of Plumbing System: The scope of plumbing services is as follows:

- Fixtures & Fittings (IPC: 401-427)
- Water Supply System (IPC: 601-609)
- Soil, Waste and Vent System (IPC: 701-712)
- Storm Water Drain & Rain Water Harvesting (IPC: 1101-1113)
- Fire Fighting (NFPA 10, 14, 25)

The sewage disposal from the building shall be terminated up to the building's Manhole, from where it shall be connected via septic tank to the main sewerage system.

The storm water drainage system shall be designed keeping in view the developed levels of the project area & shall be terminated from the building up to the road.

Fire protection system shall comprise of building fire hydrants, Fire hose reels, Fire sprinkler and portable fire extinguishers of various type as per appropriate needs and requirements. The fire water shall be provided through a separate pressurized main.

The relevant codes and standard have been being followed in calculation and design of various parameters of the water supply, selection of equipment for the water supply, sanitary / plumbing, sewage disposal and fire protection systems. The related sections of following codes and standards shall be followed in the design of the above stated works.

ASTM	American Society for Testing and Material
NFPA	National Fire Protection Association (USA)
NPC	National Plumbing Code
ANSI	American Plumbing Code.
ASME	American society of Mechanical Engineer
AWWA	American water Works Association
BCP	Building Code of Pakistan

Water Supply: Water supply system shall consist of water storage tanks, water supply network & the internal plumbing works. Potable water shall be provided from the overhead tanks to water supply network of the buildings.

Capacity of Overhead Water Storage Tanks: Overhead Water Storage tanks shall be provided in building to store water. The size of water storage tanks shall be determined from the population and its usage.

Design of Water Supply System:

- Pipe material used for water shall be of PPRc for internal plumbing works & G.I for external water supply network, pipe sizes shall be designed on the basis of total fixture units connected to the section.
- Table used to ascertain maximum numbers of fixture units that can pass through a pipe are adopted from National Plumbing Code USA.
- Conversion of plumbing fixture unit's ratings applicable to building units is adopted from Fundamental of Plumbing Design Volume.

Daily Water Requirement

The daily water consumption and storage requirements are estimated as follows:

Table 3.2: Water consumption				
S. #	Nature of Use	Minimum Quantity of Water Per User (US Gallons/day)	No. of Users/unit	Total Quantity of Water (US Gallons/day)
Type A				
1	Residential Units 09 Nos.	35 US Gallons	4	1,260
Type B				
2	Residential Units 289 Nos.	35	4	40,460
3	Commercial Units + School for handicap	15	40	600



4	Amenity Area	15	30	450
Type C				
5	Residential Units 152 Nos.	35	4	21,280
6	Commercial Units + Park + School + Grid Station	15	50	750
Type F				
7	Residential Units 198 Nos.	35	4	27,720
8	Masjid & Park	15	30	450
Type S				
9	Residential Units 09 Nos. + Green Belt Area (01)	35	4	1,400
Total				94,370

Sewerage System:

- The Sewerage System includes collection of internal waste water through network of pipe and shall be connected to the building manhole to septic tank
- The Soil waste collected from wash basins, showers and floor drain shall run through a separate pipe network and then connected to the Gully Trap (G.T)
- The Soil waste from water closet and urinals shall pass through uPVC pipes and finally connected to manhole outside the building.
- To avoid siphon of water seals form traps, vents pipes will be installed near to traps and to be continued to the vent stack in pipe duct.
- The sewerage piping system shall consist of the requisite type & adequate number of clean outs.
- All the Manholes shall be covered however; they must have proper cleaning facility.
- Estimated wastewater generation from building will be **80,214.5Gal/day**.

Following criteria shall be adopted in the design of sewerage piping network:

- Calculation of sewerage load shall be carried out on the basis of fixture units given in the National Plumbing Code.
- Total sewerage load shall be estimated using tables provided in the National Plumbing Code.
- Minimum self-scavenging velocity shall be maintained.
- Floor drain shall be provided in each toilet.
- Urinals shall be provided at locations as per Clients / Architect requirement.
- All water closets & urinals shall be vented properly through the vent piping system.
- The vent pipes shall be of PVC.

Storm Water Drainage: The storm water drainage shall be achieved through purpose made built-in slopes in the ground all around the buildings and shall be terminated on gravity towards the Storm Water catchments / gully's at the road side.

Following design criteria shall be adopted in his design of storm water drainage system.

- Local climate i.e., rainfall rate.
- Site conditions, elevation, water level and location of other utilities etc.

Fire Detection & Protection Systems:

- Fire protection system shall comprise of building fire hydrants, fire hose reels, fire sprinkler and portable fire extinguishers of various kind/types. The fire water shall be fed through a pressurized main to be installed all around the individual building/ block.
- Fire hydrant system including fire hose connection point hoses and nozzles to provide a readily accessible water supply for fire department or occupants of the project area to combat fire instantly.

Fire Detection & Alarm System: Fire detection & alarm system shall be designed as per scope of works & in line with the design requirements and is covered in the electrical system design.

Fire Protection Systems: Following fire protection system shall be design keeping in view the guide-line design requirements lay in the scope of Work & Fire Protection Philosophy of Co-Operative Market.

- Fixed Fire Protection System
- Portable Fire Protection System
- Fire sprinkler system

3.5.2 Electrical & Allied Works

The electrical design development of the Project has been carried out in accordance with the prevailing international standards and local regulatory authorities to ensure the ease of maintenance, economy and safety from shock and fire hazards.

Scope of Services

- Utility Power Supply from SEPCO
- Backup Generator Supply
- Power Distribution including Small Wiring and accessories
- UPS / Emergency Supply
- Lighting and Controls
- Earthing & Grounding
- Lightning Protection System
- Fire Alarm and Detection System
- CCTV Surveillance System
- Audio / Audio-Video Intercom System
- Voice and Data Communication System
- CATV System

The estimated electrical load of the proposed building will be 25MW.

3.5.3 Gas Supplies

The gas supply for project would be provided by the Sui Southern Gas Company Limited (SSGCL).

3.5.4 Solid Waste Generation

Average garbage (MSW) generation in Sindh is estimated at 0.4 – 0.7 Kg per person per day (SSWMB). It is estimated that approximately **1530.1 kg per day** of solid waste will be generated from the project in case of 100% occupancy.

Table 3.3: Solid Waste Generation Calculations				
S. #	Nature of Use	Average garbage (MSW) generation (kg/person/day)	No. of Users/unit	Total Quantity of Solid Waste (kg/day)
Type A				
1	Residential Units 09 Nos.	0.55	4	19.8
Type B				
2	Residential Units 289 Nos.	0.55	4	635.8
3	Commercial Units + School for handicap	0.55	40	22
4	Amenity Area	0.55	30	16.5
Type C				
5	Residential Units 152 Nos.	0.55	4	334.4
6	Commercial Units + Park + School + Grid Station	0.55	50	27.5
Type F				
7	Residential Units 198 Nos.	0.55	4	435.6
8	Masjid & Park	0.55	30	16.5
Type S				
9	Residential Units 09 Nos. + Green Belt Area (01)	0.55	4	22
Total				1530.1

Chapter 4 Description of Environment

This section details the Physical & Ecological Environment and Socioeconomic conditions of the micro and macro environment of the project area. Discussion on the Physical environment covers the area's physical and meteorological features, including geology, water resources, climate, and air quality. Overview of vegetation, wildlife and natural habitats are included in the Ecological section. Demographic trends, infrastructure and associated facilities are included in the Socioeconomic Section.

The proposed project “Noor Green Valley” is planned to be infrastructure development on Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh, having total area of 45 Acre – 25 Ghunta.



Figure 4.1: Present Status of Project Site

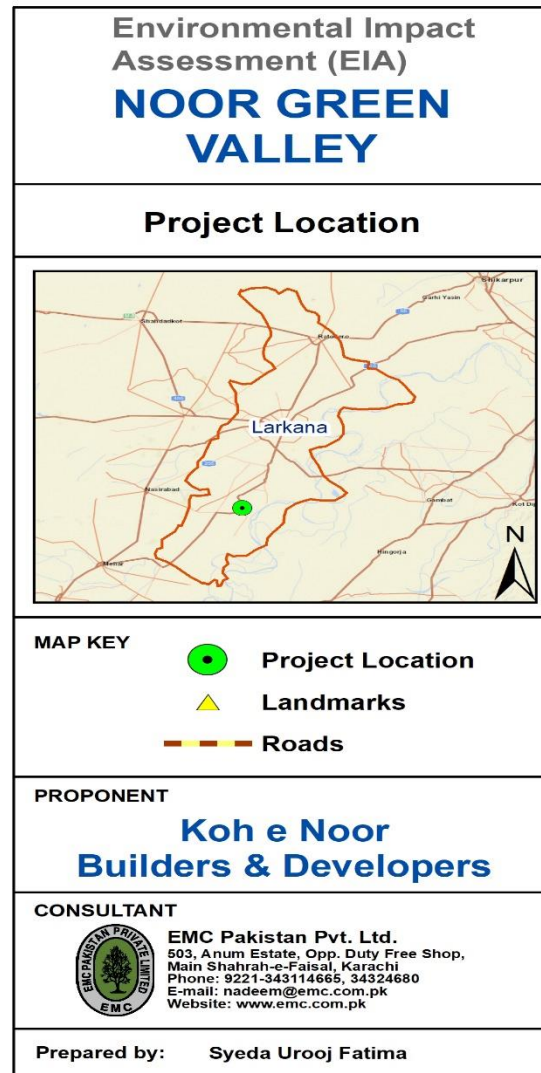


Figure 4.2: Project Location Map

4.1 Description of Physical Environment

4.1.1 Geology, Geomorphology and Soil

Geology & Topography

Larkana is covered by the Quaternary deposits of extinct streams and older terrace deposits. Stream deposits are dominated by the streambed and meander belt deposits. While the odd terrace deposits consist of loess and flood plain deposits of the middle terrace¹. Due to the physical features of the lands of the district and the well-established canal system, most of the lands are irrigated croplands. The district comprises of plains with no hilly terrains. Although there are some barren lands spread all over the district, mainly in the Dokri taluka, majority of the lands are fertile and available for crops². Indus River flows along the eastern and southeastern border of the district. Topographic map of District Larkana and the neighboring areas is depicted below;

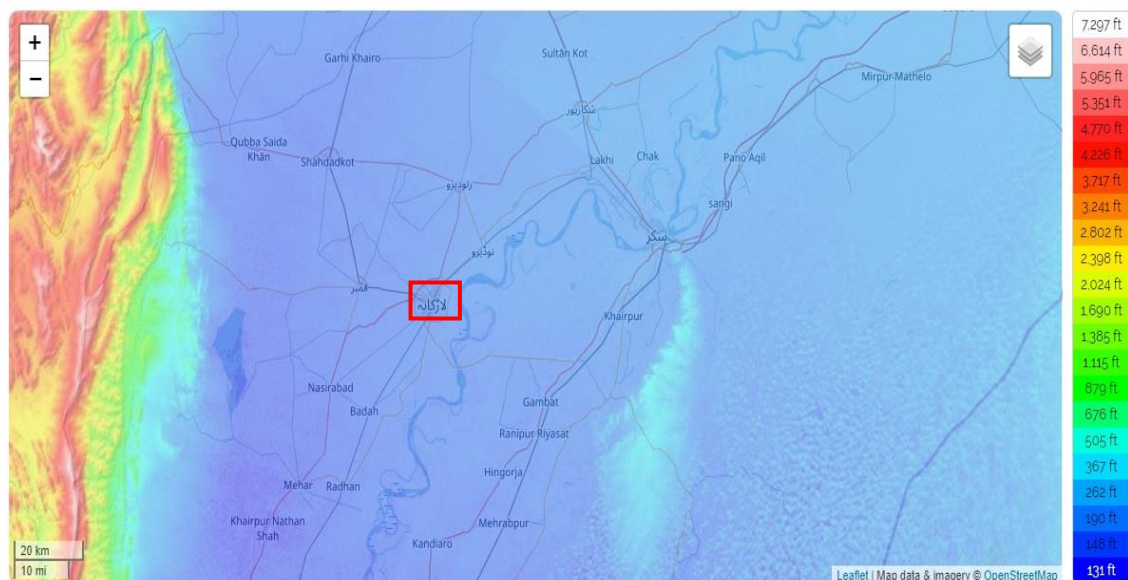


Fig 4.3: Elevation map of District Larkana and adjoining areas

¹ <https://www.scribd.com/document/172676460/Geology-of-Sindh-District>

² Pakistan emergency situational analysis District Larkana, Aug 2014.



This district is bounded by District Jacobabad and District Shikarpur in north, District Khairpur in the east, District Naushahro Feroze in southeast, District Dadu in south and District Kambar-Shahdadkot in west. Indus River flows along the eastern border of the district. Map of districts of Sindh province is given below;

³ Geological Survey of Pakistan (GSP)



Fig 4.5: District Map of Sindh

4.1.2 Seismicity

The recently developed (after the October 2005 earthquake) seismic zone map of Pakistan has divided the country into 4 seismic zones ranging in term of major, moderate, minor and negligible zones with respect to ground acceleration values. Under this zoning the project site lies in the Zone 2A.



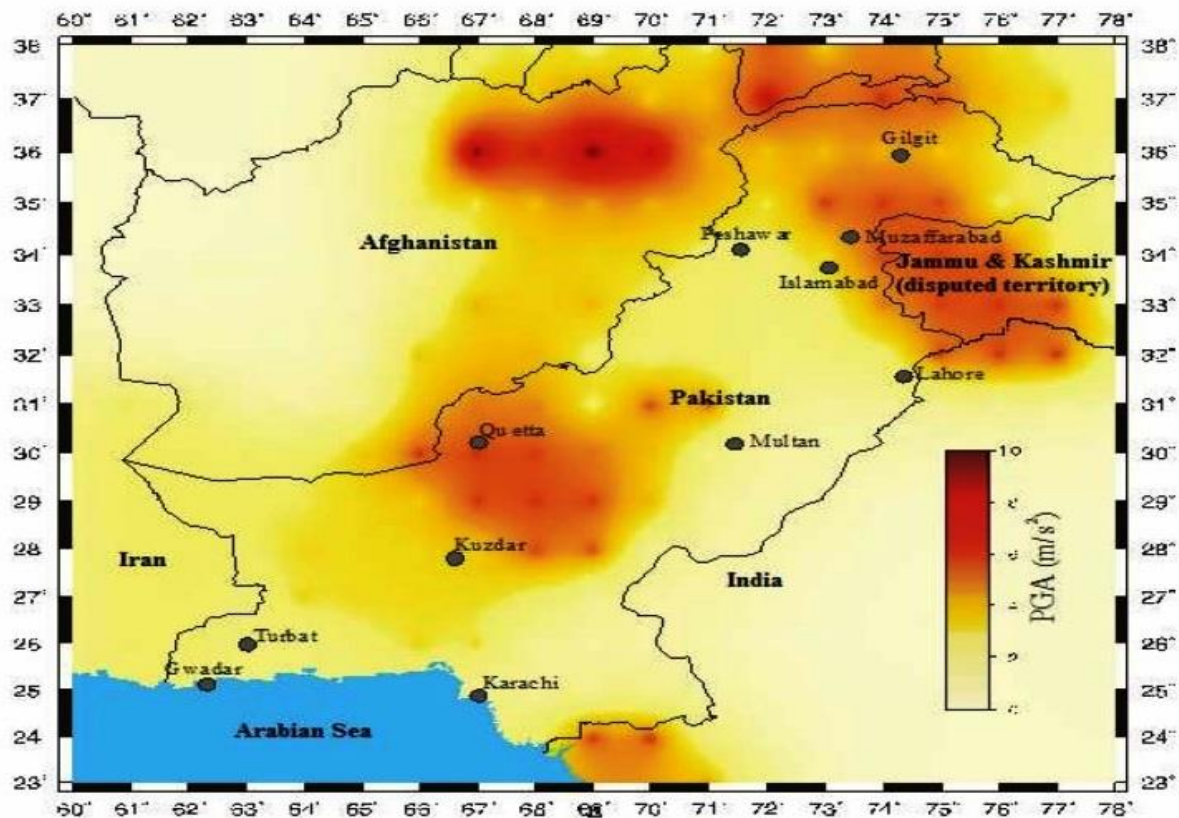


Figure 4.7: Seismic Hazard for Pakistan in terms of Peak Ground Acceleration (PGA)⁴

4.1.3 Meteorology and Climate⁵

In Larkana, the summers are sweltering and humid, the winters are short and cool, and it is dry and mostly clear year-round. Over the course of the year, the temperature typically varies from 46°F to 112°F and is rarely below 40°F or above 118°F.

Average Temperature

The daily range of reported temperatures (gray bars) and 24-hour highs (red ticks) and lows (blue ticks), placed over the daily average high (faint red line) and low (faint blue line) temperature, with 25th to 75th and 10th to 90th percentile bands.

⁴ PMD Seismic Monitoring and Early Tsunami Warning Centre - <http://seismic.pmd.gov.pk/seismicnew/map2.html>

⁵ <https://weatherspark.com/>

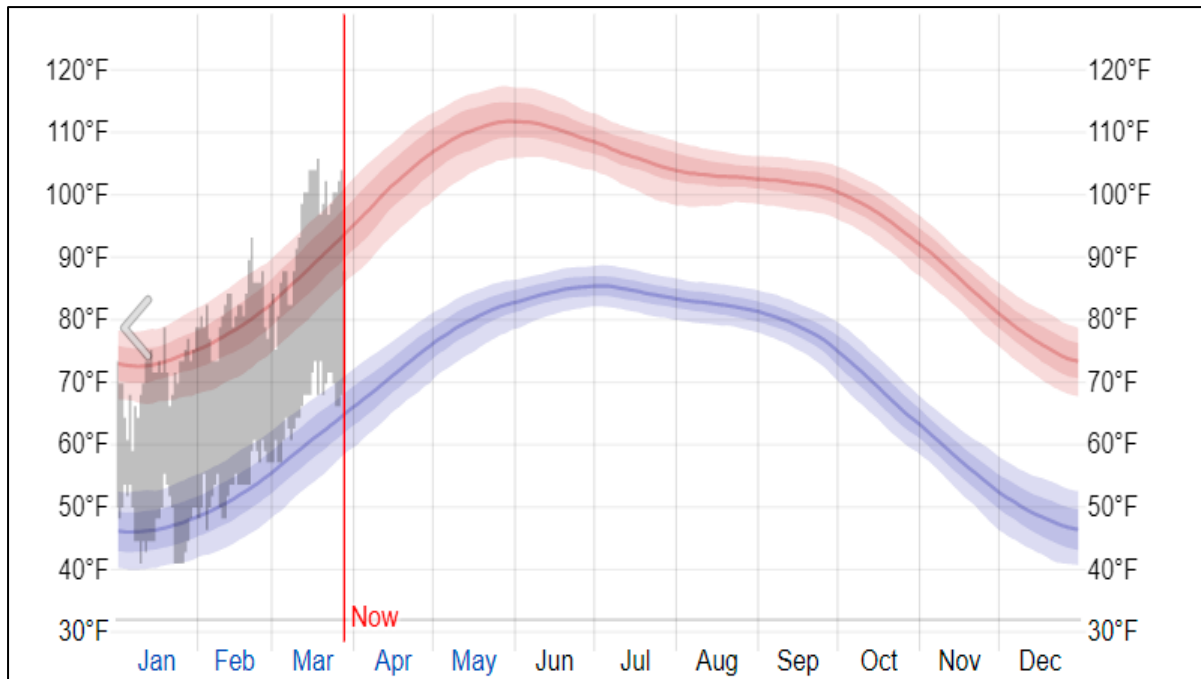


Figure 4.8: Average Temperature in Larkana (2022)

Precipitation

A wet day is one with at least 0.04 inches of liquid or liquid-equivalent precipitation. The chance of wet days in Larkana varies throughout the year.

The drier season lasts 11 months, from August to July. The month with the fewest wet days in Larkana is October, with an average of 0.2 days with at least 0.04 inches of precipitation. The hourly observed weather, color coded by category (in order of severity).

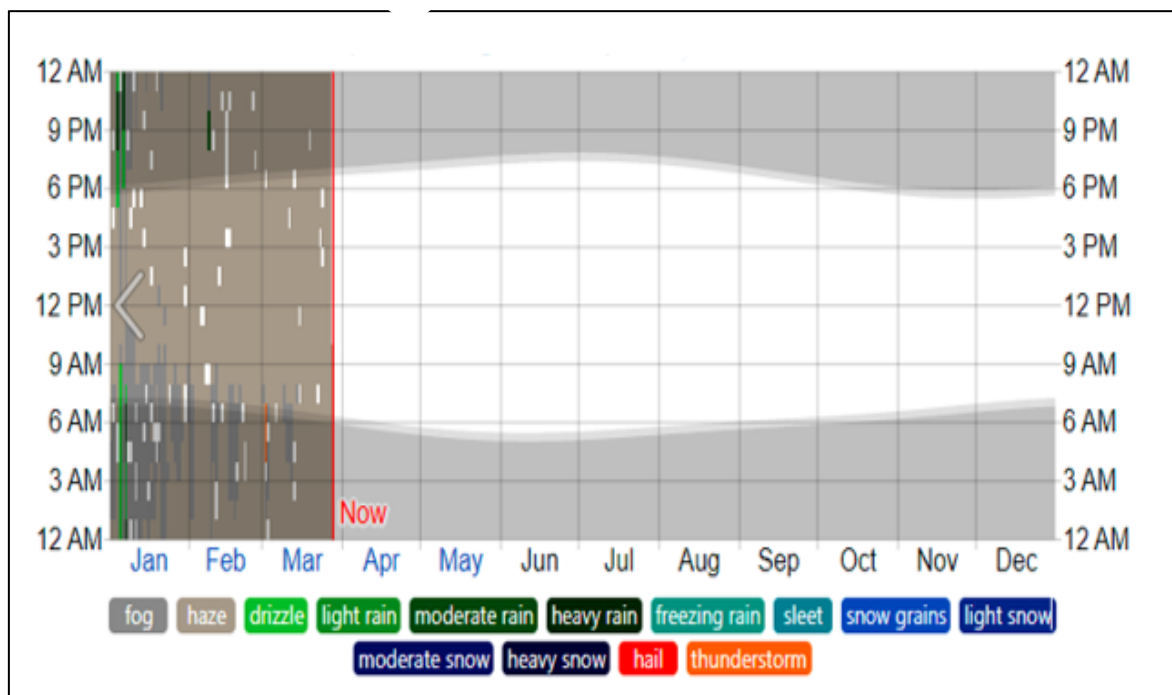


Figure 4.8: Precipitation in Larkana (2022)

Humidity

The humidity comfort level on the dew point, as it determines whether perspiration will evaporate from the skin, thereby cooling the body. Lower dew points feel drier and higher dew points feel more humid. Unlike temperature, which typically varies significantly between night and day, dew point tends to change more slowly, so while the temperature may drop at night, a muggy day is typically followed by a muggy night.

Larkana experiences extreme seasonal variation in the perceived humidity. The hourly reported humidity comfort level, categorized by dew point. The shaded overlays indicate night and civil twilight.

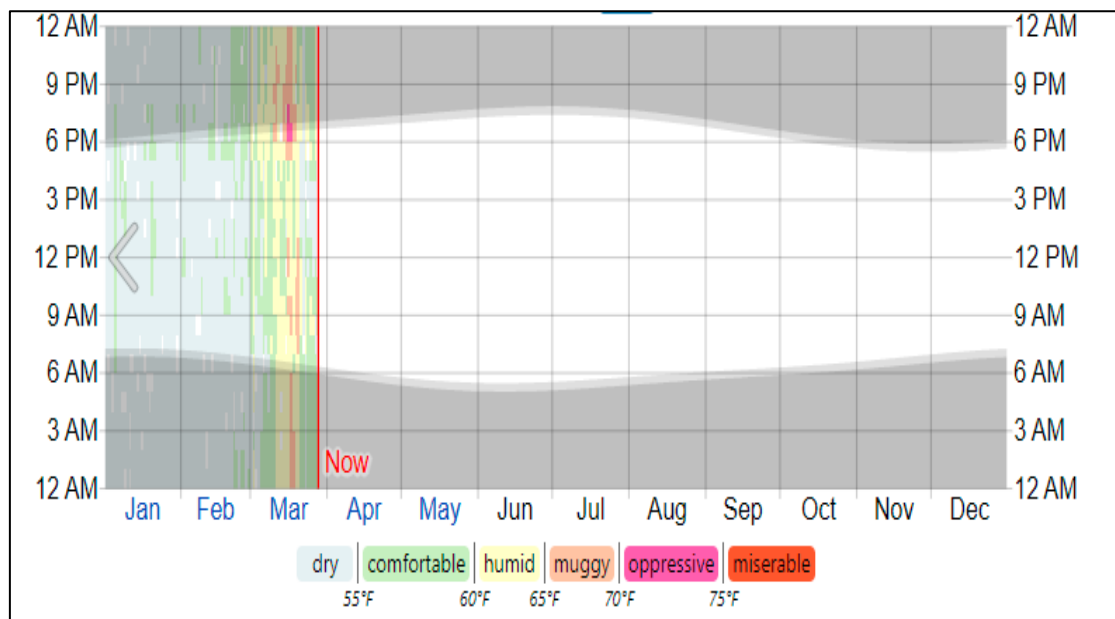


Figure 4.9: Humidity Comfort Level in Larkana (2022)

Wind Speed & Direction

An hourly average wind vector (speed and direction) at 10 meters above the ground. The wind experienced at any given location is highly dependent on local topography and other factors, and instantaneous wind speed and direction vary more widely than hourly averages.

The average hourly wind speed in Larkana experiences significant seasonal variation over the course of the year.

The average of mean hourly wind speeds (dark gray line), with 25th to 75th and 10th to 90th percentile bands. The hourly reported wind speed, color coded into bands according to the Beaufort scale. The shaded overlays indicate night and civil twilight.

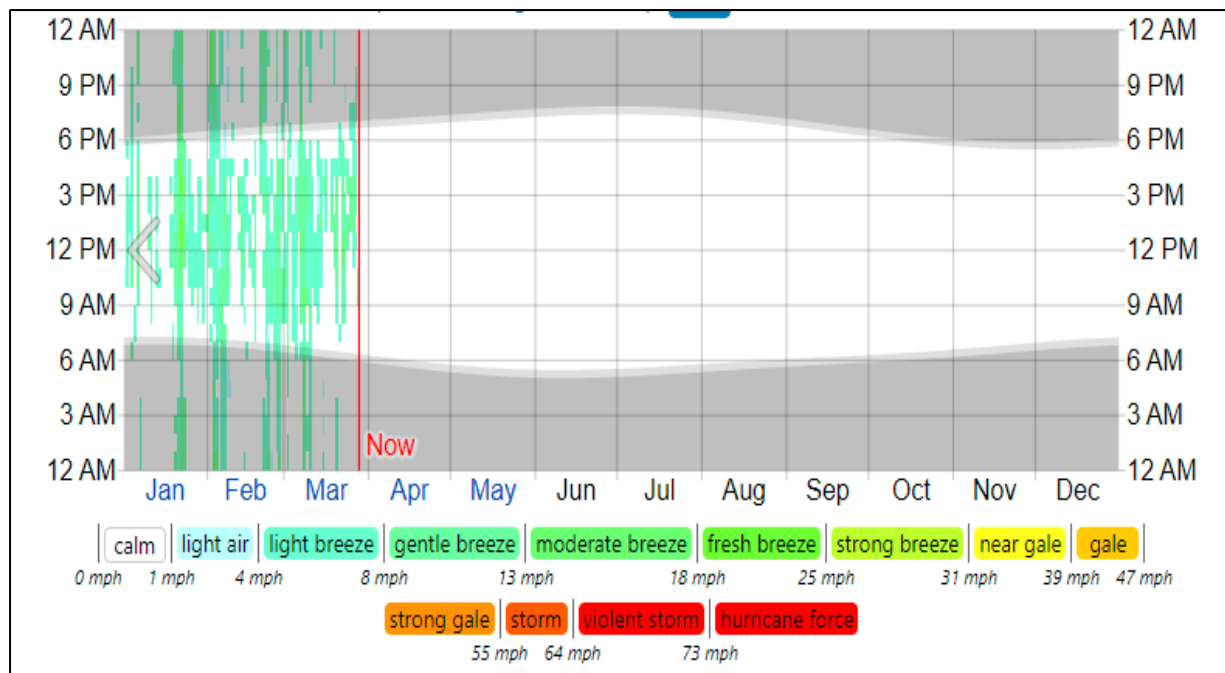


Figure 4.10(a): Wind Speed in Larkana (2022)

The percentage of hours in which the mean wind direction is from each of the four cardinal wind directions, excluding hours in which the mean wind speed is less than 1.0 mph. The hourly reported wind direction, color coded by compass point. The shaded overlays indicate night and civil twilight.

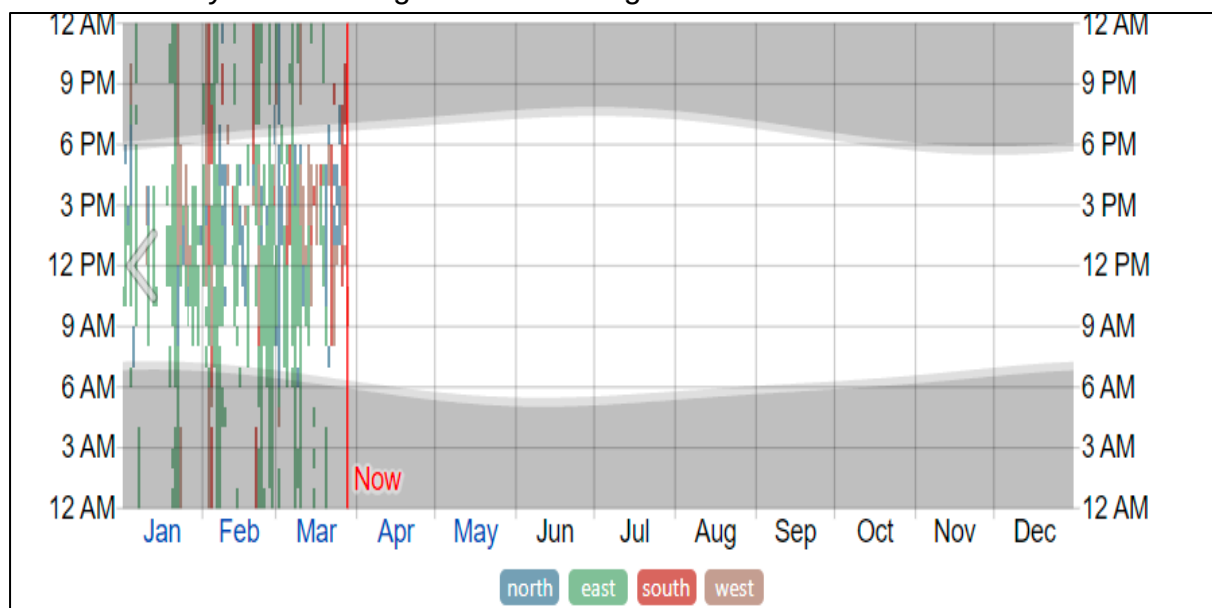


Figure 4.10(b): Wind Direction in Larkana (2022)

4.2 Flood Risk in District Larkana

Due to the proximity to Indus River, District Larkana is prone to riverine floods. The district has been hit by floods in 2007, 2010, 2013, 2014, 2015 and 2017. Most severe were the floods in 2010 and rains & floods in 2010, followed by the floods in 2015.

Summary of losses due to floods in 2010 and 2011 are given in table below;

Table 4.1: Losses and Damages in Floods/Rains 2010 and 2011			
Attribute	2010	2011	Source
Total Households		249,137	Estimated
Affected Households	83,051	9,213	Contingency Plan 2012
Total UCs		51	FAO
UC Affected	2	46	PDMA Sindh
Total Villages		184 Mouzas	ACO
Villages/Settlements Affected	115	408	Sindh Contingency Plan 2012
Total Houses Affected	22,000	5,794	Sindh Contingency Plan 2012
Total Population		1,476,209	Estimated
Affected Population	490,000	54,355	
Male	N/A	17,323	PMDA Sindh
Female	N/A	37,032	
Deaths	7	6	
Injuries	N/A	1	
Total Area (acres)		476,883	PCO
Total Affected Area (acres)	N/A	12,793	FAO
Area Sown	N/A	251,081	FAO/PMDA Sindh
Crop Area Damaged	25,028	5,396	

Agriculture production was also hit, with Cotton crop area damaged by 5%, Rice 2% and other crops were damaged by 45% in 2011.

The floods also resulted in damage to the public health infrastructure in Sindh Province. The hospitals were overcrowded and did not have capacity to cope with the situation, and the number of cases reported for severe dehydration, gastro and malnutrition were in hundreds in a day in this district. In District Larkana, Taluka Hospital Rato dero and Taluka Hospital Dokri were partially damaged while Chandka medical college hospital had reported no damage and was fully functional after the floods.

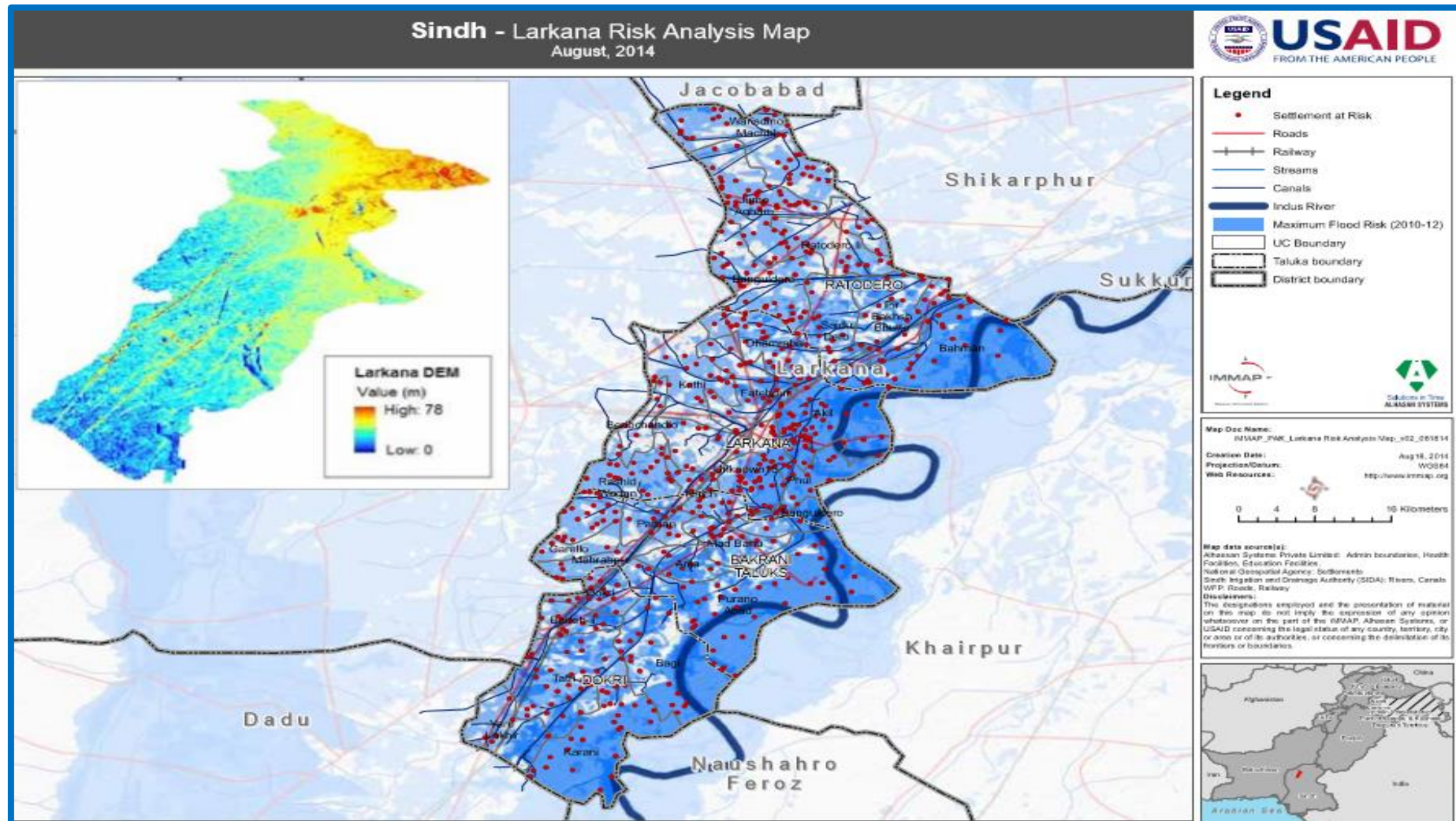


Figure 4.11: Risk Analysis map of Larkana

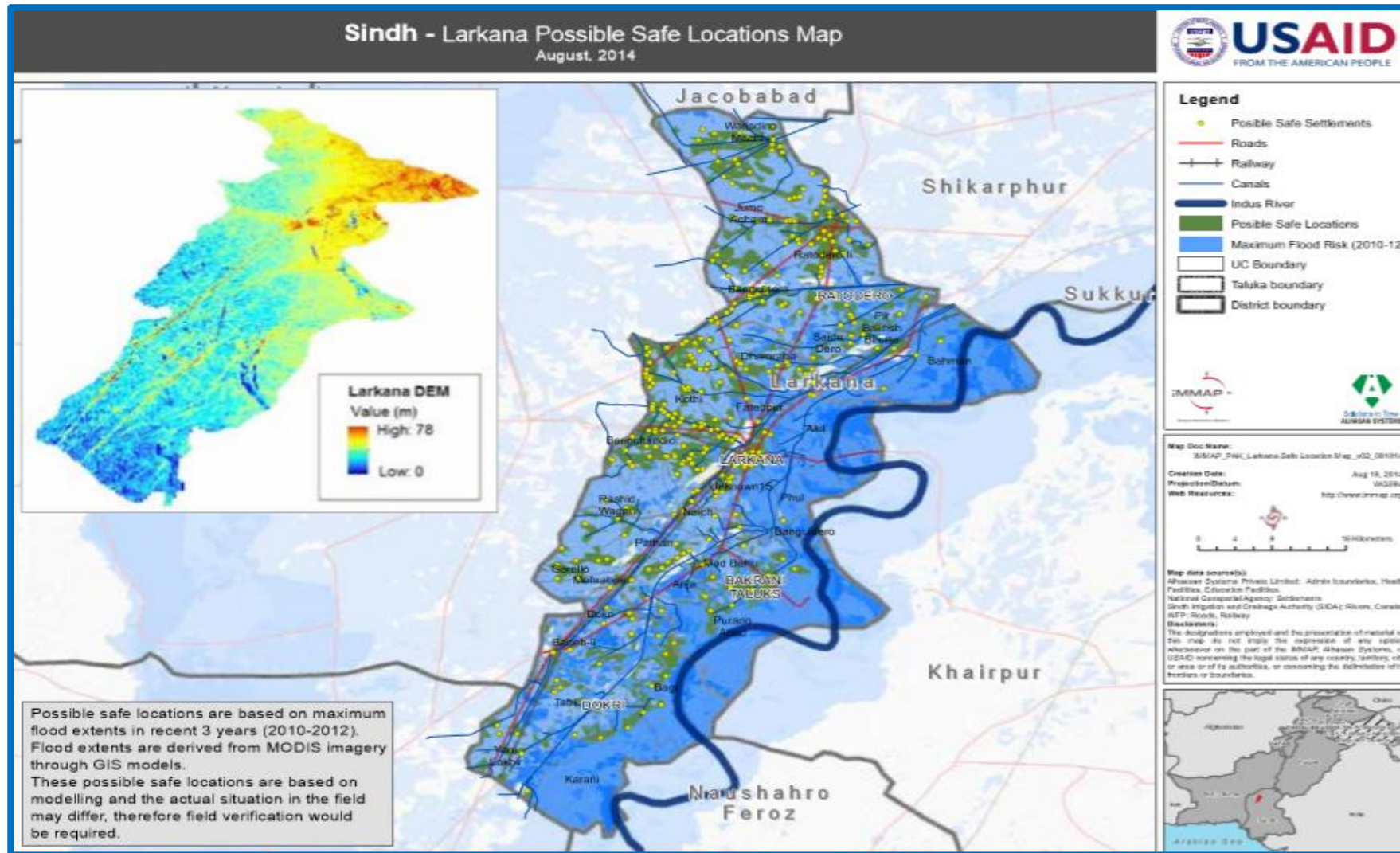


Figure 4.12: Possible safe locations in District Larkana

4.3 Ambient Air Quality and Noise

Transportation system and indiscriminate burning of garbage are the dominant sources of air pollution. Operation of defective vehicles, use of low-quality fuel, and increase in the number of vehicles beyond the capacity of roads are the main reasons for deterioration of ambient air quality. However, the impact of air pollution emanating from transportation system has been found limited to the roadways and that too at traffic intersections and on the middle of the road. Emissions from stationary sources e.g., residential and business districts associated with fuel combustion for domestic use and power generation are significant but have limited extent.

The environmental impact from vehicular exhaust emission is often neglected in Pakistan due to the lack of awareness in our society, which is the major factor contributing to vehicle emission that includes NO₂ (Nitrogen Oxide), Carbon dioxide (CO₂), Carbon Monoxide (CO) and other pollutants. The implementation of CNG vehicles in cities must count as a significant achievement by any standards. It is perhaps the first instance, after Brazil and India, of alternative transport fuels being implemented on such a large scale in a low-income country. However due to adhoc attitude and lack of long-term policies, demand of natural gas including CNG outstripped supply, leading to curtailment of CNG supply in urban centers.

In the microenvironment of the Proposed Project, the operation of vehicular traffic is the main source of air pollution. Results of ambient air monitoring are provided in tables below.

Table 4.2: Ambient Air Monitoring

Date	Time	SO ₂ (µg/m ³)	NO (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)	O ₃ (µg/m ³)	Noise (dB)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SPM (µg/m ³)	Lead (µg/m ³)
25.03.2022	11:00	5.3	4.4	8.8	0.5	8.8	54	69	18	207	ND
25.03.2022	11:15	5.1	4.0	9.3	0.7	9.0	55	73	17		
25.03.2022	11:30	4.8	4.7	7.7	0.7	9.3	51	77	15		
25.03.2022	11:45	4.4	4.2	7.2	0.8	9.6	53	82	19		
25.03.2022	12:00	4.8	4.1	7.9	0.6	9.8	50	74	21		
25.03.2022	12:15	5.2	4.8	6.4	0.7	9.6	56	70	23		
25.03.2022	12:30	4.9	5.1	6.3	0.8	10.0	52	67	25		
25.03.2022	12:45	5.3	4.9	6.6	0.6	10.3	50	69	22		
25.03.2022	13:00	5.6	4.7	5.9	0.7	10.2	48	71	19		
25.03.2022	13:15	5.8	5.3	7.3	0.5	10.1	51	75	18		
25.03.2022	13:30	6.0	5.8	7.0	0.5	9.9	54	79	17		
25.03.2022	13:45	5.7	5.9	7.6	0.6	10.0	53	81	20		
25.03.2022	14:00	5.2	6.4	7.9	0.8	10.5	55	75	23		
25.03.2022	14:15	5.1	6.1	8.4	0.7	10.3	57	78	28		
25.03.2022	14:30	4.7	5.8	8.1	0.5	10.0	52	69	31		
25.03.2022	14:45	5.3	5.5	7.4	0.6	9.9	51	64	26		
25.03.2022	15:00	5.5	5.3	7.3	0.4	10.4	55	68	22		
25.03.2022	15:15	5.8	5.2	7.1	0.7	10.2	51	63	19		
25.03.2022	15:30	6.0	4.9	6.8	0.6	10.0	50	66	21		
25.03.2022	15:45	5.7	4.3	6.4	0.5	10.6	53	71	23		
25.03.2022	16:00	5.3	4.7	7.0	0.4	10.8	55	74	26		
25.03.2022	16:15	5.1	5.7	7.1	0.7	10.3	51	78	22		
25.03.2022	16:30	5.6	5.9	6.7	0.6	10.1	49	71	19		
25.03.2022	16:45	5.9	5.3	6.9	0.7	10.0	51	77	16		
25.03.2022	17:00	5.2	5.1	7.2	0.5	9.4	47	79	19		
MIN		4.4	4	5.9	0.4	8.8	47	63	15	207	ND
MAX		6	6.4	9.3	0.8	10.8	57	82	31		
AVG		5.3	5.1	7.2	0.6	9.9	52.1	72.8	21.1		



Table 4.2: Ambient Air Monitoring

Date	Time	SO ₂ (µg/m ³)	NO (µg/m ³)	NO ₂ (µg/m ³)	CO (mg/m ³)	O ₃ (µg/m ³)	Noise (dB)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SPM (µg/m ³)	Lead (µg/m ³)
SEQS		120	40	80	5	130	*50	150	75	500	1.5

4.4 Water Resources

Major surface water body in the district is River Indus which flows along the eastern-southeastern boundary of the district. Two major irrigation canals pass through the district, namely Rice Canal and Dadu Canal. These canals originate from Sukkur Barrage at right bank. Dadu Canal is perennial and is usually supplied water throughout the year except during January and for two weeks in April for maintenance works. Rice canal however, is a seasonal canal which is usually closed for about 6 months from October to March⁶.

Dadu canal has been designed for a normal discharge of 89.2 cumec at the head. Main crops are cotton, sugarcane, wheat, rice, fruits and vegetables. Water availability of the Dadu Canal is highly variable due to stochastic nature of flow⁷. The Rice canal commands an area of nearly 5,200 acres and has been allowed to discharge 10,659 cusecs of water⁸. Fresh water availability map for District Larkana is shown in the figure below.

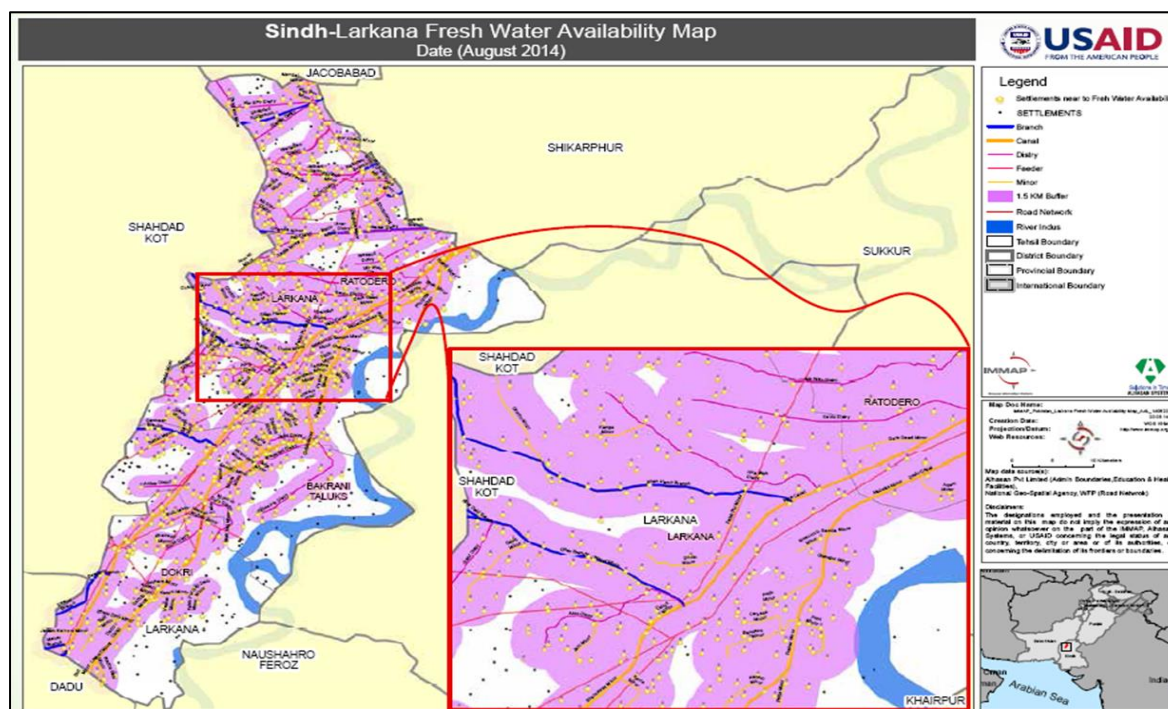


Figure 4.13: Fresh water availability map of Larkana

⁶ Location and Brief History of Sukkur Barrage. Retrieved from <https://irrigation.sindh.gov.pk/sukkur-barrage>

⁷ "On Farm Water Management Field Manuals," Vol. I, II, and III, Ministry of Food, Agriculture and Cooperative, Government of Pakistan, Mid-Year Review, July-December 2008, Planning & Development Department, Government of Sindh, pp. 1-6.

⁸ Retrieved from <https://www.thenews.com.pk/print/378234-sindh-asks-centre-to-include-two-projects-in-cpec>

4.5 Biodiversity

Protected Areas: No gazette protected area or wildlife sanctuary lies in the closed vicinity of project sites.

Flora: The proposed project is located at Larkana which is part of the lower Indus valley. As the climate of the track is arid, subtropical, the original flora of the area consists of tropical thorn forest type vegetation, in which thorny usually hard wooded species predominate with Acacia species being particularly characteristic. However, the natural vegetation has long ago been replaced completely by agricultural crops. At present, there is generally a mixture of species found in the track. The area has been used for agricultural purposes for almost a century; the natural flora has been completely replaced by cultivated species. The dominated floral species include Acacia modesta, Acacia nilotica, Dalbergia sissoo, Ziziphus nummularia and plantations of Eucalyptus globulus and Populus. The Azadirachta indica (Neem), Zizyphus vulgaris (Bir), Tamarix orientalis (Jujuba lai) and Capparis aphylla (Kirir) are among the more common trees. Mango, Date palms and the more recently introduced Banana, Guava, Orange and Chiku are the typical fruit-bearing trees.

Fauna: Significant fauna is absent in the microenvironment due to rapid urbanization.

Avifauna: Among the birds, Eagle (Aquila rapax), Hawak (Accipiter badius), Kite (Milvus migrans), Parrot (Psittacula krameri), Partridge, Common crow (Corvus splendens) and several varieties of water-fowls are reported.

Mammals: Due to urban activates within the built surroundings of the project area and its surroundings, there's hardly any chance for mammals to survive. However, rodent's species that have adopted such conditions are well established using hollow structures or maybe buildings as their nesting places. These embody rodents and tree abode species. None of those species is of ecological or economic importance. However, these may be a supply of food for raptors.

4.6 Description of Socio-Economic Environment

The successful implementation of a development project rests upon understanding and integrating the socio-economic influences in the project environs. This social baseline chapter provides a comprehensive review of the socio-economic conditions of the project area. This socio-economic profile is based on a literature review and several primary data gathering activities including site visits, sample socio-economic survey of stakeholders in the area and consultations with primary and secondary stakeholders. This social baseline provides an overview of the socio-economic conditions of the people who reside and work in the project vicinity of Noor Green Valley. It also includes an assessment of public utilities and social services (education and health facilities) of these areas. The project is located at Deh Dardra Tapo Baqapur, taluka Bakrani district Larkana.

The social baseline establishes the socio-economic conditions in the district as a whole as compared to the prevailing social influences in the environs of the ethnic groups, livelihoods, education and health facilities. The data collated in this section is mostly from validated

government and NGO publications and engagements with nearby communities, and local government representatives of the areas.

4.6.1 Administrative Context

District Larkana is situated in the upper part of the Sindh province. Larkana has the privilege of being the seat of one of the oldest civilizations of the world, the Indus Valley Civilization. Moen Jo Daro, which means “Mount of Dead” was one of the largest settlements of the Indus Valley Civilization and is designated as a UNESCO World Heritage Site, is situated 32 km away from the city of Larkana on the west bank of Indus River. District Larkana has its district headquarters at Larkana city. This district has four talukas, named: Larkana, Dokri, Rato Dero and Bakrani. It has 44 union councils and 184 mouzas (revenue village). Out of these mouzas, 153 are rural, 14 are urban, 3 are partly urban and 14 are un-populated mouzas.

Table 4.3: Taluka-wise Population of District Larkana			
Name	Administrative Unit	Population Census 1998-03-01	Population Census 2017-03-15
Larkana	District	1,001,608	1,521,786
Bakrani	Taluka	171,813	229,200
Dokri	Taluka	169,033	224,959
Larkana	Taluka	434,553	735,210
Ratodero	Taluka	226,209	332,417
Source: Pakistan Bureau of Statistics (Provisional Census Result 2017)			

4.6.2 Demography

District of Larkana's population is about 1,521,786 which is 3% of Sindh's population of about 47.9 million. With 259,411 households, the average household size in the district of Larkana is 5.78 as per the Census of 2017. Larkana's population comprises of 775,934 males and 745,530 females with 51% and 49% of the district's population respectively. District of Larkana spans over an area of 1,948 sq. km. The population density of the district is 781/sq. km.

Table 4.4: Area, Population and Sex Ratio											
Admn - Unit	Area (Sq. Km.)	Population - 2017								Population 1998	1998-2017 Average Annual Growth Rate
		All Sexes	Male	Female	Transgender	Sex Ratio %	Population Density Per Sq. Km. %	Urban Proportion %	Average Household Size		
Larkana	1,948	1,521,786	775,934	745,530	322	104	781	46	5.78	1,001,608	2.22
Rural		822,888	419,441	403,332	115	104			5.81	611,545	1.57
Urban		698,898	356,493	342,198	207	104			5.76	390,063	3.11
Source: Pakistan Bureau of Statistics (Provisional Census Result 2017)											

4.6.3 Ethno-Cultural

People of this district are pre-dominantly Sindhi speaking but Urdu, Balochi and Brohan are also spoken in the district. Bhutto, Rind, Bhughia, Mushoori, Lohana, Sheikh, Unnar, Chandio, Magsi, Tunio, Areja, Bughio, Abro, Shahani, Jatoi, Soomro, Pirzada, Memon and Kalhoro are the major clans of this district. Islam is the religion of the majority 98. 5% while 1.5% minority community include Hindu, Christian, and Qaidiani/Ahmadi in the district.

Table 4.5: Population by Religion							
District	Total	Muslim	Christian	Hindu	Qaidiani / Ahmadi	Scheduled Castes	Other
Larkana	1,521,786	1,498,148	1,082	20,562	392	1,554	48
%	100%	98.45%	0.07%	1.35%	0.03%	0.10%	0%
Source: PBS-2017 Final Census Result							

4.6.4 Economy

While agriculture is the main source of employment for the rural population of the district, in the urban areas of the district, people are engaged in various economic activities like trade, services, personal business, and government and private jobs. Larkana city is the main trading center of this district. Out of the area under cultivation for major crops, District Larkana contributes to 170,734 hectares (5.6%) out of 3,028,496 hectares in Sindh. In terms of highest proportions of area under cultivation for major crops, Wheat, Rice, Mustard and Barley are at the forefront in Larkana with 51,923 hectares. 107,599 hectares, 3,933 hectares and 2,085 hectares under cultivation respectively in the district. Similarly, the production of Wheat, Rice, Mustard and Barley is 165,887 M. Tons, 409,516 M. Tons, 4,626 M. Tons and 1,350 M. Tons. Irrigated Area in District Larkana is 26,608 hectares and Un-Irrigated area is 22,802 hectares. Canals are the mode of irrigation for 18,878 hectares in District Larkana out of 1,287,845 hectares irrigated by Canals in Sindh (1.5%). Tube-wells are the mode of irrigation for 7,730 hectares in Larkana out of 361,199 hectares irrigated by Tube-wells in Sindh (2.1%).

Table 4.6: Crops Area and Production		
Crops	Area (Hectare)	Production (M.Tons)
Barley	2,085	1,350
Cotton (bales)	1,576	7,632
Gram	1,731	1,673
Rapeseed & Mustard	3,933	4,626
Rice	107,599	409,516
Sesame	1,173	572
Sugarcane	714	49,755
Wheat	51,923	165,887
Source: Government of Sindh, Bureau of Statistics, Development Statistic of Sindh, 2019.		

4.6.5 Poverty

MPI (Multi-Dimensional Poverty Index)

Multi-Dimensional Poverty Index measures the number of people/households that are 'multidimensionally' poor. Essentially, it means the number of people (or HHs) deprived in at least one third of the weighted indicators (H) along with the weighted average number of deprivations poor people experience at the same time (A). The weighted indicators are along three broad dimensions: -

4.6.6 Education, -Health, and -Living Standards

In District Larkana, the MPI value is 0.2, which is slightly lower than the average MPI Value of 0.25 in Sindh. The headcount of households that are multidimensionally poor in Larkana is 41% compared to the headcount of 47% in Sindh.

In District Larkana, 16.8% of household members are vulnerable to poverty (i.e., deprived in one fifth to one-third of weighted indicators). Similarly, 16.8% of household members are in severe multidimensional poverty (i.e., deprived in more than one-half of weighted indicators).

Table 4.7: MPI Head Count in Larkana				
District	M-Poverty Headcount 2018 (H)	MPI 2018	% Vulnerable to Poverty	% in severe Poverty
Sindh	0.47	0.25	12.50	28.30
Larkana	0.41	0.20	16.80	16.80

Source: Government of Sindh, Bureau of Statistics, Multiple Indicator Cluster Survey 2018-19.

4.6.7 Education Facility

According to the report of Pakistan Emergency Situational Analysis for District Larkana (August 2014) the prominent educational institutions in Larkana are Chandka Medical College, Z. A. Bhutto Agricultural College, Shaheed Mohtarma Benazir Bhutto Medical University (SMBBMU), Cadet College, Government Degree Colleges for Boys and Girls, Arts & Commerce College, Oriental College and Law College. Sir Shah Nawaz Bhutto Memorial Library is located in Larkana city.

According to Government of Sindh, School Education & Literacy Department, Sindh Education Profile, 2019, district Larkana has 1,287 schools in which are 193 boys, 215 girls' schools and 879 mixed schools. District Larkana has total 265,975 Enrollment in different level of School's classes. (Pre-Primary/Kachi classes 45,993, Primary Classes (I-V) 146,359, Middle Classes (V-VIII) 43,235, Secondary Classes (IX-X) 24,129, Higher Secondary Classes (XI-XII) 6,259. Likewise, total boys are 152,861 and girls are 113,114 of total 265,975 in all level of classes. District Larkana has total 6,927 teaching staff in different level of schools. There are 4,755 Male teachers while female teachers are 2172.

According to the Pakistan Standards Living Measurement (PSLM) Survey, Larkana District enjoys an overall Adult Literacy of 54 % (Male 70 % and Female 38 %), while literacy is understandably higher for both male and female population residing in urban areas (Male 77 % and Female 49 %) compared to those residing in rural areas (Male 65 % and Female 28 %).

Table 4.8: Gender wise Summary Number of Schools, Enrollment and Teachers in District Larkana

No. of Schools				Enrolment			Teachers		
Boys	Girls	Mixed	Total	Boys	Girls	Total	Male	Female	Total
193	215	879	1,287	152,861	113,114	265,975	4,755	2,172	6,927

Source: Government of Sindh, School Education & Literacy Department, Sindh Education Profile, 2019

Table 4.9: Level wise Enrollment in District

District Name	Pre-Primary	Primary Classes	Middle Classes	Secondary Classes	H. Secondary Classes	GRAND TOTAL
	Kachi	Class (I- V)	Class (VI-VIII)	Class IX & X	Class XI & XII	
Larkana	45,993	146,359	43,235	24,129	6,259	265,975

Source: Government of Sindh, School Education & Literacy Department, Sindh Education Profile, 2019

4.6.8 Health Facilities

The major government hospitals in Larkana include the Civil Hospital, Larkana, Shaikh Zayed Women Hospital, Larkana, Pediatricians Medicine Hospital, Pediatricians Surgery Hospital. Shaikh Zaid Children Hospital. These hospitals are amongst the best in district, but, like most of Sindh are still far behind in comparison to the best hospitals in Karachi such as Liaquat National, Aga Khan, and Dr. Ziauddin. Moreover, these hospitals are constantly overburdened, especially during the flu season and more so, after the HIV Outbreak.

In April, 2019, an HIV outbreak was reported in the town of Ratodero in Larkana District. The outbreak was highlighted when 15 children with persistent fever were sent for HIV testing at a government-contracted facility and all were found to be infected. As an immediate response to the outbreak, the Sindh AIDS Control Programme (SACP) has been carrying out a major testing campaign by expanding HIV testing hubs and establishing a new HIV testing facility at the Taluka Headquarter Hospital in Ratodero.

According to the Health Facility Assessment (HFA) carried out by the Technical Resource Facility (TRF), there is only one teaching hospital with a capacity of 1,320 beds. There are 27 dispensaries but no beds in any dispensary. These health facilities are sufficient for only 14% of the estimated 2014 population of the district.

Table 4.10: Capacity of Health Facilities in District Larkana

District	Hospital		Hospital Beds		Dispensaries		R.H.C		T.B. C		B.H.U		M.C. H.C.
	Teaching	Civil, Specialized & Taluka	Teaching	Civil, Special & Taluka	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.
Larkana	1	3	1,320	115	27	-	5	119	12	-	27	54	-

Chapter 5 Information Disclosure, Consultation & Participation

The participation of project stakeholders in project planning, design and implementation is now universally recognized as an integral part of environmental & social impact assessment. Local communities, their representatives, government departments, national and international NGOs and the civil society at large may all be able to contribute to and benefit from, the dialogue directed at identifying and resolving key project-related issues. Stakeholder consultation has become an important requirement of the EIA study after the enactment of the guidelines for public consultation under the Pakistan Environmental Protection Act (PEPA) 1997. After the 18th Amendment to the Constitution, the Government of Sindh passed the Sindh Environmental Protection Act 2014, which also stresses the importance of engaging with the concerned primary and secondary stakeholders during the EIA study.

The proposed project “Noor Green Valley” is planned to be infrastructure development on Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh, having total area of 45 Acre – 25 Ghunta.

While in the short-term, the impacts might be felt only in the microenvironment of the project, in the long-term, the impacts may also spread to other nearby neighbourhoods and activities including traffic management, the swift passageway for fire tenders and ambulance and stress on existing utilities. Instead of these perceived impacts, meaningful engagement with the project stakeholders has been carried out to identify the potential positive and negative impacts, assess the magnitude of these impacts from a social perspective and prescribe solutions for the construction and operations phase of the proposed project.

5.1. Stakeholder Mapping

To better understand the different stakeholder groups for this project, a stakeholder mapping exercise has been carried out whereby the different stakeholder groups and their interests in the project are discussed in this section:

1. **Local People/Neighborhood:** Individuals or groups in the vicinity of the project site are informed regarding the project background and context. Due to their proximity to the project site, they are often the most vulnerable stakeholders and therefore, consultation with these stakeholders is carried out throughout the project life. The consultation exercise provides an opportunity to appraise the stakeholders regarding the consultation process, identify likely project impacts, and record concerns of local communities. Moreover, intensive stakeholder engagement during the planning stage of the project provides a basis for reducing the trust deficit and encourages confidence-building.
2. **Proponents:** The main aim of the project proponent “M/s JB Holdings” 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 associations 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. 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 inputs on alternatives and mitigation measures.

3. **Government Agencies:** The government agencies involved in the EIA process is mandated to have their policy and regulatory responsibilities addressed in impact analysis and mitigation consideration. For the competent authority, an effective public involvement program will ensure a project proposal that effectively incorporates environmental and social concerns. 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 stakeholders.
4. **NGOs/Interest groups:** Comments from NGOs and specific interest groups often provide a useful policy perspective on the project's methodology and implementation mechanisms. For example, due to the vast exposure of certain NGOs and interests groups, alternative measures for reaching the project goals may be advised that is more environmentally friendly and socially acceptable.

5.2. Primary and Secondary Stakeholders

Primary Stakeholders: People groups or institutions affected positively (beneficiaries) or negatively by the project.

Secondary Stakeholders: People, groups, or institutions that are important intermediaries in the project delivery process e.g., the institutions, research organizations, government line agencies, or NGOs etc.

In the case of the Noor Green Valley Project, the primary stakeholders are the local communities living in and around the project side that will face significant impacts. During the site visit, a total of 03 villages were identified and consulted. The secondary stakeholders include representatives of relevant local, provincial and federal government departments, utility companies, and NGOs. The primary and secondary stakeholders identified and engaged for the Noor Green Valley project are listed in following table.

Table 5.2: Stakeholders for Noor Green Valley Project	
Neighbourhood	<i>Residential Interests</i> • Dhani Bux Junejo-Village • Goth Dhang • Bagi Bindi Village <i>Commercial Interests</i> • Byco Pump • Mobile Shop <i>Institutional/Governmental Interests</i> • Cadet College Larkana • Social Welfare Department-Larkana

	• Saiab • Local Representatives-UC Chairman
Government Agencies & Other Service Providers	Sindh Environmental Protection Agency (SEPA) District Larkana Sukkur Electric Power Construction Cooperation (SEPCO) Sui Sothern Gas Company (SSGC)
NGOs/Interest groups	Sindh Rural Support Organization (SRSO) HANDS PPHI Banh Belli

5.3. Consultation Approach & Methodology

5.3.1 Consultation with Primary Stakeholders

A Neighborhood Survey was conducted to identify the residential and commercial interests in the area that may face direct impacts from the proposed development. 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 conduct an initial identification of potential positive and negative impacts. Relevant public service institutions directly involved in service provision in the areas were also identified.

During the second stage, a social survey field team used a pre-designed semi-structured template to engage the area residents, commercial interests and public service institutions. Those stakeholders, who were not available at the first attempt, were re-visited on the same day or followed-up for their comments during the next few days. During each meeting, the project team introduced the project to the stakeholders, recorded their concerns, 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 were 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 questionnaire to ensure that the respondents could openly share their opinions and suggestions relevant to the study. The following table shows the stakeholders that were approached during the Neighborhood Survey.

Table 5.3: Consultation with Primary Stakeholders

S. No	Village/Organization	Stakeholder Type
1	Dhani Bux Junejo-Village	Residential
2	Goth Dhang	Residential
3	Bagi Bindi Village	Residential
4	Byco Pump	Commercial
5	GPS Dhani Bux Junejo	Institutional
6	HANDS	NGOS
7	SRSO	NGOs
8	Banh Belli	

5.4. Consultation Feedback

The comments, concerns and suggestions received from stakeholders during the neighborhood survey have been collated in this section. The comments solicited from stakeholders were helpful in the screening of the potential environmental & social aspects of the project.

The social team from EMC carried out consultations in the project area after an initial site visit. Consultations were conducted mostly with the commercial living in the vicinity of project site. The following major issues and concerns were raised by the primary stakeholders:

- All the stakeholders consulted were of the opinion that the development of the housing society will bring many positive outcomes. They said that project would improve the general outlook of the area. They were also of the view that the housing society will improve the security situation in the area and will therefore boost the local economy.
- Villagers said that employment opportunities for locals will increase. Business in the project areas will increase since locals will be able to open small shops on both sides of road.
- Education opportunities are available only up to the primary level in the area, with only few villages having middle schools. This project has planned to open good private schools in the area where children will get quality education. Villagers said that local people should allow sending their children in schools and parks in the project area, as children get proper and quality education in their vicinity.

Chapter 6 Screening of Potential Impacts & Proposed Mitigation Measures

This section presents the screening process that identifies the environmental aspects and makes assessment of impact of different activities on the physical, biological and social environment. The screening process has, through review of literature, primary as well as secondary baseline data, and expert judgment, made assessment of the potential impacts of said activities on the physical, biological, and socioeconomic environment of the Project. Mitigation measures have been proposed to reduce, minimize or compensate for the identified potential negative impacts and their adoption has been recommended.

The **Noor Green Valley**, Project is located at Deh Dadra, Tapo, Baqapur, Airport Road, Larkana, Sindh. The environmental aspects of the project as identified by situation analysis are related to the following:

- Physical environment,
- Biological environment, and
- Socio-economic environment.

Description of microenvironment and macroenvironment in the previous chapters have provided a classification of the micro-site based on assessment of impact using both primary and secondary data on climate, air quality & noise, hydrology, geology, geomorphology, soil characteristics and seismicity, ecology, built environment including road network and traffic movement, and the socioeconomic aspects pertinent to siting of the project and its adaptation in the emerging situation of intense construction activity in Larkana. Mitigation measures have been proposed wherever required.

Screening of potential environmental impacts on the physical environment is related to:

- Siting of the Project
- Topography, Geology and Seismicity of the microenvironment
- Vulnerability of soil to liquefaction
- Availability of utilities in the area
- Vulnerability of site to flooding and storm water drainage
- Air, water and noise pollution and other forms of nuisance during construction at site, and in the microenvironment (neighborhood) and macroenvironment of site
- Burden on Infrastructure
- Capacity of adjoining roads, traffic movement, and congestion

6.1 Screening of Environmental Aspects related to Siting of Project

The Project **Noor Green Valley** the site falls in the appropriate category that permits the designated land-use by the relevant authority. The project responds to the need of the segment of population that is seeking home, safety, security and improvement in quality of life.

Availability of infrastructure facilities for establishment of residential complex and its location ideally suited the siting of housing scheme.

It may be reiterated that stimulation of the economy of the country lies in the housing sector. Other sectors are not likely to help the economy as much as would the housing sector.

6.2 Assessment of Impacts at the Construction and Operation stages of the Project

6.2.1 Demolition of Structure(s)

The site is an open land with no significant permanent structure at the site. No demolition will therefore be required.

6.2.2 Structural Stability

The seismic zone map of Pakistan has divided the country into 4 seismic zones ranging in term of major, moderate, minor and negligible zones with respect to ground acceleration values. Under this zoning the project site lies in the Zone 2A.

Mitigation Measure

- During the construction, it will be important to maintain the stability of excavated area.
- During monsoons it will be essential to protect the excavation walls with shoring/bracing.

6.2.3 Erosion of Soil

Generally, the exposed soil after site clearance, road development and excavation for foundations is vulnerable to erosions and runoff by rains. Such a situation will be of temporary nature and short duration and lasts during construction phase.

Mitigation Measure

- Covering the open soil during the construction phase till such time that the foundations will adequately concreted.
- Intensification in fugitive dust emission caused by erosion of soil will be mitigated by appropriate measures to reduce the level of impact to minor significance.
- Control of air emission during construction will be ensured by adopting sound operating procedures such as:
 - Exposed surface will be regularly wetted to effectively keep airborne dust levels to minimum
 - Stockpiles of fine material will be wetted or covered with tarpaulin especially during windy weather conditions.
 - Site workers will be mandated to wear dust masks especially during dry & windy weather conditions.

6.2.4 Excavation

The provision of foundations will require excavation below ground level. Once removed, the void space is likely to impact the integrity of the soil in the surrounding. To maintain the stability

of excavation and to protect foundations of adjacent structures, retention measures such as bracing or shoring can be used to retain the soil during the construction of basement. It is essential to keep the excavation dry and excavation should be performed during dry season. It is imperative that system should have adequate water proofing to make sure moisture doesn't ingress into the retention system and basement.

Mitigation Measure

- Fencing and obscuring the construction site to reduce the perception impact was undertaken.
- It would be advisable to monitor the excavation cuts and if found necessary, shoring/bracing may be employed. It should be ensured that the excavation is done in dry season.
- The neighborhood will be notified with adequate signage at the very start of the project. Sites will be appropriately covered all around to contain the fugitive dust emission within the microenvironment. The impact of the activity will be continuously monitored by third-party since it is apprehended that the residents in the immediate neighborhood are likely to be exposed to dust fall hazards.

6.2.5 Construction Waste

Typical solid waste generated during construction includes wasted concrete, steel and wooden scaffolding, cement bags, excavated soil, wood remains etc. It is envisaged that the quantum of earth fill material will be significant. The waste generated has the potential to cause adverse impact on the surroundings if not properly managed and disposed to approved dumpsites by approved waste contractors. The excavated waste has the potential to block nearby drainage channels that could ultimately cause localized flooding, particularly during the monsoon season. Irregular storage of this waste may pose health hazards to the workers at site and more so to the school going children and residents in the neighborhood.

The following measures have been recommended for management of the excavation procedure and disposal of construction wastes:

Mitigation Measure

- Sites will be properly cordoned off by placing curtains all around.
- Unusable wastes will be transport to approved dumpsites.
- Excavated soil will be disposed of through the regular channel of the approved disposal contractor.
- Proper solid waste containers of adequate capacity will be provided to cater to daily waste generation.

6.2.6 Topography and Geology

The Project is not likely to impose additional stress on topographical parameters and hence no significant impacts are envisaged. The siting of the project demands careful planning and evaluation of load bearing capacity of the soil to ensure the stability of the proposed structure.

As such the stability of the project is ensured and is not likely to impose additional stress on the sub-soil structure and hence no significant impacts are envisaged.

6.2.7 Air Quality

The major source of air pollution during the construction phase will be dust emission due to earth works and gaseous emissions from construction equipment. The major source of air pollution during the operation phase when the Project is functional will be the pollutant emissions from vehicles and stand-by generators.

Impacts from each source and proposed mitigation measures are likely to be as follows:

Dust Emission: Particulate matter emitted during construction activities results in deterioration of ambient air quality in the vicinity of the source and is usually a nuisance to the neighborhood and the communities in the neighborhood besides the construction workers. Dust emission from construction site is a concern particularly if the site is near residential areas. The main health hazards emanate from particles smaller than 10 microns (PM_{10}) in particular $PM_{2.5}$ as they are respirable. These particles are sufficiently charged to assume the properties of aerosols which on reaching the receptors have heavy impact on the respiratory system and on the surface of furnishings of the living environment. The impact on the environment would be considered significant if there is an increase in suspended particulate matter within and beyond the boundaries of the project site due to activities at the site, or if the dust affects local property or results in complaints from the community.

- Potential sources of particulate matter emission during construction activities include earthworks (dirt or debris pushing and grading), exposed surfaces/storage piles, truck dumping, hauling, vehicle movement on unpaved roads, and concrete batch mixing. The quantity of dust that is generated on a particular day depends on the magnitude and nature of activity and the atmospheric conditions prevailing on the day. Availability of Ready-mix on commercial scale has considerably reduced the level of emission of fugitive and construction sites are no longer required to have a batching plant.

Mitigation Measure

The following mitigation measures have been recommended:

- Water sprinkling and monitoring to ensure adequate suppression of dust will be a regular activity as long as the excavation activity lasts.
- Dust emission from soil piles and aggregate storage stockpiles will have to be reduced by appropriate measures like keeping the material moist by sprinkling of water at appropriate frequency and regularly monitored by IMC. Availability & use of ready-mix on commercial scale will considerably reduce the level of emission of fugitive at the project site.
- Construction materials that are fragile and vulnerable to raising visible dust will be transported only in securely covered trucks to prevent dust emission during transportation.
- The exposure of construction workers to dust needs to be minimized by provision of dust masks and mandating the workers to wear them.

Vehicle and Equipment Exhaust: Combustion exhaust from vehicles and construction equipment can affect the ambient air quality of the site surroundings. The impact would be potentially significant when the ambient air quality deteriorates due to emissions from construction equipment and machinery or the construction generators etc. beyond the guidelines especially at the environmental receptors in the neighborhood. The exhaust emissions will include particulate matter, hydrocarbons, and oxides of nitrogen, Sulphur, and carbon.

Mitigation Measure

- All vehicles, generators and other equipment used during the construction will be properly tuned and maintained in good working condition in order to minimize emission of pollutants.
- The stack height of the generators during operation phase will be vented through vertical stacks to minimize exposure at ground level.
- The noise and air emission from the Project as a whole will be contained within its microenvironment by measures engrained in the development of infrastructure and other facilities in town. The mechanical area will be provided with noise abatement devices. Generator's emissions will be controlled to acceptable levels by segregating their locations and timely maintenance.
- In order to compensate for the increase and footprint of carbon and water vapor it would be desirable for proponent of project to undertake plantation of large number of trees with dense canopy at the nearest public park/green belt in consultation with the Independent Monitoring Consultant (IMC).

6.2.8 Construction Noise

Depending on the construction equipment used and its distance from the receptors, the commuters and residents in the neighborhood may be exposed to intermittent and variable noise levels. During the day such noise results in general annoyance and can interfere with sleep during the night.

In general, human sound perception is such that a change in sound level of 3 dB is clearly noticeable, and a change of 10 dB is perceived as a doubling or halving of sound level. The noise in the project area will increase during construction and completion of the proposed project and may result in disturbance to the nearby receptors unless it is contained within the appropriately fenced and covered site of the Project.

Baseline noise measurements were obtained through continuous monitoring for a 24-hour period at the project site. It was found from the noise monitoring that the typical average noise level in the project area was >70 dB (A). The Sindh Environmental Quality Standards for noise require that the sound level in residential and commercial areas should not exceed 55 dB (A) and 65 dB (A) respectively during day time and 45 dB (A) and 55 dB (A) respectively during the night time.

Mitigation Measures

- Restraining the use of noisy equipment to suit to the conditions of the living environment namely 65 dB (A) during the day and 55 dB (A) during the night.
- Reducing equipment noise at source by proper design, regular maintenance & repair of construction machinery and equipment.
- Minimizing noise from vehicles and back-up power generators by use of proper silencers and mufflers.
- Use noise-abating devices wherever needed and practicable.

6.2.9 Water Sourcing

Water required for the numerous construction activities would not be of such order as to result in its reduced availability for other activities for the living environment. Conservation practices would nevertheless be adopted during the entire course of construction and operation.

Water will generally be obtained from the tube well. The availability of ready-mix on commercial scale has greatly resolved the problem of availability of water in the initial stages. The drinking water need will be fulfilled through bottled from a bottled water supplier of repute.

Option for recycling of the wastewater and regeneration of the potable water from groundwater resources by adequate treatment may have to be explored. Water bowzers may also provide be obtained in case of water supply issues.

Mitigation Measures

- A complete record of water consumption during the construction and operation phase will be maintained.
- Water conservation practices will be adopted to prevent wastage of water.
- The water supply lines will be checked and repaired for leaks, if any, in order to reduce wastage of water.
- Use of water efficient sanitary fittings such as low flush toilets, water efficient shower heads, and aerators on faucets will be ensured throughout the Project cycle.

6.2.10 Soil Contamination

The contractor shall be mandated to follow the SOPs with regard to handling, storage, transfer, use and final disposal of contaminants, if any by the proponent. The following measures will be adopted during the construction stage to reduce the chances of soil contamination:

Mitigation Measure

- Fuel oils, lubricants, and chemicals will be stored in covered dike areas, underlain with impervious lining. The construction site(s) will be provided with hard cover or tarpaulin lining to prevent contamination of soil.
- Washing and maintenance of vehicles and equipment will only be carried out at designated areas.

- Regular inspections will be carried out to detect leakages in construction vehicles and equipment.
- Appropriate implements such as shovels, plastic bags and absorbent materials will be made available near fuel and oil storage areas for removal of oil and contaminated soil.
- Contaminated soil will be removed and properly disposed after treatment such as by incineration by SEPA certified contractor.
- Hazardous Substances Rules 2014 will be adhered to for storage, transfer, subsequent handling and final disposal of any chemicals/substances during the operation stage.

6.2.11 Wastewater Generation & Disposal

Construction Phase: Disposal of domestic effluent from the construction site has to be adequately managed so that the wastewater flows into the regular channel and does not contaminate the soil and groundwater of the site or its surrounding.

Mitigation Measures

The following mitigation measures will be adopted during stages of construction:

- Wastewater generated will be routed to the nearest drain / sewerage system through multi-chamber Septic tank.
- Sewage will not be mixed with any other waste.

Operation Phase: Small quantities of hazardous wastewater may be produced during the maintenance activities in the project site (such as oily water etc.). The source of wastewater will include toilets, washrooms, laundry and kitchen. This wastewater would comply with the SEQS values provided that other hazardous wastes (i.e., paints etc.) are not mixed with it. The discharges from kitchen, canteen and other sources will be provided grease traps to separate the oily waste that will be disposed of responsibly through EPA approved contractor.

Mitigation Measures

Following mitigation measures will be adopted for effective management of wastewater during the operation stage of project:

- Sewage water shall be treated into sewage treatment plant, comprising at least of primary and secondary treatment before discharge into allocated drain. Option shall also be explored to reuse the treated water for irrigation purpose within the town.
- Option may also be explored to separate grey and soil water streams.
- Waste segregation measures would be employed to minimize entry of solid waste into the wastewater stream.
- Water conservation strategies will be employed to avoid wastage of water.

6.2.12 Solid Waste Generation and Management

- **Construction Phase:** The construction phase of the project is expected to generate wastes including; packing waste; scrap, excess construction materials and debris,

domestic wastes from construction camp, empty containers and drums, used lubricating oils and chemicals etc.

- The impact of solid waste disposal would be significant if the waste management is not carried out appropriately. This may adversely affect the health of workers, cause soil pollution, and deteriorate the quality of surface water and groundwater. Also, if excessive wastes are generated, recyclable wastes are not recycled, wastes are scattered, handling of wastes will result in contamination, and wastes are improperly disposed of, the result would be serious degradation of the environment.
- Waste generated as a result of construction activity will be inherently less reactive and chemically inert under normal conditions however, its handling and storage may pose adverse impacts of minor nature which could be controlled by employing the recommended mitigation measures in the EMP.

Mitigation Measures

- A waste management plan will be developed for the construction stage of the project. The following will be the key elements of the waste management system:
 - Separate bins will be placed for different type of wastes - plastic, paper, metal, glass, wood, and cotton.
 - Recyclable material will be separated at source. The recyclable waste will be sold to EPA certified waste contractors for recycling.
 - Non-hazardous non-recyclable wastes such as kitchen wastes will be disposed of in landfill site managed by municipal administration or approved waste manager/contractor.
 - No wastes will be dumped at any location outside the site boundary.
 - All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with restricted access and proper marking. Hazardous wastes will be disposed of through approved waste manager/contractor.
 - Surplus construction materials including partially filled chemical and paint containers will be returned to suppliers. Inert construction wastes will be disposed of onsite as fill material or sold as scrap to contractors.
 - Records of all waste generated during the construction period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register.
 - Training will be provided to personnel for identification, segregation, and management of waste.
- **Operation Phase:** The project will generate solid waste from residential and commercial units of the project.
- If not properly managed and disposed of this can pose serious environmental threat of pollution not only to the residents and visitors to the complex but also to the surrounding settlements.

- The Government of Sindh has recently taken a big and positive step in this regard in Larkana, Sindh, Pakistan. Leading Chinese company “GANSU” will now work with the Sindh government in this regard and a formal plan has been prepared.⁹

Mitigation Measures

- The following measures would reduce the negative impacts of solid waste disposal:
 - The solid waste shall be collected through garbage chute at dedicated site.
 - All solid waste shall be segregated into organic and recyclable waste at source and then collected, stored, and transported for ultimate safe disposal.
 - Handling & disposal of solid waste shall be managed by a dedicated waste management contractor.
 - The solid waste management plan developed will be implemented and facilities for collection, storage and transportation will be established and organized.

6.2.13 Operation of Vehicular Traffic

Vehicular traffic management will have to be undertaken seriously to restrain unnecessary traffic jams that may cause annoyance to the commuters travelling on the roads surrounding the project.

Mitigation Measures

The following mitigation measures will be adopted to remove the constraints to smooth flow of traffic:

- Heavy traffic during construction; phase will come to the project site during late night hours. Project vehicles shall not be fitted with pressure horns.
- Speed of vehicles will be regulated during construction phase.
- Designated parking areas will be provided for different type of project vehicles within and around the project site.
- Traffic management plan will be introduced to manage smooth flow of vehicular traffic and to avoid traffic jam and long queues.
- Traffic management plan will be implemented and monitored.
- Vehicles will be parked at designated parking areas during operational phase.
- Parking of vehicles alongside the road would be prohibited at all time.

6.2.14 Seismic Hazards

The area presents a moderate to high hazard potential for earthquake activity. The recently developed (after the October 2005 earthquake) seismic zone map of Pakistan has divided the country into 4 seismic zones ranging in term of major, moderate, minor and negligible zones with respect to ground acceleration values.

Mitigation Measures: No specific mitigation measures other than construction of the housing facility in accordance with the UBC Zone 2A are recommended.

⁹ By Muhammad Mehdi | Gwadar Pro, Feb 1, 2022

6.2.15 Fire Hazards and Life Safety

Fire is one of the major hazards in houses and commercial units. Fire can cause loss of life and property. However, at the same time fire have the potential to severely harm the people in the vicinity and affect the living environment.

Mitigation Measures

Risks involved with fire hazard can be reduced by adopting following measures:

- A dedicated fire tender shall be available at Project Site.
- For all engineering designs, NFPA (National Fire Protection Association) codes needs to be followed.
- Standard fire and smoke detection and protection devices such as alarms, fire hoses and hydrants to be provided in all critical areas.
- A detailed emergency and evacuation plan shall be prepared that will be regularly drilled to make sure that the responsible staff remains trained at all times.
- Firefighting equipment such as fire extinguishers and hydrant systems will be maintained at strategic locations e.g., schools, commercials centers and residential areas within the scheme.
- Regular inspection and servicing of the extinguishers will be undertaken by a reputable service provider and record of such inspections should be maintained.
- Signs such as “NO SMOKING” will be prominently displayed within the premises, especially in parts where fuel storage is involved.
- Fire extinguishers and buckets of sand to be provided in the fire-prone area and elsewhere.

6.2.16 Energy use

Electricity during construction phase will be produced from diesel generators, whereas during operation phase, power supply from Sukkur Electric Power Company (SEPCO) shall be made available.

A back up diesel operated generator will also be installed in case of emergency or suspension of power supply from the mains. Since energy produced from non-renewable resource results in CO_x, SO_x, and NO_x emissions, it is important to ensure that energy is used prudently and best management practices are adopted.

6.2.17 Materials Selection

General specification/details have been worked out in respect of type of structures, concrete, and all other materials required for the construction of facilities in town. The following measures will be adopted to ensure sustainable development of the Project:

Mitigation Measures

- The structures and materials will, in the construction stage, conform to recommended standards and follow standard practice of civil works.

- Materials including paving stones, crush, gravel and sand will be brought from commercial quarries located in Sindh province. Environmentally sound materials and goods will be selected, with priority being accorded to products meeting national and international standards.
- Traditionally well-trying materials and components will be selected and selection of construction materials would be based on sustainable source.
- The production, use and disposal of concrete materials during the construction stage of the project will utilize considerable amount of energy and resources; all attempts will be made towards efficient consumption and minimization of wastage of water, energy and materials
- Best practice of energy efficiency will be adopted in the infrastructure development in town. The residential house and other facilities would be constructed with high level of thermal insulation
- The environmental impacts arising from selection of materials and components would take account of the environmental issues during the materials selection process, and introduce Recycling strategies such as Reuse and Reduction of Wastewater.

6.2.18 Disturbance to Wildlife

The project site does not have any designated wildlife habitat or endangered species. Therefore, no significant impacts are envisaged on the wildlife during the project construction and operation phase.

6.2.19 Potential Impacts on Socio-economic Environment

- Health, Safety and Environment are major components of the Environmental Management Plan (EMP) of which monitoring of the environmental performance is an integral part. The proponent has to ensure strict adherence to the measures and guidelines stated in the EMP and the contractor must be made to follow the Standard Operating Procedures (SOPs) for construction activities.
- It is not unusual to observe that construction workers are left on their own to protect themselves from imminent hazards. Accidents usually occur at unprotected sites and are incident on unprotected workers. HSE considerations require that precautions must be taken against even the most insignificant impacts.
- Major social concerns during the construction stage arise when: i) the stakeholders are not informed about the project or its schedule of operations; ii) the site is not appropriately cordoned off to restrain outsiders from entering the site; iii) construction crew invariably ignores or sidetracks the mandatory requirement of wearing PPEs; iv) construction crew is not pre-trained to be aware of the likely hazards during various stages of the project; v) even if they are trained on awareness and provided the PPEs the lukewarm attitude of the supervisors does not oversee the follow-up of HSE procedures/SOPs.
- Safety risk assumes substantial proportion in densified areas of urban centers. Under the circumstances there is need for strict compliance with the HSE procedures and accidents incident on non-observation of HSE procedures must be keenly monitored and recorded to ensure the safety of both workers and citizens. For this purpose, the contractor will be

required to maintain a record of procedures on Health, Safety and Environmental Management Plan and Standards Operating Procedures in addition to the following:

- Provide alternative traffic arrangement/detours, if necessary, so that traffic can be distributed and move on different roads; and, ensure that public/residents association is informed about such traffic diversions;
 - Provide information to the public through media – daily newspapers and local cable television (TV) services about the need and schedule of work, and alternative routes;
 - Maintain transparency of the project, public information/caution boards must be provided at the work site – information shall *inter-alia* include: project name, cost and schedule; executing agency and contractor details; nature and schedule of work; traffic diversion details, if any; entry restriction information; competent official's name and contact information for public complaints.
 - Restraining access to the public from the site by enclosing/barricading the construction area; providing warning boards and sign boards and positioning security guards throughout the day and night, 07/24;
 - Ensuring provision of PPEs (helmet, hand gloves, boots, masks, safety hoists when working at height, etc.) and making sure that all workers do wear them;
 - List the code of conduct and standard operating procedures (SOPs) to be followed during different stages of construction;
 - Employ an Environmental, Health and Safety (EHS) expert on site;
 - Provide on-site Health and Safety Training for all site personnel;
 - Report accidents to the authorities promptly, and maintain records on regular basis
 - Temporary inconveniences due to construction works will be minimized through planning and coordination with community members and organizations e.g. Traffic Management Authorities.
 - Maintain the service roads in good condition to allow smooth traffic movement; provide necessary personnel to guide and control the traffic.
- The proposed Project will create employment during its construction and operation phase. The Project will create employment opportunities after completion. This also includes staff directly involved in the operation and management of the facilities that include the project management, the staff engaged by the residential flat owners, shop owners, domestic servants, security personnel, and drivers.
 - Most of the workforce will consist of local people. The generation of employment is likely to be a major positive impact arising from the proposed development.
 - The Table presented below illustrates an analysis of the socioeconomic impacts on the two domains of socioeconomic environment viz. macroenvironment and microenvironment. It may be seen from the Table that both domains have impact that are positive. The Project would promote economic uplift and raise the status of the commercial enterprises and social status as well as lifestyle of the community resident in the microenvironment of project area. Creation of jobs and promotion of business and commercial activities is an additional feature of the proposed Project.

Table 6.1: Nature and Degree of Positive Socioeconomic Impacts

Nature of positive impact	Degree of impact	Description
I. Construction Phase:		
Job opportunity	Positive Impact	Generate unskilled, semi-skilled and skilled jobs as construction laborers and other service providers.
Wider economic impact	Positive Impact	Economic impact in terms of generating opportunities for other business-like sourcing of man and material supplies for specialized jobs.
II. Operation Phase		
Job opportunity	Major Positive Impact	Generate large number of jobs in various positions both in managerial, supervisory and subordinate positions.
Improvement in quality of life	Major Positive Impact	Provide safe and secure environment for social, cultural, and commercial activity
Enhancement of quality of environment	Major Positive Impact	Benefit the macroenvironment by adopting Public Park/greenbelt as a social responsibility

6.2.20 Cultural Resources

There are no protected or otherwise cultural or archaeological sites in the microenvironment of the project site and hence no impact of the project will occur on cultural or archaeological resources.

6.2.21 Land-use and Aesthetics

The Project falls in the category that permits the designated land-use; the Project will add the skillfully and sustainably designed mixed-use housing scheme as a landmark to the horizon of Larkana and produce positive impact on the aesthetics of the urban environment. The Project is designed as a self-contained building; with 24-hour security system all over the building the designers have ensured that the concerns on invasion of privacy are alleviated and eased. The Project would thus achieve its objective of providing a secure and safe building at an attractive location. This being a positive impact would be an indicator of achievement of the objectives of the Project.

6.2.22 Impacts Rating

The following Checklist for the Project provides the screening of potential environmental impact on different components of ecosystem:

Table 6.2: Potential Environmental Impact during Different Stages of the Project and Mitigation Measures

Actions Affecting Environmental Resources & Values	Damage to Environment	Recommended Mitigation Measures	Significance of Impact			
			None	Small	Medium	Major
Environmental Problems during Construction Phase						
Soil Erosion	Loss of fertile soil	Careful planning of land excavation.		✓		
Contaminated Land	Soil and water pollution	Implementation of Waste management plan and provision of septic / soak pits.		✓		
Construction Waste	Soil contamination, water and air pollution	Implementation of Waste management plan. Adequate monitoring during construction			✓	
Change in Ambient Air Quality	Nuisance due to dust esp. by PM ₁₀ , spoil property and cause visibility issues.	Water sprinkling. Careful planning to minimize air emissions.		✓		
Wastewater Generation & Disposal	Deterioration of surface and ground water quality, disturbance to flora and fauna as well as contamination of soil surface	Provision of septic / soak pits. Careful monitoring of effluent discharge			✓	
Solid Waste Generation & Disposal	Effect the health of the workers, cause soil and water pollution	Implementation of Waste management plan. Careful planning to minimize the problem.			✓	
Noise & Vibration	Nuisance problem	Careful planning and management of noise producing activities		✓		
Vehicular Traffic	Environmental degradation	Careful planning and management. Implementation of Traffic management plan during construction.		✓		
Occupational Health & Safety	Over exertion, slips and falls as well as site hazards	Implementation of appropriate procedures			✓	

Environmental Hazards during Operation Phase						
Inadequate management and monitoring of operation	Environmental degradation, waste of resources and time	Properly programmed operations and their monitoring		✓		
Wastewater Generation & Disposal	Deterioration of surface and ground water quality, disturbance to flora and fauna as well as contamination of soil surface	Careful monitoring of effluent discharge. Installation of WWTP		✓		
Solid Waste Generation & Disposal	Effect the health of the workers, cause soil and water pollution	Careful monitoring to minimize the problem. Proper disposal of waste as well as management.		✓		
Energy Consumption	Utilization of natural resources	Careful monitoring to save the natural resources.		✓		
Illumination	Cause of light pollution for the neighbourhood	Careful planning to solve the problem.		✓		
Emergency situation; fire hazard	Occupational hazard, possible environmental degradation	Provision of firefighting system		✓		
Environmental Aesthetics	Loss of environmental aesthetics	Careful planning	✓			

Chapter 7 Environmental Management Plan (EMP)

7.1 Introduction

7.1.1 General

The Environmental Impact Assessment (EIA) for the proposed development activities of Project has identified potential impacts that are likely to arise during the construction and operation phases. The EIA has examined in detail both negative and positive impacts of each stage of the operation. Where adverse impacts have been identified, the EIA has recommended mitigation measures; include management and monitoring practices, physical controls, or compensation in monetary terms. The mitigation measures proposed are based on a good understanding of the sensitivity and behavior of environmental receptors, past experience, case studies, legislative controls, guidelines, & expert advice. For the effective implementation and management of the mitigation measures and monitoring requirements an Environmental Managements Plan (EMP) has been prepared and presented in this section. For any residual impacts (impacts remaining after applying the recommended mitigation measures) or for impacts in which there has been a level of uncertainly in prediction, monitoring measures have been recommended. Advice on monitoring measures required was sought from experts involved in the EIA and case studies of similar development activates at international level.

7.1.2 Objectives

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

The primary objectives of the EMP are to:

- Outline mitigation measures recommended in the EIA and define the responsibility and timing for the implementation of these measures;
- Develop monitoring mechanism & identify parameters that can confirm the implementation of the mitigation of these measures;
- Define roles and responsibilities of the project proponent for the implementation of EMP and identify areas where these roles & responsibilities can be shared with other stakeholders and
- Define the requirements necessary for documenting compliance with the EMP and communicating it to all concerned regulatory agencies.

For each impact, or activity, which could give rise to an impact, the following information is presented:

- Mitigation measure that will be implemented;
- The person(s) responsible for ensuring full implementation of the mitigation measure;

- The parameters that will be monitored to ensure effective implementation of the mitigation measure;
- The timing for the implementation of the action, to ensure that the objectives of the mitigation are fully met.

7.2 Structure of the EMP

The EMP consists of the following section.

- Legislation and guidelines.
- Organizational structure and roles and responsibilities;
- Mitigation management's matrix
- Environmental monitoring program
- Change management plan
- Training Program

7.3 Legislation and Guidelines

The EIA has discussed in detail all the legislation and guidelines (chapter 2) which has relevance to the project. The proponent shall ensure that the construction and operation of project is conducted in conformance to relevant legislations and guidelines and guidance is sought as and when required. The proponent shall also ensure that the key project management staff is aware of these legislations and guidelines. SEQS for municipal and industrial effluents, selected gaseous pollutants from industrial sources and motor vehicle exhaust and noise have been provided in Chapter 2.

7.4 Organizational Structure and Roles and Responsibilities

7.4.1 Organizational Structure

The proposed project includes the following main organization:

- The project proponent and owners of the EMP.
- The construction contractor as well as contractor required during the operational phase (e.g., waste contractor) as the executors of the EMP.

These organizations will have the following roles and responsibilities during the project activities.

7.4.2 Roles and Responsibilities

A. General

Project Proponent: Project proponent will be responsible for ensuring the implementation of the EMP. A person holding a senior position will be responsible for the overall environmental performances during the proposed project. The person will be responsible for ensuring the implementation of the EMP by the proponent and all project contractors. The proponent's Site

Representative (SR) will be responsible of implementation of the EMP and liaison with project contractor and stakeholders at site regarding environmental issues during the construction phase. Further the person holding a senior position in the proponent team will also be responsible for monitoring EMP's compliance and provided technical support in environmental issues.

Project Contractors: For the proposed project, the proponent will appoint construction contractor for different field operations. Various contractor will also be hired during the operation phase of the facilities in town (e.g., waste contractors). The contractors will be responsible for implementation of, or adherence to, all provisions of the and the EMP and with any environmental and other codes of conduct required by the proponent. Overall responsibility of the contractor's environmental performances will rest with the person holding the highest management position within the contractor's organization reporting to their management. The contractor's site managers will be responsible for the effective implementation of the EIA and the EMP. The contractor's HSE officers will have functional responsibilities to ensure implementation of or adherence to the EMP.

B. Planning and Design of the Operations

Details of project Activities: Details of the project activities are provided in section 2 of the EIA report. Following approval of the EIA, any changes to the proposed activities will be handled through the change Management Plan provided in this EMP.

Approvals: No-objection Certificate (NOC)/Approval from SEPA will not relieve the proponent of other legal obligation and hence the proponent and project contractors will obtain all other relevant clearance and necessary approvals required by the Government of Sindh and Relevant departments prior to commencing the respective operations.

Contractual Provision: Adherence to the requirements of the EIA and EMP in terms of environmental mitigation will be required from all project contractors and thus EMP will form part of their contractor with the proponent.

C. Implementation of the Operation

Co-ordination with Stakeholders: The proponent will ensure that co-ordination with the regulators and other stakeholders on environmental & social matters is maintained throughout construction & operation phase of the project.

Monitoring: The proponent and the contractors will ensure that monitoring of the project activities is carried out throughout the project. The site representative will monitor all project activities during the construction and operation phase. He will keep a record of all non-conformances observed and report these along with actions to the proponent management in Larkana for further action. The site representative will also report any impacts anticipated along with his recommendation for further action.

Emergency Procedures: The proponent and the contractors will prepare contingency plans to deal with any emergency situation that may arise during the construction and operation e.g., major oil spills, medical evacuation & communicate these to the regulatory agencies if required by these agencies.

Approvals: The project contractor will be responsible for obtaining all relevant approvals such as approvals for waste contractors, water source & others as specified in Mitigation Management Matrix.

Trainings: The project contractors will be responsible for the selection and training of their staff capable of completing the project activities properly and efficiently. The contractors will be responsible for providing training to their staff members according to the training programme. The training programme is discussed briefly in section 6.6.3.

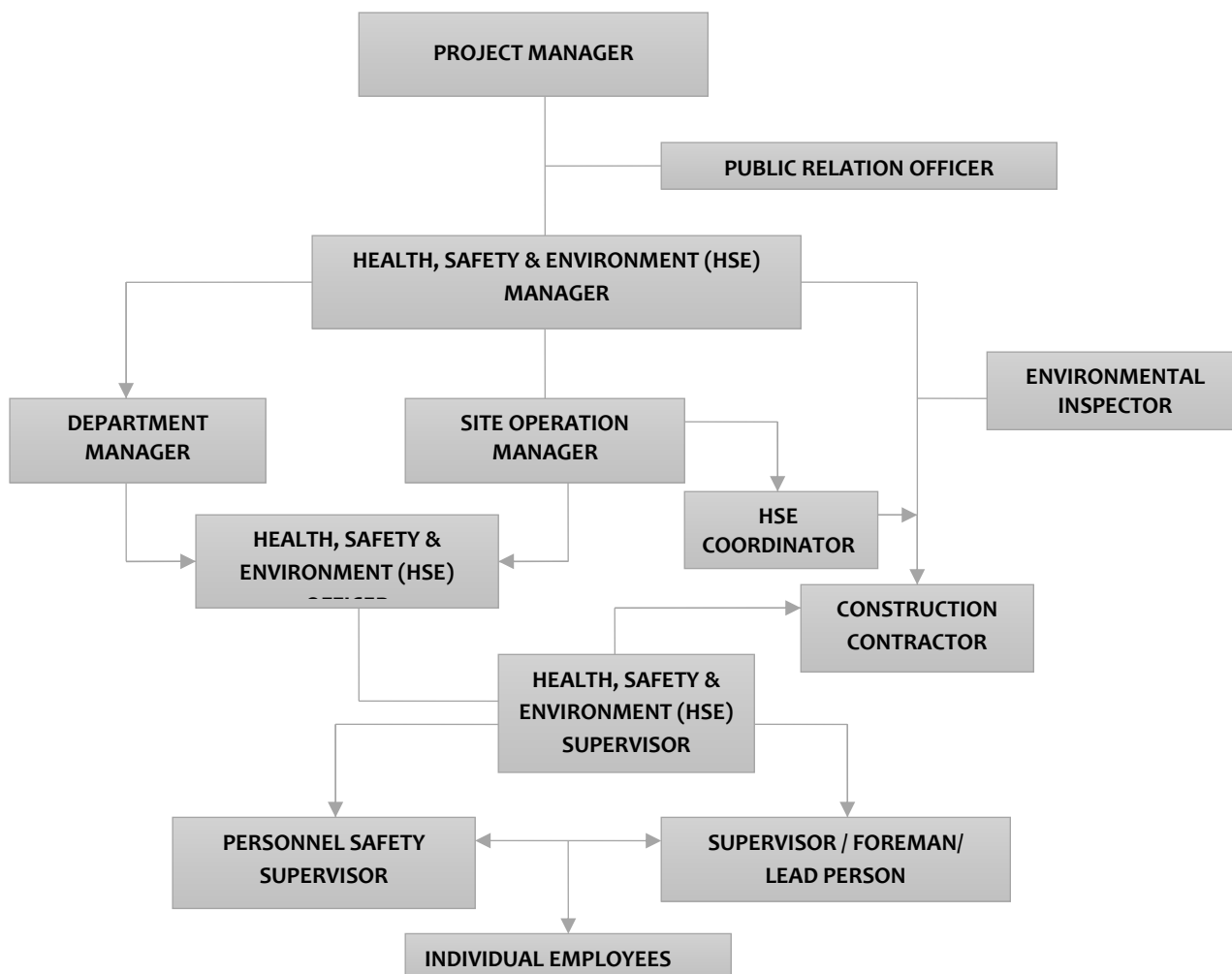
D. Communication and Documentation

The proponent and the contractor will ensure that the communication and documentation requirements specified in the EMP are fulfilled during the construction and operation phase.

Change Management: The EIA for the proposed project recognizes that changes in the operation or the EMP may be required during the project activities and therefore provides a Change Management Plan to manage such changes. Overall responsibility for the preparation of change management statements will be with Proponent's site representative.

Restoration: The proponent along with the construction contractor will be responsible for the final restoration of work areas.

SUGGESTED ORGANOGRAM FOR ENVIRONMENTAL MANAGEMENT



7.5 Maintenance of the EMP

EMP needs to be revised on timely basis to keep up-to-date as per the requirements comes up regularly. Therefore, outlining the responsibilities and activities associated with the maintenance of the EMP is essential. The responsibilities of the Construction Contractor should be detailed and procedures for requesting EMP revisions should also be outlined. EMP revision procedures must include requirements for notification of the appropriate government and municipal agencies so that their role is also played in the overall management process.

7.6 Environmental Health and Safety Management System

Environmental, Health and Safety Management System is essential for the care of EHS issues which should outline mitigation measures and best management practices. This management system recommends carrying out a complete assessment, evaluating, monitoring, identifying and control all potential hazards and risks arise during the construction and operation phases of the proposed project. It needs to ensure that the Health and Safety Plan (HSP) along with the Health and Safety Rules is established and enforced. The Plan should outline roles,

responsibilities and expected outcomes with respect to the environmental health and safety management of the construction & operation phase of the Project. These measures should be implemented to ensure that no significant adverse environmental, health and safety impacts are created by activities associated with the construction of the project.

Protection of the public and workforce health and safety during both construction and operations is the prime responsibility of proponent. Utilizing expert personnel and the Environment, Health and Safety Management System (EHSMS), the potential health and safety hazards and risks will be identified and assessed, then the subject of substantial planning, organization, procedures for various facility are developed.

7.6.1 Health and Safety during Construction Phase

Worker Health & Safety Management Plan will also be outlined to implement mitigation measures and best management practices. The plan should be implemented to ensure that no significant adverse worker's health and safety issues arise from activities associated with the construction of the project.

Potential hazards for workers in construction include:

- Falls (from heights);
- Trench collapse;
- Scaffold collapse;
- Electric shock and arc flash/arc blast;
- Failure to use proper personal protective equipment; and
- Repetitive motion injuries.

7.6.2 Health and Safety during Operation Phase

Since the project is high-rise development, occupational health & safety issues need to be addressed and managed effectively to ensure safety of its occupants in particular and the neighborhood in general.

7.7 Emergency Response Plan

Emergency may be defined as a sudden event causing or has the potential to cause serious human injury and/or environmental degradation of large magnitude. The best "cure" for an emergency is, of course, "prevention". The probable emergency situation can be:

- Serious fire or explosion
- Major gas leakage.
- Major Spillage
- Natural calamity such as heavy rain, flooding, dust storm or earthquake, cyclone, etc.
- Bomb threat or any sabotage/terrorist activity
- Any other incident involving all or large part of the premises and its workers.

Emergency Response Management is provided by a small team of senior managers (the “Control Committee”) who in turn will direct all response activities through the Emergency Response Unit.

7.7.1 Objectives

The main objective of this plan is to establish the general guidelines for the actions to be taken in the event of fires, explosion, emergencies, accidents, disasters and sabotage, aimed at minimizing their effects and consequences, in order to protect:

- The lives of own or third-party personnel present in the project facilities.
- The lives of the occupants of the Project
- The lives of the nearby residents & communities coming into the direct influence of the project area.
- The lives of the ecological systems located in the surroundings of the Project.

7.7.2 Emergency Response Manuals

Based on the Risk Assessment the proponent should prepare written emergency preparedness and response plans/procedures for the project facilities to cover emergency situations that could occur. It may be required that Emergency Response Manuals will be developed for various situations arising.

7.8 Environmental Compliance Reporting, Documentation and Trainings

The management will be responsible for the regular audit and review of the environmental management and monitoring plan. This will include both on-site auditing and review of performance reports. Additional onsite inspections and investigations will be undertaken in the event of significant environmental incidents. These will be undertaken in conjunction with the IMC. The management will participate in the audits and inspections and investigations. The management will also be responsible for regular review of the environmental performance of the site and site personnel, and for the reporting on the implementation of commitments made in the EMP.

In particular, there will be:

- Periodic audit reports.
- A review and improvement of the EMP.

Management recognizes that periodic external compliance audits and inspections will be made through a third-party consultant (IMC) to monitor, assess and validate the level of performance and compliance pursuant to the commitments made in the accepted Environmental Management Plan. The monitoring reports shall also be submitted to Sindh Environmental Protection Agency (SEPA) on regular intervals.

Training: It is an important step for the implementation of the EMP. All the employees will require to be trained to work appropriately on EMP. EHS Manager will organize trainings in consultation with HSE Officer. It will make sure that employees understand the Environment, Health and Safety issues. Trainings should be arranged on a regular basis with notification that it should be attended by all respective employees.

HSE Officer will determine the training requirements during both phases. Induction will be the basis of all training courses for contractor & subcontractor during construction phase.

Trainings identified in EMP are given below:

- Site induction course
- Training for emergency response and preparedness
- Training for familiarization with site environmental controls

7.9 Mitigation Management Matrix

The Mitigation Management Matrix will be used as a management & monitoring tool for implementation of the mitigation measures required by the EIA. Mitigation management matrix for construction and operation is provided in the table 6.1. The matrix lists down the following:

- The mitigation measure 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.

It is highlighted that although responsibilities for executing and monitoring mitigation measures have been delegated to different persons, the proponent will hold the primary and overall responsibility for ensuring full implementation of the EMP.

7.10 Environmental Monitoring Programme

The objective of the environmental monitoring during the construction & operation phase will be as follows:

- To check compliance of the contractors with the EMP by monitoring activities of the project on a daily basis. This will be called compliance monitoring.
- To monitor impacts of the operation in which there has been a level of uncertainty in prediction such as impacts of noise, water abstraction etc. and to recommend mitigation measures if the impacts are assessed to be in excess of or different from those assessed in the EIA. The aim will be attained through effects monitoring.
- To achieve these objectives, the following monitoring programme will be implemented.

7.10.1 Compliance Monitoring

Compliance monitoring will be carried out to ensure compliance with the requirements of the EIA and to document and report all non-compliances. The mitigation management matrix provided in the EMP will be used as a management and monitoring tool. The contractor's HSE Officer will be responsible for monitoring the compliance of their organization with the relevant EMP requirements. Proponent's site representative will monitor the contractor's compliance and will also ensure that during construction each activity system and plan is in place for effective compliance monitoring. The site representative will make regular checks on the contractor's works; keep records of all non-compliances observed during the execution of the project activities; & the details of all remedial actions taken to mitigate the project impacts.

7.10.2 Effects Monitoring

The effects monitoring requirements have been detailed in Table 7.2. An independent monitoring consultant (IMC) will be responsible to carry out the required effects monitoring during the construction and operation phase.

7.10.3 Environmental Reporting

A. Final Monitoring Report (Construction Phase)

After completion of construction phase, a final monitoring report will be prepared by Proponent's site representative. The report will include the following:

- Introduction.
- Details of the Project Activities.
- Natural Resource used during the Project.
- List of Non-compliances recorded.
- Effects of the Project on Communities and Physical Resources.
- Photographic Records
- Approvals provided during the project
- Change managements statements
- Trainings
- Conclusions

B. Annual Environmental Monitoring Reports (Operation Phase)

The project proponent shall prepare annual environmental monitoring reports describing the conduct of the operation phase for project along with details of the effects monitoring conducted annually during the operation phase of the project. The report shall be submitted to the SEPA.

7.11 Change Management Plan

The EIA for the proposed project recognizes that changes in the operation or the EMP may be required during the construction and operation and therefore provides a Change

Management Plan to manage such changes. The management of changes is discussed under two separate headings, Additions to the EMP and Changes to the Operation and the EMP.

7.11.1 Changes to the EMP

The EIA and the EMP have been developed based on the best possible information available at the time of the EIA study. However, it is possible that during the conduct of the proposed operation additional mitigation measures based on the findings of environmental monitoring during the operation may have to be included in the EMP. In such cases following actions will be taken:

- A meeting will be held between the proponent and the concerned project contractors. During the meeting, the proposed addition to the EMP will be discussed and agreed upon by all parties.
- Based on the discussion during the meeting, a change report will be produced collectively, which will include the additional EMP clause and the reasons for the addition.
- The report will be signed by all parties and will be filled at the site office: A copy of the report will be sent to the proponent and contractor head offices.
- All relevant project personnel will be informed of the addition.

7.11.2 Changes to the Operation

The change management system recognizes three orders of changes:

A. First Order:

A first order change is one that leads to a significant departure from the project described or the impacts assessed in the EIA and consequently require a reassessment of the environmental impacts associated with the change. Example of first order change includes change in location of proposed project. Action required in this case will be that the environmental impacts of the proposed change will be reassessed by the proponent and sent to the SEPA for approval.

B. Second Order

A second order change is one that does not result in the change in project description or impacts that are significantly different from those detailed in the EIA. Example of second order changes includes extension in the site area. Action required for such changes will be that the proponent will reassess the impact of the activity on the environment & specify additional mitigation measures if required and report the changes to SEPA.

C. Third Order

A third order change is one that does not result in impacts above those already assessed in the EIA, rather these may be made site to minimize the impact of an activity such as:

- Increase in project workforce;
- Change in layout plan.

The only action required for such changes will be to record the change in the Change Record Register.

7.12 Training Programme

Environmental training will form part of the environmental management system. The training will be directed towards all personnel for general environmental awareness.

7.12.1 Objectives

The key objective of training program is to ensure that the requirements of the EMP are clearly understood and followed throughout the project. The trainings to the staff will help in communicating environmental related restrictions specified in the EIA and EMP.

7.12.2 Roles and Responsibilities

The contractors will be primarily responsible for providing environmental training to all project personnel on potential environmental issues of the project. The contractors will be responsible to arrange trainings and ensure the presence of targeted staff.

7.12.3 Training Programme

The environmental awareness, EIA and EMP training will be carried out during the project activities.

A. Training log

A training log will be maintained by the contractors. The training log will include:

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

B. Training Needs Assessment

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

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

C. Training Material

The contractors will develop & prepare training material regarding environmental awareness, sensitivity of the area, EIA, EMP and restrictions to be followed during the project. Separate training material will be prepared for each targeted staff.

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
1	Land Use and Soils			
1.1	The construction activities will be planned to minimize disturbance to soil	Proponent, CC	Monitoring compliance	During construction phase
1.2	To the extent possible, equipment and materials would be staged in areas that have already been disturbed	Proponent, CC	Monitoring compliance	During construction phase
1.3	Movement of construction equipment will be restricted to work areas only to avoid unnecessary disturbance to soil	CC	Monitoring compliance	During construction phase
1.4	Routes of water tankers, dumper trucks and other project vehicles will be monitored for any signs of soil disturbance & road damage	CC	Monitoring compliance	During construction phase
1.5	Area showing signs of unstabilised soil conditions will be compacted and watered	Proponent, CC	Monitoring compliance	During construction phase
1.6	The assessment of settlement within affected zone due to dewatering will be conducted prior to dewatering	CC	Monitoring compliance	During construction phase
1.7	The affected zone of settlement, if identified will be monitored regularly during dewatering activity	Proponent, CC	Monitoring compliance	During construction phase
1.8	Proper drainage will be provided to construction camp, construction site, especially near excavations and around proposed facility	CC	Monitoring compliance	During construction phase
1.9	Vehicle speed will be regulated and monitored to avoid excessive dust emissions	CC	Monitoring compliance	During construction phase
1.10	Total land uptake by the project and associated facilities will be kept to the minimum	Proponent, CC	Monitoring compliance	During construction phase



Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
1.11	Periodic trainings will be provided to drivers on mitigation measures related to off-road travel and speed limits	Proponent, CC	Check training records	During construction phase
1.12	The Project will have a storm water collection system so that the storm water effluent has minimal sediment load	Proponent, CC	Monitoring compliance	During design and construction phase
2	Air Quality			
2.1	Dust Emissions			
2.1.1	Water will be sprinkled daily or when there is an obvious dust problem on all exposed surfaces to suppress emission of dust. Frequency of Sprinklings will be kept such that the dust remains under control, particularly when wind is blowing towards the receptors	CC	Monitoring compliance	During construction phase
2.1.2	Dust emissions from soil piles and aggregate storage stockpiles will be reduced by appropriate measures. These may include: → Keeping the material moist by sprinkling of water at appropriate frequency → Erecting windshield walls on three sides of the piles such that the wall project 0.5m above the pile, or → Covering the pile, for example with tarpaulin or thick plastic sheets, to prevent emissions. → Locating stock piles out of the wind direction	CC	Monitoring compliance	During construction phase
2.1.3	All roads within the proposed Project will be paved as early as possible after the commencement of construction work. Until the roads are paved, they will be sprinkled regularly to prevent dust emission. Other temporary tracks within the site boundary	Proponent, CC	Monitoring compliance	During construction phase



Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
	will be compacted and sprinkled with water during the construction works.			
2.1.4	Project traffic will maintain a maximum speed limit of 20km/hr on all unpaved roads within the proposed site area.	Proponent, CC	Check speed of vehicles	During construction phase
2.1.5	Construction materials that are susceptible to dust formation will be transported only in securely covered trucks to prevent dust emission during transportation.	CC	Monitoring compliance	During construction phase
2.1.6	The exposure of construction workers to dust will be minimized by provision of dust masks.	CC	Check for dust masks	During construction phase
2.2	Vehicle Equipment and Exhaust.			
2.2.1	All vehicles, generators and other equipment used during the construction will be properly tuned and maintained in good working condition in order to minimize emission of pollutants.	Proponent, CC	Maintenance records of vehicles and equipment	During construction phase
2.2.2	The stack height of the generators during operation phase will be vented through vertical stacks to minimize exposure at ground level	CC	Monitor compliance	During construction phase
2.3	Generator Emissions			
2.3.1	The option of using natural gas as fuel in the back-up generators should be explored.	Proponent, Generator Vendor	Monitor compliance	During design phase
2.3.2	The generator will be properly tuned and maintained in good working condition in order to minimize exhaust emissions	Proponent	Check maintenance records	During operation phase
2.3.3	The diesel generator should be used for a very short duration with the power switched back to the main power supply as quickly as possible.	Proponent	Monitoring compliance	During operation phase



Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
2.3.4	NOx emission reduction techniques should be employed on a regular basis	Proponent	Monitor NOx emissions	During operation phase
3	Construction Noise			
3.1	Reduce equipment noise at source by proper design, maintenance and repair of construction machinery and equipment	Proponent, CC	Check maintenance records	During construction phase
3.2	Minimize noise from vehicles and power generators by use of proper silencers and mufflers.	Proponent, CC	Monitor compliance	During construction phase
3.3	Use noise-abating devices wherever needed and practicable.	Proponent, CC	Monitor compliance	During construction phase
4	Water Sourcing			
4.1	A complete record of water consumption during construction and operation phase will be maintained	Proponent, CC	Check water consumption records	During construction and operation phase
4.2	If a new water well is to be installed, it will be designed to abstract water preferably from deep aquifer not being used by local communities	Proponent, CC	Monitor compliance	During construction phase
4.3	Water conservation program will be initiated to prevent wastage of water.	Proponent, CC	Monitor compliance	During construction and operation phase
4.4	The water supply lines will be checked and repaired for leaks in order to reduce wastage of water.	Proponent, Maintenance Contractor	Check maintenance records	During operation phase
4.5	Recycle grey water for use for toilet flushing	Proponent	Monitor compliance	During operation phase



Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
4.6	Ensure that water efficient sanitary fittings are used throughout the development e.g., low flush toilets, water efficient shower heads, and aerators on faucets	Proponent, CC	Monitor compliance	During construction and operation phase
5	Soil Contamination			
5.1	Fuels, lubricants, and chemical will be stored in covered bounded areas, underlain with impervious lining	Proponent, CC	Monitor compliance	During construction phase
5.2	Maintenance of vehicles and equipment will only be carried out designated areas. The area will be provided with hard surface or tarpaulin will be spread on the ground to prevent contamination of soil	Proponent, CC	Monitor compliance	During construction phase
5.3	Vehicles will only be washed at designated areas.	CC	Vehicle Inspection record	During construction phase
5.4	Regular inspections will be carried out to detect leakage in construction vehicles and equipment	Proponent, CC	Check inspection / maintenance records	During construction phase
5.5	Appropriate arrangements, including shovels, plastic bags and absorbent materials, will be available near fuel and oil storage areas	CC	Monitor compliance	During construction phase
5.6	Contaminated soil will be removed and properly disposed after treatment such as incineration etc.	Proponent, CC	Monitor compliance	During construction phase
6	Traffic			
6.1	Heavy traffic during construction phase will come to the project site during late night hours.	Proponent, CC	Traffic record	During construction phase



Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
6.2	Project vehicles shall not be fitted with pressure horns	CC	Monitor compliance	During construction phase
6.3	During construction, regulate speed of vehicles	Proponent, CC	Monitor compliance	During construction phase
6.4	Designated parking areas will be provided for different type of project vehicles within and around the project site	Proponent, CC	Monitor compliance	During construction phase
6.5	Manage vehicle movement to avoid traffic jam and long queues	Proponent, CC	Monitor compliance	During construction and operation phase
6.6	Prepare, implement and monitor the traffic management plan	Proponent	Monitor compliance	During construction and operation phase
6.7	Vehicles to use designated parking areas during operational phase.	Proponent	Monitor compliance	During operation phase
6.8	Parking of vehicles alongside the road should be prohibited at all time.	Proponent	Monitor compliance	During construction and operation phase
7	Wastewater Generation			
7.1	Wastewater Generation During Construction			
7.1.1	Wastewater generated at the campsites will be stored temporarily in septic systems comprising of septic tanks from where it will be routed to a nearest drain/sewerage system.	Proponent, CC	Monitor compliance	During construction phase
7.1.2	At the time of restoration, septic tanks will be dismantled in place and backfilled with at least 1m of soil cover above the surrounding natural surface level	CC	Monitor compliance	After the completion of construction phase



Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
7.2	Wastewater Generation During Operation			
7.2.1	The grey water will be recycled to be re-used again in toilets and kitchens etc.	Proponent	Monitor compliance	During operation phase
7.2.2	Black water will be temporary stored in septic tanks and will be discharged into a nearby out fall sewer via trunk sewer	Proponent, CC	Monitor compliance	During design, construction & operation phase
7.2.3	Waste segregation measures would be employed to minimize entry of solid waste into the wastewater stream	Proponent	Monitor compliance	During operation phase
7.2.4	Water conservation strategies will be employed to avoid wastage of water	Proponent	Monitor compliance	During operation phase
8	Solid Waste Generation and Management			
8.1	Solid Waste Generation and Management During Construction			
8.1.1	Separate bins will be placed for different types of wastes- plastics, paper, metal, glass, wood, and cotton.	Proponent, CC	Monitor compliance	During construction phase
8.1.2	Recyclable material will be separated at source. The recyclable waste will be sold to waste contractors for recycling	Proponent, CC	Monitor compliance	During construction phase
8.1.3	Non-hazardous non-recyclable wastes such as construction camp kitchen wastes will be disposed off in landfill site through municipal administration or approved waste contractor.	Proponent, CC	Monitor compliance	During construction phase
8.1.4	No waste will be dumped at any location outside the proposed site boundary.	Proponent, CC	Monitor compliance	During construction phase



Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
8.1.5	All hazardous waste will be separated from other wastes. Hazardous wastes will be stored in designated areas with restricted access and proper marking. Hazardous wastes will be disposed off through approved waste contractors.	Proponent, CC	Check hazardous waste disposal records	During construction phase
8.1.6	Surplus construction materials including partially filled chemical and paint containers will be returned to suppliers. Inert construction wastes will be disposed of onsite as fill material or sold as scrap to contractors.	Proponent, CC	Check waste records	During construction phase
8.1.7	Records of all waste generated during the construction period will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register	Proponent, CC	Check waste record register	During construction phase
8.1.8	Training will be provided to personnel for identification, segregation, and management of waste	Proponent, CC	Check training records	During construction phase
8.2	Solid Waste Generation and Management During Operation			
8.2.1	Waste generation will be minimized by adopting waste management strategy of reduce, reuse and recycle	Proponent	Monitor compliance	During operation phase
8.2.2	A waste management plan will be prepared, implemented and monitored for the safe collection, storage and treatment/disposal of the waste	Proponent	Monitor compliance	During operation phase
8.2.3	Records of all waste generated will be maintained. Quantities of waste disposed, recycled, or reused will be logged on a Waste Tracking Register	Proponent	Check waste tracking register	During operation phase
8.2.4	Training will be provided to personnel for identification, segregation, and management of waste	Proponent	Check training records	During operation phase



Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
8.2.5	All inert and non-hazardous construction wastes will be disposed to the existing tipping sites within or outside of the city limits	Proponent, Waste Contractor	Monitor compliance	During operation phase
8.2.6	Hazardous wastes will be disposed of through waste management contractors who will identify suitable disposal options for these wastes such as recycling, metal recovery, incineration or bioremediation etc.	Proponent, Waste Contractor	Monitor compliance	During operation phase
8.2.7	Various waste containers for waste collection should be placed at appropriate locations in the vicinity	Proponent	Monitor compliance	During operation phase
8.2.8	Waste storage areas should be located within the facility and sized to the quantities of waste generated, with the following design considerations: Hard, impermeable floor with drainage, and designed for cleaning/disinfection with available water supply, Secured by locks with restricted access designed for access and regular cleaning by authorized cleaning staff and vehicles Protected from sun, and inaccessible to animals/Rodents Equipped with appropriate lighting and ventilation Segregated from food supplies and preparation areas Equipped with supplies of protected clothing, and spare bags/containers	Proponent, CC	Monitor compliance	During operation phase
9	Seismicity			
9.1	No specific mitigation measures other than to construct the facility in accordance with UBC Zone 2B	Proponent, Structure Design Consultant, CC	Monitor compliance	During project design phase



Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
10	Sustainability			
10.1	Best practice of energy efficiency will be incorporated in the town development	Proponent, CC	Monitor compliance	During project design phase
10.2	Houses and other facilities to be constructed with high levels of thermal insulation	Proponent, CC	Monitor compliance	During project design phase
10.3	Ensure that HVAC system, refrigeration equipment and fire suppression equipment do not contain HCFC's or Halons	Proponent, CC	Monitor compliance	During project design phase
11	Socio-Economic Impacts			
11.1	Deliveries should be programmed to arrive and routed to minimize disturbance to residential areas, hospitals and offices.	Proponent, CC	Monitor compliance	During construction phase
11.2	Designated parking areas will be provided for different type of project vehicles within and around project site	Proponent, CC	Monitor compliance	During construction & operation phase
11.3	Areas earmarked for amenity and commercial infrastructure will not be used for other purposes after construction	Proponent	Monitor compliance	During construction & operation phase
11.4	Employment preference will be given to residents of the project area	Proponent, CC	Monitor compliance	During construction & operation phase
11.5	Local contractors will be given preference for hiring equipment and machinery during operation	Proponent, CC	Monitor compliance	During construction & operation phase
11.6	Ensure maximum quantity of water to be treated and reused in order to lessen its burden on the existing sewerage system.	Proponent	Monitor compliance	During design, construction & operation phase

Table 7.1: Environmental Management Plan (EMP)				
S.#	Impact and Mitigation Measures	Responsibilities	Monitoring	Timing
11.7	Locals, surrounding business and city government are kept on the same page during all stages of the development of the project.	Proponent	Monitor compliance	During construction phase
11.8	A complaint register will be maintained on site during construction to record complaints of the nearby residents.	Proponent	Provision of complaint register	During construction phase

Table 7.2: Environmental Monitoring Plan				
Ambient Air Quality Sampling Plan				
Parameters	Locations	Frequency	Duration	Standards
SOx, NOx, CO, O3, PM2.5, PM10 Lead, SPM	At the interface of project site and residential community	Monthly	Continuous for 8 hours* in a full working day	SEQS
Drinking Water Quality Sampling Plan				
Parameters	Locations	Frequency	Duration	Standards
Heavy metals, TDS, TSS, pH, Total Coliform, Fecal Coliform	Ground water source and other sources	Monthly	Grab sampling	SEQS for drinking water
Wastewater Quality Sampling Plan				
Parameters	Locations	Frequency	Duration	Standards
BOD, COD, DO, TSS, TDS, pH, NO ₃ , SO ₄ , Oil & Grease)	Camp site discharge points into drains	Monthly	Grab sampling	SEQS
Noise Level Sampling Plan				
Parameters	Locations	Frequency	Duration	Standards
Decibels [dB(A)Scale]	At the interface of project site & residential community	Monthly	Continuous for 8 hours in a full working day	WHO Noise Guidelines
	7 m from the equipment at construction site			
Solid Waste				
Parameters	Locations	Frequency	Duration	Standards



Table 7.2: Environmental Monitoring Plan				
Waste generation rate, waste composition; recyclables and non-recyclables, hazardous waste	At main solid waste collection point from where the waste is transported from site	Monthly	24-hour sample collected during week days	Best Practices



Table 7-3 EMP Implementation Cost		
Activity	Cost (Rupees PKR)	Remarks
Training Program	500, 000	refer section 7.11
Environmental Monitoring		
Ambient Air	$(40,000 * 12) = 480,000$	Cost for 1-year monitoring at 01 location @Rs.40,000/per location.
Drinking Water Quality	$(20,000 * 12) = 240,000$	Cost for 1-year monitoring at 1 sample @Rs.20,000 for all primary parameters
Wastewater	$(50,000 * 12) = 600,000$	Cost for 1-year monitoring at 1 location @Rs.50,000/location
Noise Levels	$(1,000 * 4 * 12) = 48,000$	Cost for 1-year monitoring at 04 locations @Rs.1,000/location
Solid Waste	10,000	Estimated cost for 1 year
Gaseous Emissions	$(1,500 * 1 * 6 * 4) = 36,000$	Cost for 1-year monitoring at 1 location for 06 parameters @Rs.1,500/parameter
Mitigation Measures	500,000	Initial estimates
Reporting	1,000,000	Initial estimates
Contingencies (5% of EMP cost)	500,000	-
Grand Total	<u>3,414,000</u>	-
Grand Total (in words)	Three Million Four Hundred Fourteen Thousand	-

Chapter 8 Conclusion

In this Chapter all the initial environmental impacts of project area have been concluded, that the city has overgrown its sustainability limits, it is imperative that the Builders and Developers take cognizance of the cumulative effect of the current pace of rapid development. Consequently, each project is required to keep the sustainability principles in view and go an extra mile beyond the present approach which is confined to bare survival. Their projects have so far been profited oriented, now they will have to share the profit with net zero energy and net zero discharge approach in the project design.

Based on the findings of the environmental impact assessment it is concluded that the environmental impacts of the construction and operation of **Noor Green Valley** is builder manageable and can be mitigated by implementing the Environmental Management and Monitoring Plan which forms an integral part of EIA document. The screening process has through review of literature, primary as well as secondary baseline data, and expert judgment, made assessment of the potential impacts of said activities on the physical, biological, and socioeconomic environment of the Project. Mitigation measures have been proposed to reduce, minimize or compensate for the identified potential negative impacts and their adoption has been recommended. The proposed project is a planned to be a self-contained housing having its own back-up power generation, water supply supplemented by filtration plant and sewage treatment and disposal system in addition to commitment for the provision of required parking space. This being a positive impact would be an indicator of achievement of the objectives of the Project.

The study therefore recommends that the Environmental Impact Assessment (EIA) report should be approved with the provision that the suggested mitigation measures will be adopted and the Environmental Management Plan will be followed in letter and spirit.

ANNEXURES

Annex – 1

Approvals



SINDH BUILDING CONTROL AUTHORITY

Karachi dated the 06th August, 2020

NOTIFICATION

No.SBCA/PS-CE/2020/ 105: In exercise of powers conferred under section 21-A, Sub Section 2(b) of 1979 in order to facilitate general public under the Ease of Doing Business Reforms to grant construction permits on faster track through One Window Cell SBCA, the office order vide No.SBCA/Secy to DG/2018/79, dated: 24.04.2018 is withdrawn and henceforth NOCs from Utility Agencies will not be required at the time of issuance of Construction Permit for Category II, III & IV buildings, hence construction permits shall be issued with the condition that availability of Utility Services will be ensured before completion of the project.

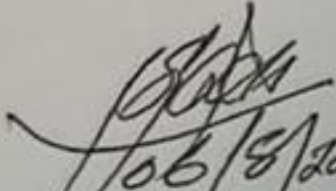
However, Clause 5-2.28 of Karachi Building & Town Planning Regulations-2002 shall remain applicable for open plots housing schemes and Developer shall furnish NOCs of Utility Agencies at the time of applying for Sale & advertisement NOC.


DIRECTOR GENERAL/
CHIEF EXECUTIVE
S.B.C.A

ALL DIRECTORS

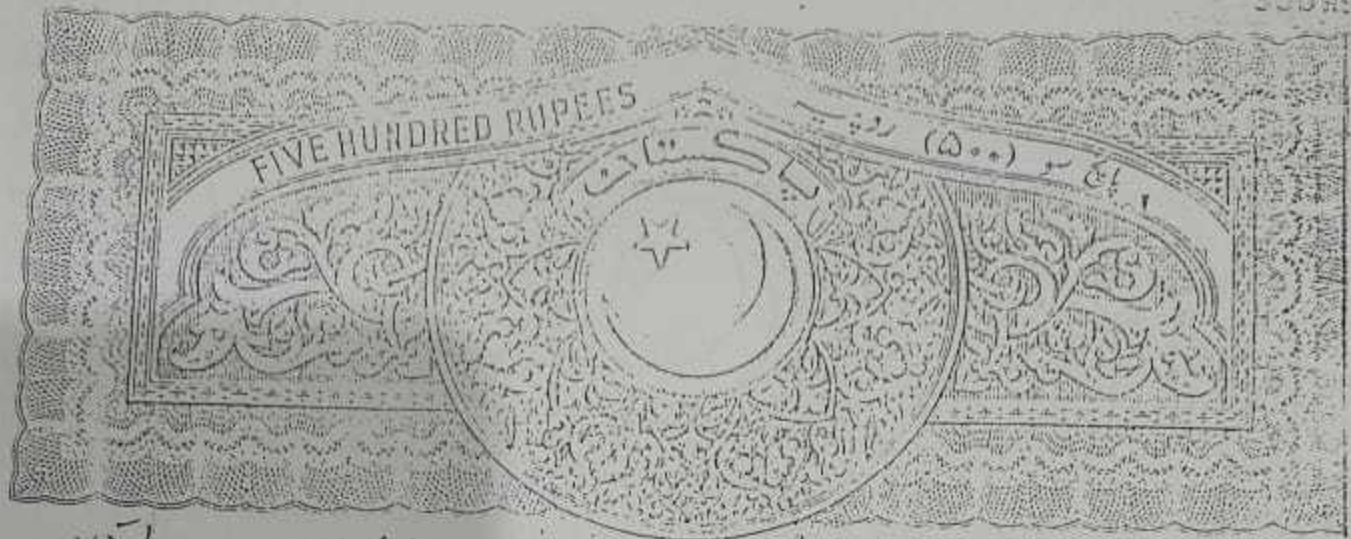
Copy to:

- Executive Director (Legal) & PLO, SBCA.
- Director Administration, SBCA.
- P.S. to Secretary Local Government Department, GOS.
- Office order file.


106/8/2020.
Dy. Director (Admn-P-I)
S.B.C.A.

Annex – 2

Land Documents



51 02/06/2011
 Magister Mr. 870 Haji. Sahib Nungy M. 870
 02/06/2011

سروی نمبر	ایراضی سارو	حصو	حصی موجب ایراضی
649	(4-16) ایکڑ	سارو	(4-16) ایکڑ
652	(3-19) ایکڑ	مان	(2-19) ایکڑ
663	(2-16) ایکڑ	مان	(0-22) گینٹم
667	(3-10) ایکڑ	سارو	(3-10) ایکڑ
650/1	(1-10) ایکڑ	سارو	(1-10) ایکڑ
669	(3-11) ایکڑ	سارو	(3-11) ایکڑ
670	(3-37) ایکڑ	سارو	(3-37) ایکڑ
672	(3-34) ایکڑ	سارو	(3-34) ایکڑ
674	(3-02) ایکڑ	مان	(0-23) گینٹم

ٹوٹل سترھن سروی نمبر ایراضی (42-03) ایکڑ اکرن پائیتالیہ ایکڑ تی گینٹم

فقط وکری ہیٹ واقع دیہہ دیرا تپو بقاپور تعلقو باقراٹی ضلعو لاڑکانو سب

دستریکت رجسٹریشن دستریکت لاڑکانی مہ پٹن انداز 8,00,000/- روپیہ

اکرن اٹ لک روپیہ فقط مہ

Ha Kimi

Signature

B

مہاراجہ

Annex – 3

Project Layout Plan

NOOR GREEN VALLEY



PROPOSED PLAN OF
NOOR GREEN VALLEY
DEH: DADRA TAPO: BAQAPUR
AIRPORT ROAD LARKANA

- OWNER
- MR: NOOR AHMED S/O
SHAHNAWAZ KHAN ABBASI
 - MR: SUHAIL AHMED S/O
SHAHNAWAZ KHAN ABBASI
 - MR: MUZAFAR ALI S/O
SHAHNAWAZ KHAN ABBASI

LAYOUT PLAN 45 ACRE - 25 GHUNTA

Annex – 4

Court Order

Complaint No.20/2018 (SEPA V/s. M/s Noor Green Valley Housing Scheme & another).
19.07.2022

Case called. Ms. Ifat Rana, APG for the State and Mr. Altaf Ali, authorized officer of complainant, Mr. Ahmed Mujtaba, counsel for respondent No.2 and D.D Law, SEPA are present. Counsel for respondent No.2 files NOC/approval of IEE report. It appears that the land involved in the project is 45 acres and 25 ghuntas which required EIA approval under the provisions of SEPA (Review of IEE/EIA) Regulations, 2014 as such law was applicable in the year 2018 when this complaint was filed, however such regulations were substituted by regulations framed in 2021 which are not applicable to this case, registered prior to the promulgation of regulations 2021. Learned counsel for respondent agrees to this legal position and states that they will make due compliance of law and shall produce EIA approval. For this purpose, they need sufficient time. Adjourned to 01.09.2022 for submission of compliance report/approval duly signed by the D.G SEPA.

Sd-
MEMBER (TECHNICAL)

Sd-
MEMBER (LEGAL)

Sd-
CHAIRMAN

Date of Application 01/11/2022
Date of Assessment 5/11/2022
Date of Deposit Cost 5/11/2022
Copy Ready to 5/11/2022
Copy Submitted 5/11/2022
Copy Accepted Re. So
Urgent Fees Charges Re. Normal
Compliance Charges Re. ---
Proposed by ---
Compared by ---
Paper Charges ---

to be True Copy



Sd-
01/12/2022
ASSISTANT REGISTRAR
Sindh Environmental Protection Tribunal
Karachi