

ENVIRONMENTAL IMPACT ASSESMENT (EIA)



RIVER GARDEN HOUSING SCHEME PHASE IV

**SITUATED AT MOUZA SAMMA DHEREKEY &
GURALA, TEHSIL & DISTRICT GUJRAT.**

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Glossary

Environmental Management System (EMS):

A set of management processes and procedures that allows an organization to analyze and reduce the environmental impact of its activities. Environmental Monitoring Systematic, geo-referenced observations of the environment essential to detecting changes in ecosystems over time. Environmental Protection Plan (EPP) is a practical tool that describes the actions required to minimize environmental effects before, during and after project implementation. The plan may include details about the implementation of the mitigation measures identified in the environmental assessment, such as who is responsible for implementation, where the measures are intended to be implemented, and within what timeframe.

Habitat:

Land and water used by wildlife. This may include biotic and abiotic aspects such as vegetation, exposed bedrock, water, and topography.

Impact:

Any aspect of a project that may cause an effect; for example, land clearing during construction is an impact, while a possible effect is loss and fragmentation of wildlife habitat.

Indirect Affect:

An effect in which the cause-effect relationship (e.g., between the project's impacts and the ultimate effect on a Valued Ecosystem Component) has intermediary effects. As an interaction with another effect is required to have a cumulative effect (hence, creating intermediary effects), cumulative effects may be considered as indirect. Industry Relations Corporation (IRC) The Corporation or organization that a First Nation has created to manage the First Nation's relations, including Consultation with Alberta, Canada and Industry.

Mitigation:

The elimination, reduction or control of the adverse environmental effects of the project. Mitigation includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.

Non-Renewable Resource:

Natural resources that are in fixed supply such as coal, oil and minerals.

Project:

The activity or group of activities proposed by the Proponent. The types of activities that could be subject to Alberta's environmental assessment process are listed in the Schedule of Activities in the Environmental Protection and Enhancement Act and in the Water Act. The Project includes all associated construction, operation, decommissioning and reclamation activities and all phases of development described by the Proponent. Project Area Project Footprint/Study Area The area includes all lands subject to direct disturbance from the project and associated infrastructure. Project Components The different physical entities and activities that together make up the Project.

Residual Effect:

An effect that remains after mitigation has been applied

Scoping:

An activity that focuses the assessment on relevant issues and concerns and establishes the boundaries of the environmental assessment. A consultative process for identifying and possibly reducing the number of items (e.g., issues, VECs) to be examined until only the most important items remain for detailed assessment. Scoping ensures that assessment effort will not be expended in the examination of trivial effects.

Significance:

A measure of the magnitude, duration, frequency, timing, probability of occurrence, ecological and social context, geographic extent, and degree of reversibility of an effect on a Valued Ecosystem Component

Emission:

One or more substances released to the water, air or soil in the natural environment.

Environment:

Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelations. This definition extends the view from a company focus to the global system.

LIST OF ABBREVIATIONS

EMMP	Environment Management and Monitoring Plan
EPA	Environment Protection Agency
EPD	Environmental Protection Department
EIA	Environmental Impact Assessment
IEE	Initial Environment Examination
NEQS	National Environmental Quality Standards
NGO	Non-Government Organizations
NOC	No Objection Certificate
HSE	Health, Safety and Environment
PEPA	Pakistan Environment Protection Act
PEPC	Pakistan Environmental Protection Council
PMD	Pakistan Meteorological Department
RO	Reverse Osmosis
TDS	Total Dissolve Solids
TOR	Terms of Reference
WASA	Water and Sanitation Agency

EXECUTIVE SUMMARY

1. Title and Location of the Project

The Proposed project is the M/S River Garden Housing Scheme Phase IV Situated at Mouza Samma, Dhereky, Khatala & Goral, Tehsil & District Gujrat.

2. Name of the Proponent

Mr. Choudhary Ijaz Ahmed S/o Choudhary Nazar Muhammad R/O River Garden G.T road Gujrat.

3. Name of the Organization Preparing the Report

Greentech Environment Consultants
Office # 10, 4th Floor, Tele Tower Plaza, Link Road, Model Town, Lahore
Phone: +923057726621
E-mail: Consultants.greentech@gmail.com

4. A Brief Outline of the Proposal

The proposed project is the establishment of M/S River Garden Housing Scheme Phase IV of 772 Kanals, 12 Marlas, 192 SFT which will comprise of residential plots, Park Area, public buildings, Solid Waste Plot and Wastewater Treatment Plot. It is located at Mouza Samma, Dhereky, Khatala & Goral, Tehsil & District Gujrat. The current land use at site is agricultural cum residential and it is surrounded by various housing schemes. The site is well connected to the other parts of the city through a metalled road and the major road linked to the site is G.T Road. The detail distribution of the project area is given below.

Land Distribution of M/S River Garden Housing Scheme Phase IV

The proponent of the M/S River Garden Housing Scheme Phase IV engaged M/S Greentech Environmental Consultants to carry out the environmental and social impact assessment for the development of aforesaid project in accordance with Punjab-EPA guidelines. The salient features of the proposed project are given below:

Salient Features of Project

Sr#	Salient Features	
1	Project Title	Establishment of the M/S River Garden Housing Scheme Phase IV,
2	Project Location	Mouza Samma, Dhereky, Khatala & Goral, Tehsil & District Gujrat
3	Proponent	Mr. Chaudhary Ijaz Ahmed S/o Choudhary Nazar Muhammad R/O River Garden G.T road Gujrat.
4	Consultant	Greentech Environmental Consultants
5	Total Area	772 Kanals, 12 Marlas, 192 SFT
6	Cost of Project	PKR 100 million
7	Tree Planation	At 7% designated area
8	Water Source	Ground Water
9	Status of Project	Open Land
10	Nature of Area	Agricultural cum Residential
11	Source of Power	WAPDA
WAPDA= Water and Power Development Authority		

5. The Major Impacts

Environmental impacts have been identified and mitigation measures are recommended within the project area of influence. The major impacts on physical, biological and social environments are described as under:

Impacts Summary

Environmental Parameters	Impact Assessment	
	During Construction	After Construction
1. Location	+2p	+3p
2. Design	+1p	+2p
A: Physical		
<i>Land Resources</i>		
1. Solid Waste	-1t	-2p
2. Land Use	-1p	-1p
<i>Air Resources</i>		
1. Air Emission	-1p	-1p
2. Noise	-1t	-1t
<i>Water Resources and Wastewater Management</i>		
1. Water Resource	-1p	-2p
2. Wastewater Management	-1p	-1p
B : Ecological		
<i>Flora</i>		
1. Vegetation	0	+2p
<i>Fauna</i>		
2. Wildlife	NA	NA
C: Socio-Economic		
1. Transportation	0	+2p
2. Employment	+1p	+1p
3. Aesthetic	-1t	2p
4. Energy Consumption	NA	-1t
 Legends: 1= Low; 2= Medium; 3= High; 4= Extremely High; NA= Not Applicable; t= Temporary; p= Permanent; app= Applicable; 0= Negligible  All adverse environmental impacts except natural calamities are manageable easily by implementing EMMP		

6. Recommendations for mitigation measures

To manage the environmental and social impacts of the project, significant negative impacts and their mitigations have been covered in this section. For the ease to understand and identify the impacts and to implement their mitigations, a mitigation plan has been developed as a ready reference for the Proponent and Contractor to

minimize the negative impacts or to manage activities in such a manner to avoid any adverse negative impact.

Mitigations for physical, biological and socio-economic parameters will be measured to determine compliance with standards established in EMP. The Monitoring Plan will record the inputs provided by various participants in the environmental and social management process. The air quality is determined once before the commencement of the development and once after the end of the development. During the operational phase solid waste management practices and wastewater disposal practices will be monitored by the concerned authority on the regular basis. Moreover, fire-fighting equipment installed in the public and private buildings will be maintained and monitored on the regular basis.

The total estimated cost for the implementation of EMMP in proposed project area is approximately 2% of the total cost of the project.

7. Proposed Monitoring

A comprehensive Environmental Management and Monitoring Plan (EMMP) have been prepared to effectively manage and monitor the environmental and social impacts for the development of the housing scheme. However, in the interest of commercial viability of the society, all necessary measures to keep the houses and its surroundings environment neat and clean will be adopted. Further recommendations are as following;

- The adverse environmental impacts can be reduced significantly by adopting best management and monitoring practices as well as by implementation EMMP effectively.
- It is recommended to construct the green building instead of conventional building, having green-roofs, insulation as well as maximum utilization of the sunlight. Green-roofs will not only attract the customers but will serve as an insulator. In addition, the life of the green-roofs is longer than conventional roofs.

It is recommended that the Proponent should obtain an Environmental Approval (NOC) from the Punjab-EPA before proceeding further into the construction activities.

CHAPTER 1: INTRODUCTION

1.1 PURPOSE OF REPORT

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

The development of a housing scheme is a commercial venture. Availability of a land at the best convenient place and at economical price is the main consideration for the site selection. Availability of access roads, communal facilities, communication facilities, electricity, gas, basic infra-structure, sewerage lines and water supply pipe-lines is the basic requirement of the development of the housing scheme which will be provided to the residents of the M/S River Garden Housing Scheme Phase IV. As these all facilities are available in the vicinity of the project area.

Section 12 of Pakistan Environmental Protection Act, 1997 (PEPA, 1997) states “No proponent of a project shall commence construction or operation unless he has filed with the Federal Agency an Environmental Impact Examination (EIA) or where the project is likely to cause an adverse environmental effect, an Environmental Impact Assessment (EIA), and has obtained approval from the Federal Agency in respect thereof.” Later on, Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000 provided the guidelines for categorizing the Projects. The aforesaid project i.e., “River Garden Housing Scheme Phase IV” falls under Schedule II i.e. Project requiring EIA, Category H-1 (Housing Scheme more than 300 Kanals).

The proposed project is the development of the M/S River Garden Housing Scheme Phase IV in Gujrat comprised of residential plots, Parks and commercial plots. The anticipated project will comply with regulation of Pak-EPA 1997, Punjab Environmental Protection (Amendment) Act 2022 and Punjab Development of Cities Act 1976. The land of the project area is owned by the Client. The land ownership documents are attached at **Annex-II** followed by Term of Reference (TOR) which are attached at **Annex-III** of this EIA Report.

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

This report is prepared by critical examine of the environmental factors which might be affected due to construction and operation of the project. The purpose of this report is to analyze impacts of the project. This EIA provides the basis for a determination of the degree of the environmental impacts of the project.

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

The main objectives of this EIA study were:

- To determine and document the state of the environment of the project area to establish a baseline in order to assess the suitability of the Project in that area.
- To identify pre-construction, construction and operation activities and to assess their impacts on environment.

- Provide assistance to the proponent for planning, designing and implementing the project in a way that would eliminate or minimize the negative impact on the biophysical and socio-economic environment and maximizing the benefits to all parties in cost effective manner.
- To present Mitigation and Monitoring Plan to smoothly implement the suggested mitigation measures and supervise their efficiency and effectiveness.
- To provide opportunity to the public for understanding the project and its impacts on the community and their environment in the context of sustainable development.
- Prepare an EIA Report for submittal to the Environmental Protection Agency, Punjab for according Environmental Approval.

1.2 IDENTIFICATION OF PROJECT AND PROPONENT

1.2.1 The Project

The Project under study is titled as Development of M/S River Garden Housing Scheme Phase IV located at Mouza Samma, Dhereky, Khatala & Goral, Tehsil & District Gujrat. Its salient features have been described later in this Chapter, Chapter 2 and briefly in Executive Summary of the EIA.

1.2.2 The Proponent

Name: Mr. Bilal Bashir
Address: DHA Phase II House No.111-U Street No.2 Lahore Cantt
Contact No. 03102106621

1.3 DETAILS OF CONSULTANTS

For the preparation of the EIA Report of this Project, the proponent has hired the services of the environmental consultants; **M/S Greentech Environmental Consultants.** Team comprising of environmental engineers, chemical engineers,

environmental experts and environmentalists has worked on this report. The following table lists the names of those experts:

Table I: list of experts

Sr. No.	Team Member	Position Held	Qualifications
1.	Muhammad Hassan Waqas	Manager Operations / Principal Environmentalist-I	MS Environmental Sciences, University of Gujrat (UOG) BS Environmental Sciences, University of Gujrat (UOG)
2.	Zain Abbas	Principal Environmentalist-II	MS Environmental Sciences, National University of Science and Technology (NUST), Islamabad BS Environmental Sciences University of Gujrat
3.	Bilawal Zafar	Environmental Consultant	B.S Environmental Sciences, University of Lahore
4.	Saddat Mazhar	Ecologist	MS Forestry & Environment University of Viterbo "La Tuscia", Italy BS Environmental Sciences University Of Gujrat (UOG)
5.	Anam Imtiaz Zaidi	Business Development Manager	Mphil Environmental Sciences The University of Lahore BS (Hons.) Environmental Sciences The University of Lahore
6.	Ramsha Shahid	Environmental Geologist	MSc Applied Environmental Geology Cardiff University, United Kingdom BS Environmental Sciences, CEES, Punjab University(PU)
7.	Swabia Nadir	Sociologist	M.Sc Sociology Punjab University (PU), Lahore

8.	Farhan Khalid	GIS Specialist	MS Remote Sensing & GIS Institute of Space Technology (IST), Islamabad BS Environmental Sciences, University of Gujrat (UOG)
9.	Hafiz Rizwan Akram	Restoration Specialist	MS Horticulture Fujian Agricultural & Forestry University BS Agricultural Engineering University of Agriculture, Faisalabad

1.4 BRIEF DESCRIPTION OF NATURE, SIZE AND LOCATION OF PROJECT

1.4.1 Nature of Project

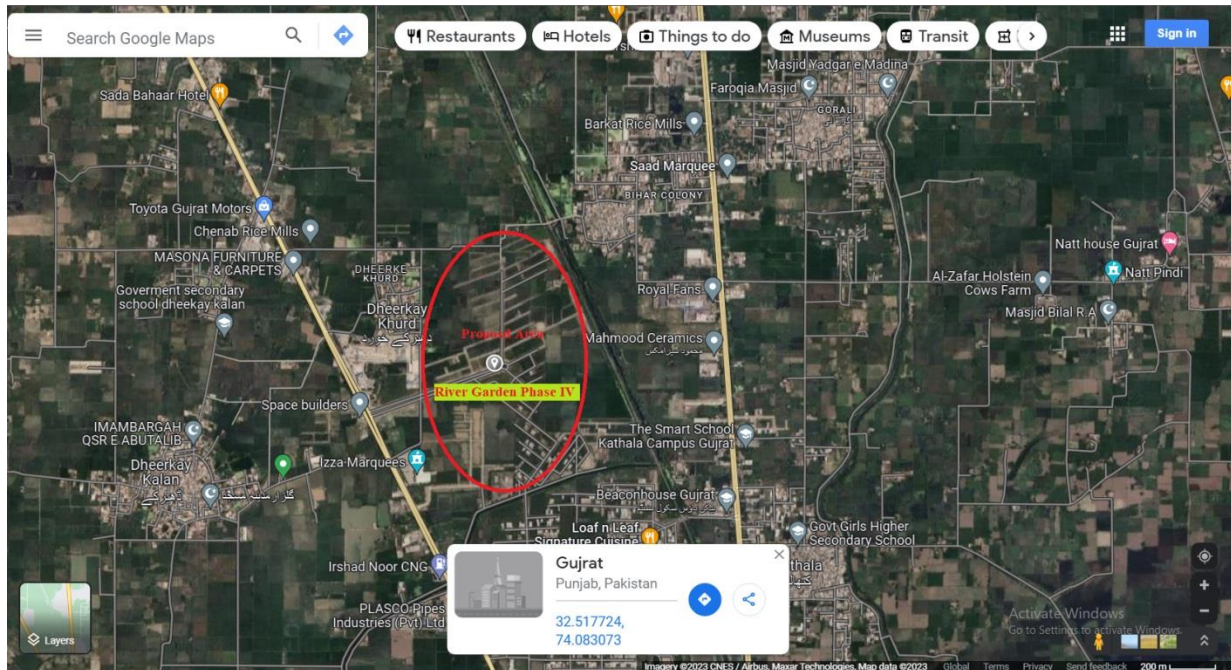
This project is the Development of Housing scheme.

1.4.2 SIZE OF PROJECT

Project will have total area of 772 Kanals, 12 Marlas, 192 SFT. Proposed Project will provide residential plots, parks and public building along with other facilities.

1.4.3 LOCATION OF PROJECT

This project is to be located at Mouza Samma, Dhereky, Khatala & Goral, Tehsil & District Gujrat.



CHAPTER 2: DESCRIPTION OF PROJECT

The proposed project includes the development of M/S River Garden Housing Scheme Phase IV to increase the sustainable housing capacity to accommodate more people with basic social amenities as well as to promote modern housing facilities and infrastructure. For this purpose, 772 Kanals, 12 Marlas, 192 SFT of the area shall be developed into residential areas having commercial and green zones with basic social amenities.

2.1 TYPE AND CATEGORY OF PROJECT

The proposed project comprised of development of M/S River Garden Housing Scheme Phase IV located at Mouza Samma, Dhereky, Khatala & Goral, Tehsil & District Gujrat. The project will provide religious, social and communal amenities to its residents such as; mosque, parks, public places and roads as well as it will have a proper solid waste collection and wastewater disposal system.

As per Review of Environmental Impact Assessment (EIA) Regulations, 2022 the Project of Development of M/S River Garden Housing Scheme Phase IV falls in the category of projects mentioned in Schedule II, under the category H (1), i.e. Urban Development and Tourism (Housing Scheme).

2.2 OBJECTIVES OF PROJECT

The main aim of carrying out the Development of Proposed housing scheme is to develop a modern, stable, affordable, accessible and green housing linked to health, justice and community support services and to help people live independently and improve life opportunities related to family, work, education, recreation or other pursuits.

2.3 ALTERNATIVES CONSIDERED REALISTICALLY AND REASON FOR THEIR REJECTION

2.3.1 Site Alternatives

The developing of a Housing Scheme is a commercial venture. Availability of land at the best convenient place and at reasonable price was yet the other considerations for the site selection. Availability of access roads, communication facilities, electricity, gas, basic infrastructure, sewer etc. was yet the other necessary requirements. Of course neat and clean environment was also the other consideration.

No project alternative was considered as the proposed location for the development of the M/S River Garden Housing Scheme Phase IV as area is categorized as already built-up land located in the urban area. The proposed project site is selected as it is available at the centre of the already established housing societies categorized as the built-up land under the Gujrat Peri-Urban Structure Plan and the land is owned by the Proponent. So, no impact is envisaged due to the proposed location of the housing society as the project is being established on the middle of medium dense housing societies. All the communal services such as; shops (grocery shops), Hospital (Surgical Hospital), School (Smart School Al Huda Campus) are also present in the vicinity of the proposed project location.

Keeping these requirements and their availability, the present site is the best suited for the construction of the project. The area is far away from the dense industrial activity. All the other basic infrastructural requirements are available at the selected site. Accordingly, the selected site is ideally suited for construction of the Scheme and no other site was considered as the selected site is within a residential area and no industry is nearby.

2.4 LOCATION AND LAYOUT OF PROJECT

2.4.1 Location of the Project

Project site is located at Mouza Samma, Dhareky, Khatala & Goral, Tehsil & District Gujrat.

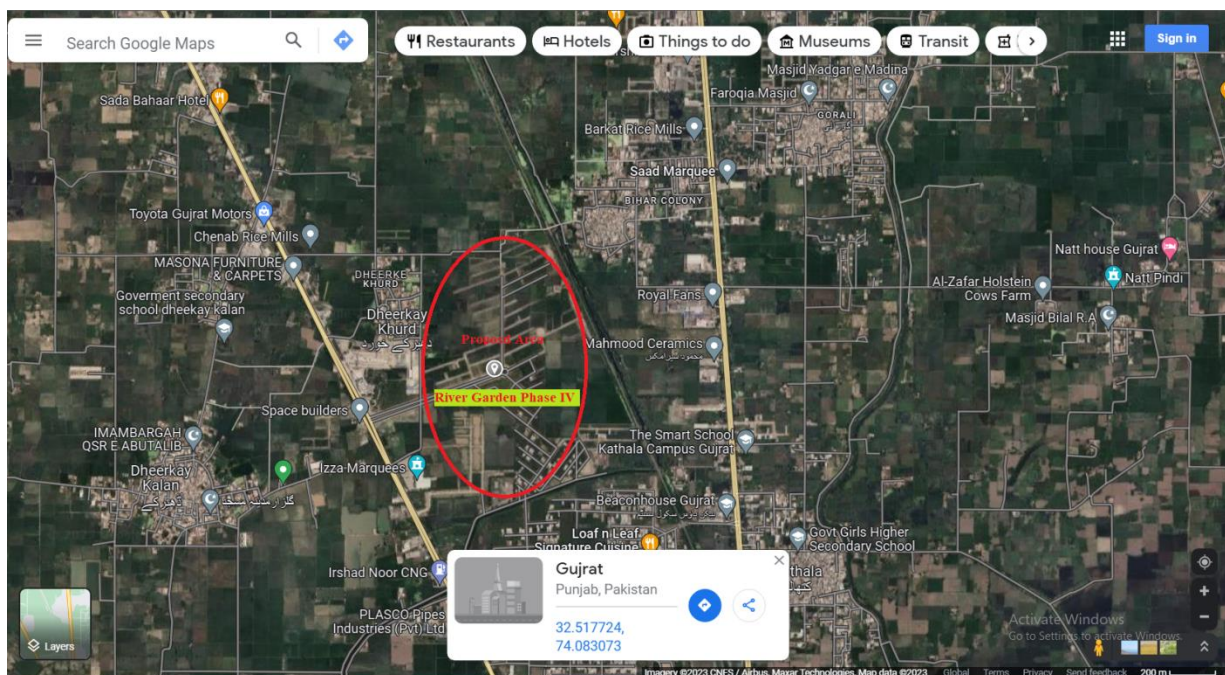


Figure 1: Location of the project

Google courtesy

2.4.2 Layout of the Project

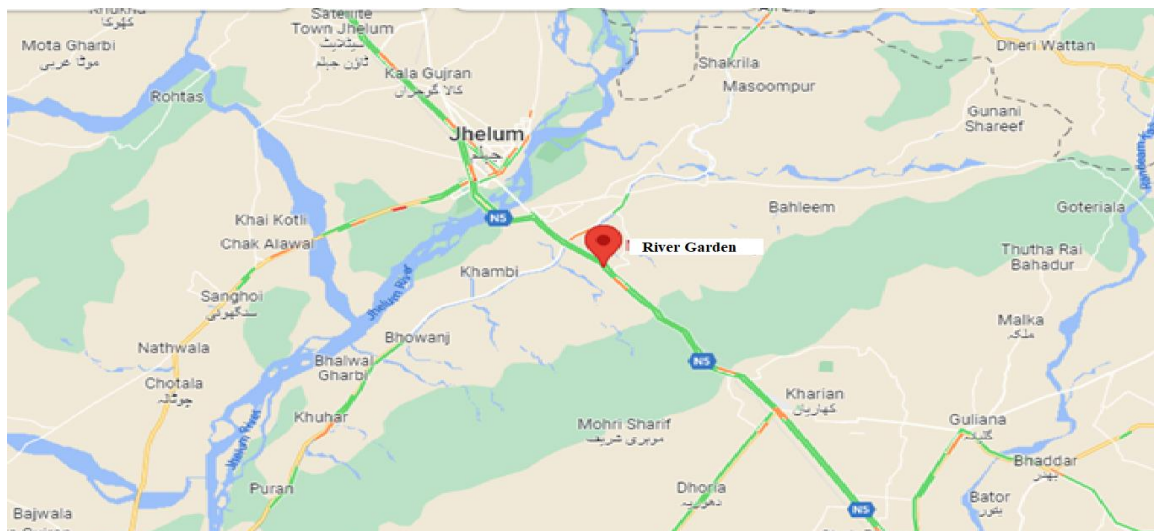
Layout map of the project site is attached with the report.

2.5 LAND USE ON SITE

The land use on the proposed project area is an open land. It is located besides already built-up zones. The study area is being use for various agricultural purposes and few agricultural areas had been converted to the barren lands due to the over-cultivation. Moreover, the proposed site is surrounded by various housing schemes.

2.6 ROAD ACCESS

Main roads and markets are in easy and close access of the project site. Road network is shown.



2.7 VEGETATION FEATURES OF SITE

The project area is surrounded by the residential areas and project site is inhabited by various trees, herbs and grass species along with various crops. The list of the vegetative features present on-site is given in Table 2.

Table 2: Vegetative Features of Project Area

Sr.#	Local Name	Biological Name
1	Gold Mohar	<i>Deloxin regia</i>
2	Sukh Chain	<i>Pongamia globra</i>
3	Neem	<i>Azadiruhta indica</i>
4	Sheesham	<i>Dalbergia sissoo</i>
5	Beri	<i>Ziziphus mauritiana</i>
6	Farash	<i>Tamarix aphylla</i>
7	Grass	-----

2.8 COST AND MAGNITUDE OF OPERATION

The cost of the project will be PKR 100 million approximately as per proponent and magnitude of operation includes:

- Detailed site survey, planning and demarcation of the various regions in the Project Area
- Construction of public and social amenities such as; road construction, infrastructure development/public areas, installation of street-lights, demarcation of parks.
- Plantation of various ecologically important herbs, shrubs, trees and grasses on the designated green spaces

2.9 SCHEDULE OF IMPLEMENTATION

The schedule of implementation of construction phase of proposed project of development of M/S River Garden Housing Scheme Phase IV is approximately one year and the detail timeline of the construction period is given in Table 3.

Table 3: Timeline for Project Development

Sr. #	Activities	3 Months			3 Months			3 Months			3 Months		
		1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M
1	Detailed Designing												
2	Mobilization of Contractors												
3	Lean Construction Period												
4	Peak Construction Period												
5	Restoration of Site												
6	Commissioning												*
M=Month													

2.10 DESCRIPTION OF PROJECT (PROCESS FLOW CHART/STEPS)

M/S River Garden Housing Scheme Phase IV is one of those housing schemes which will be unique in many aspects providing numerous facilities to its residents. A spacious network of major and minor roads with footpaths, ornamental plants and fancy street lights is an integral part of housing scheme.

The proposed project site is spread over area of 772 Kanals, 12 Marlas, 192 SFT. This will be developed into residential plots, roads, green parks, public buildings, 1 plot for solid waste collection and 1 for Solid Waste disposal. The proposed housing scheme shall provide electricity and sewerage system.

- Layout plan of the project is attached as [Annex-IV](#)
- Colored map of Google earth including the proposed project area and distance from nearby residential areas, water body, road network and sensitive habitat is attached as [Annex-V](#)
- Proposed activated sludge process design is attached as [Annex-VI](#)

2.10.1 Features of the Project

The designing of M/S River Garden Housing Scheme Phase IV, Gujrat has been done in such a way that it should be remarked as one of the most modern and beautiful Residential Scheme due to its pleasing look.

Following are the main features of the Scheme:

- Optimum use of space
- Wide roads and streets with street lights
- Excellent sewerage and drainage facilities
- Efficient solid waste collection and disposal system
- Provision of commercial, recreational and religious facilities,
- Landscaping of open areas i.e., trees, park etc.

- Complete administration set up for the operation of the Scheme.
- Facilities for Sports activities like Grounds etc.

2.10.2 Facilities Provided to the Residents

Proposed scheme will provide excellent facilities to its residents. Residents will have access to the basic life facilities Parks, Market etc. within the premises of the Scheme and they will not have to go far for their everyday needs. In short all basic necessities will be provided in adequate manner.

2.10.3 Environmental Considerations

The proposed scheme will be an environment-friendly Scheme. Sewerage water from the houses and commercial facilities will be allowed to treat with wastewater treatment plant installed and then disposed off as per practices of area. The residents will not be allowed to throw their wastes in the open area. Sanitary workers will be hired by the Scheme for handling of solid waste. Final disposal of the solid waste will be done in accordance with the municipal practices of area.

2.10.4 Utilities

All infrastructure i.e., roads, water supply, sewerage, electric supply etc. will be developed in the Proposed Project.

2.10.5 Size and Magnitude of Operation

It includes the town planning work, site survey, site clearing work, infrastructure work, structural work, electrical and mechanical works and Activities of construction includes the following:

- a) Demarcation of the Area for various facilities
- b) Infrastructure works (roads, water supply, sewerage and drainage, gas, electrical works etc.)

- c) Installation of street lights
- d) Plantation of plants and grass

2.10.6 Supplies

2.10.6.1 Water supply

The water requirement for the project is only for domestic purpose. This requirement will be fulfilled through groundwater from bore of depth 60-70ft.

2.10.6.2 Electricity

Source of power will be WAPDA only.

2.10.6.3 Manpower

8-10 workers will be there on Proposed Site.

2.10.7 Wastewater

After the development of the housing scheme the ground water will be consumed for the domestic purposes. Primarily, the ground water will be used for the domestic purposes and it is anticipated that the water will be taken from the depth of 60-70 ft.

The wastewater is mainly sewerage that will be generated by the households. The amount of the wastewater can be estimated as; the per capita consumption of water is 200 liters/day and it is assumed that the average household size is 7 individuals per household. So, the amount of the consumption will be 102,200 litres/day and it is considered that 84% of the consumed water will turned into wastewater. The wastewater will be disposed off in already drain lines. Area is reserved for WWTP. Complete design of WWTP is attached with the report.

2.10.8 Solid Waste

During the construction phase the solid waste will mainly consist of the construction material such as; steel, wood, sand, debris and packaging material. They are re-usable and will be sold by Proponents. During operational phase the solid waste will be mainly generated by the residents mainly consisting of the municipal solid waste such as; kitchen waste, plastic, paper, tin, etc. The solid waste generation rate by each person is approximately 1.1kg/day. The number of the households will be 79 and the estimated members of the households are 7. So, the estimated amount of the solid waste generated will be 380 kg/day. For the collection of the solid waste approximately 5,225 ft² of the project area is designated by the proponent. The collection system will be formulated by the Proponent and it will be a door to door collection system. After the approval of the housing society, the solid waste will be disposed off as per practices of area.

2.10.9 Area

Total Area of the Project is 772 Kanals, 12 Marlas, 192 SFT.

2.11 NATURE OF AREA

Proposed area is agricultural cum residential in nature.

2.12 LAND OWNERSHIP

Property ownership documents have been attached with this report clearly showing the ownership of project without any dispute.

2.13 RELOCATION AND REHABILITATION PLANS

There exists no human settlement on the selected project site to be displaced owing to the commencement of the Project. No structure of any significance stands at the site to be relocated or dismantled. Land is already under proponent's ownership, and no fresh land is to be occupied; hence, no relocation and rehabilitation is required.

2.14 GOVERNMENT APPROVALS

Management has applied for Environmental Approval and after getting Environmental Approval, they will apply for other required approvals.

CHAPTER 3: DESCRIPTION OF THE ENVIRONMENT

3.1 GENERAL

This Section of the report covers a comprehensive description of the baseline conditions of the project and its related influential area with respect to the physical, biological and social aspects. In addition to the secondary data, the field survey was carried out and the environmental baseline conditions were established based on socioeconomic interviews, impact location profiles; environmental profile questionnaires and public consultations. A social survey was carried out through consultation with various communities. Interviews were conducted from the locals near the project area. The main intention of these interviews were to acquire feedback associated with the project as well as its impacts on their daily life on short term as well as long term basis.

The project site is situated at Mouza Samma, Dhereky, Khatala & Goral, Tehsil & District Gujrat and the land acquired for the project is agricultural in nature. The surface area of the land is plain and does not require any activity to it done plain for construction purpose. The water for construction activities have been arranged through self-turbine from the deep groundwater origin. The water carrying out from groundwater source is in 220 feet in depth. The water for drinking purposes was acquired from filter plant which was almost 300 meters far from project site and that drinking water found tube potable and palatable under the guidelines of world health organization WHO, 2008 general drinking water standards. No surface water impact are found as no surface water body is situated near the project's area except the river Chenab which is flowing miles away from Gujrat. The proposed project does not seem to be having any major environmental impact on the surrounding area. Furthermore environmental details like physical resources (topography, soils, climate, surface water, groundwater, and geology/seismology), ecological resources (fisheries, aquatic biology, wildlife, forest, rare or endangered species) and socioeconomic resources around the project area are given below

3.2 PHYSICAL ENVIRONMENT

This section provides a clear description of the physical resources such as topography, soil, climatic conditions, surface and groundwater resources and quality, ambient air quality and geology of the project site but also city as a whole. The description of physical environment of project site is presented in following subsections.

3.2.1 Topography

Natural elevation of Gujrat is 232 meters mean sea level (MSL) and soil is alluvial in nature transported by river Chenab thus comprising specific flood plain area. Soil is silt clayey in nature and fertile due to presence of good nutrients and moisture. The site area is having no hilly terrain and plain in nature. The project location is surrounded by residential colony.

3.2.2 Climate and rainfall

The climate of the proposed project area is warm and semi-arid. In Pakistan, there are four seasons prevailing in the country on the basis of temperature, which are winter (December to march), summer (April-June) monsoon (July-August) and autumn (September- November). The survey of Pakistan classifies country into eight climatic zones on the basis of monthly temperature and precipitation data. The zones are shown in map given below (Pakistan climatic zone map).

These climatic zones are characterized by mild, moist winters and hot dry summers in the north to semi-arid and arid zones in the west and parts of the south. The north-eastern mountains and sub-mountainous areas receive more than 1,700 mm annual precipitation and got huge amount of precipitation (over 1000 mm) from summer monsoon. On the other hand, the extremely arid plains of southwest Baluchistan get only 30 mm precipitation during the whole year. Temperature variance rangers from extreme daily, seasonal, and annual difference: temperatures can fall as low as -26oC over the northern mountains and go as high as 52oC over the central arid plains. In the semi-arid plains, temperatures of 42oC are recorded at various stations in the month of May and June (biodiversity guide to Pakistan)

Gujrat's climate is warm and semi-arid. Gujrat is adjacent to Azad Kashmir so climatic conditions of Kashmir have good impact on Gujrat's climate due to cool air and excessive rainfall. There are two main types of rainfall seasons i.e. monsoon and winter season rainfall. Monsoon starts from mid-July and ends in mid-September while winter season rainfall occurs from December to March. The temperature of Gujrat varies between 45oC in the summer and 2oC in the winter. The annual average rainfall of Gujrat is 670 mm (Hussain et al., 2010)

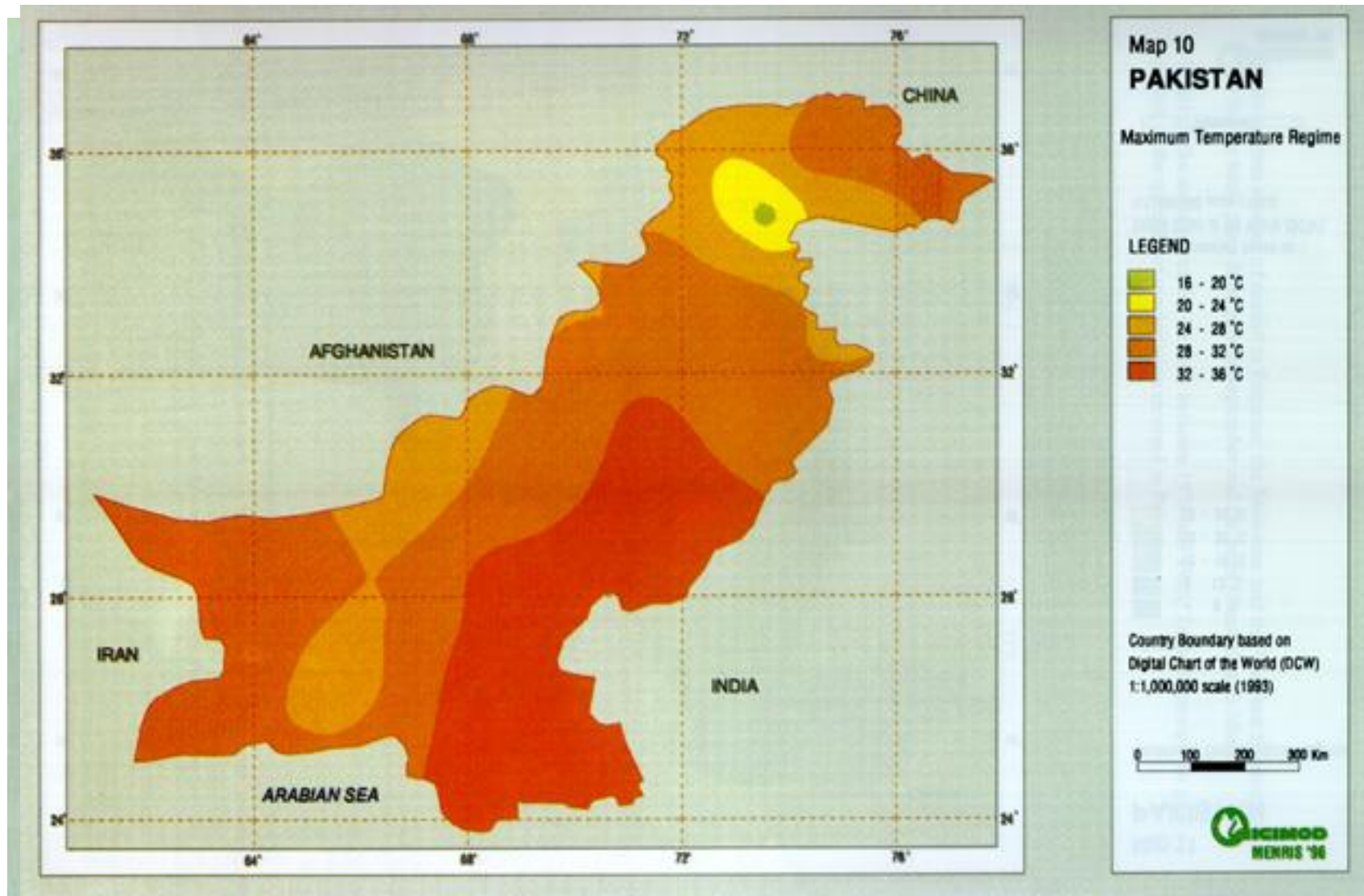


Figure 1: Climate of Pakistan, regions of minimum temperature

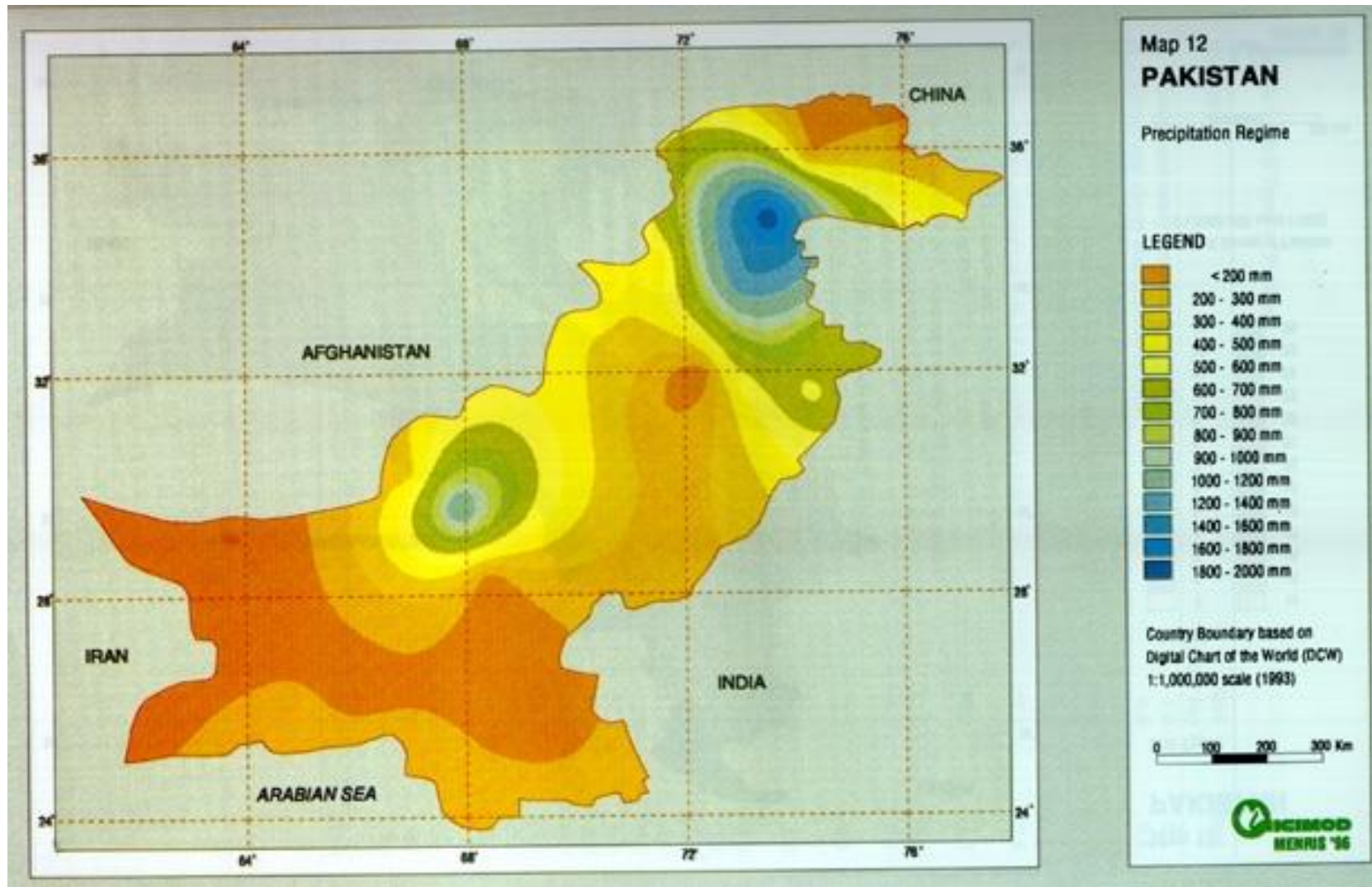


Figure 2: Precipitation Map of Pakistan

3.2.2.1 Temperature

The climate of the district can see extremes, with a summer maximum temperature 45 °C (113 °F) and a winter temperature of 12 °C (54 °F). The mean maximum and minimum temperature in summer are 39 °C (102 °F) and 27 °C (81 °F) respectively. In winter it peaks at around 17 °C (63 °F) and 12 °C (54 °F) respectively. The summer season starts from April and continues until October. May, June and July are the hottest months. The winter season starts from November and continues until March. December, January and February are the coldest months.

Detail description of the seasons is as under:

- Winter (October to February): Moderate to extreme and dry
- Spring (March & April): Pleasant and moderately cold
- Summer (May to September): Very hot to humid
- Monsoons (June to August): Wet. Although the temperatures are milder but due to appreciable humidity, the heat is oppressive; and
- Post-Monsoon Summer (September & October): Moderate and slightly humid

Given below are the maximum and minimum temperatures of area throughout the figure.

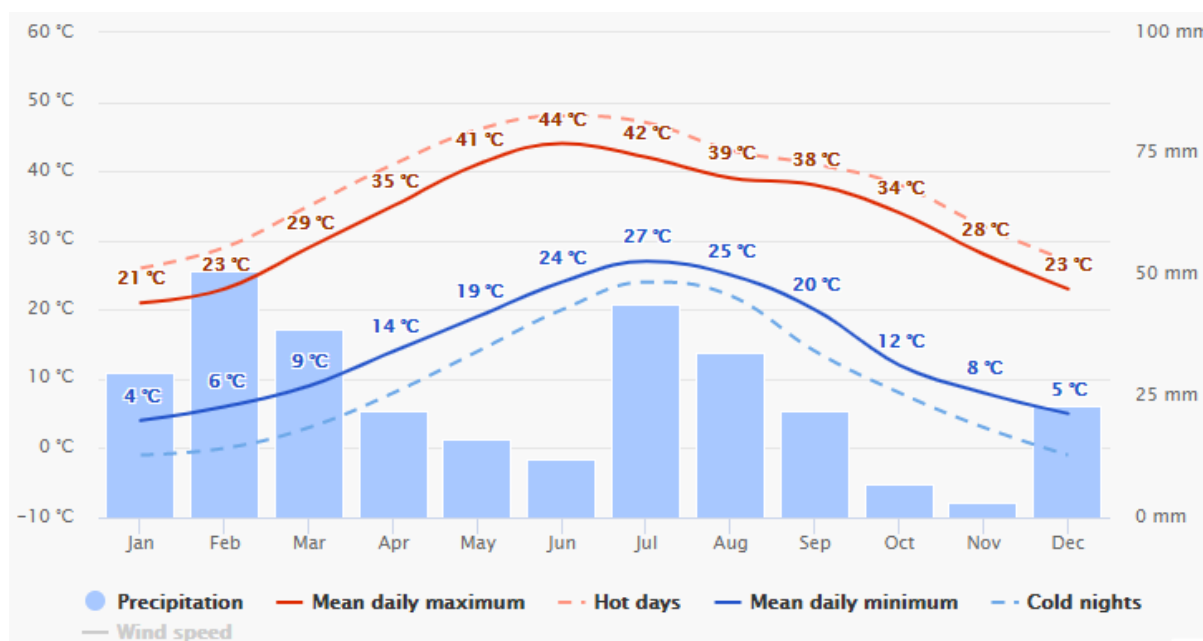


Figure 3: Average Annual Temperatures and precipitation in Gujrat

The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Gujrat. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years. For vacation planning, you can expect the mean temperatures, and be prepared for hotter and colder days. Wind speeds are not displayed per default, but can be enabled at the bottom of the graph.

The precipitation chart is useful to plan for seasonal effects such as monsoon climate in India or wet season in Africa. Monthly precipitations above 17mm are mostly wet, below 30mm mostly dry.

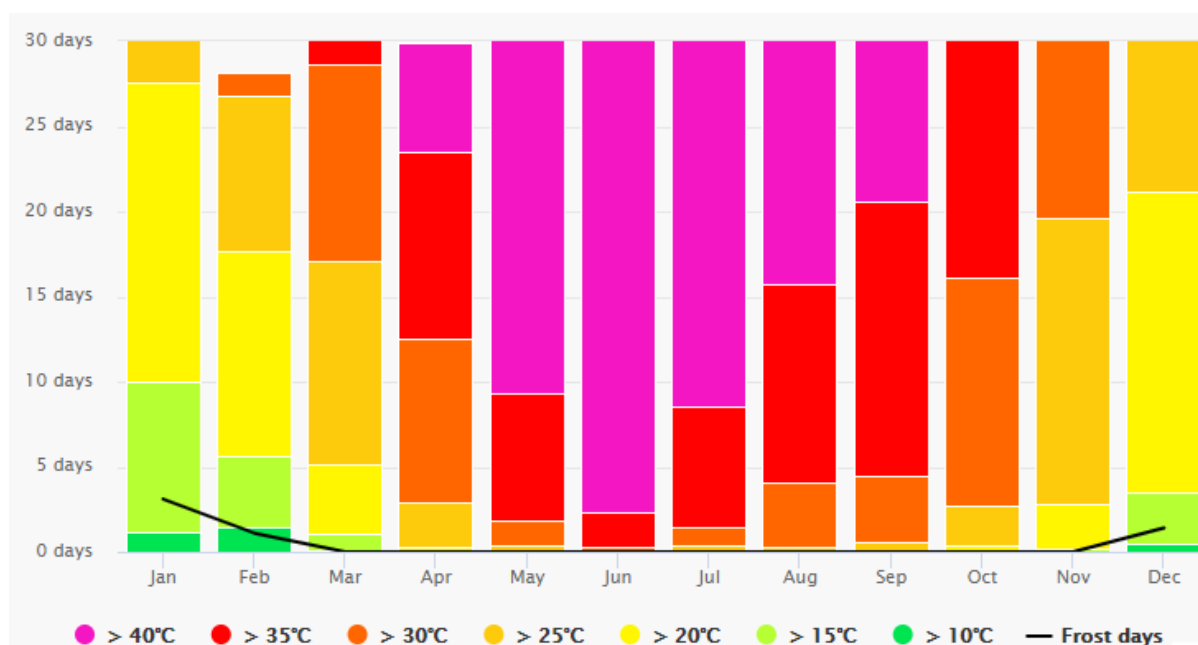


Figure 4: Maximum temperature ranges in Gujrat

3.2.2.2 Rainfall

The average yearly rainfall lies only at about 388 mm (15.3 in) and is highly seasonal with approximately half of the yearly rainfall in the two months July and August.

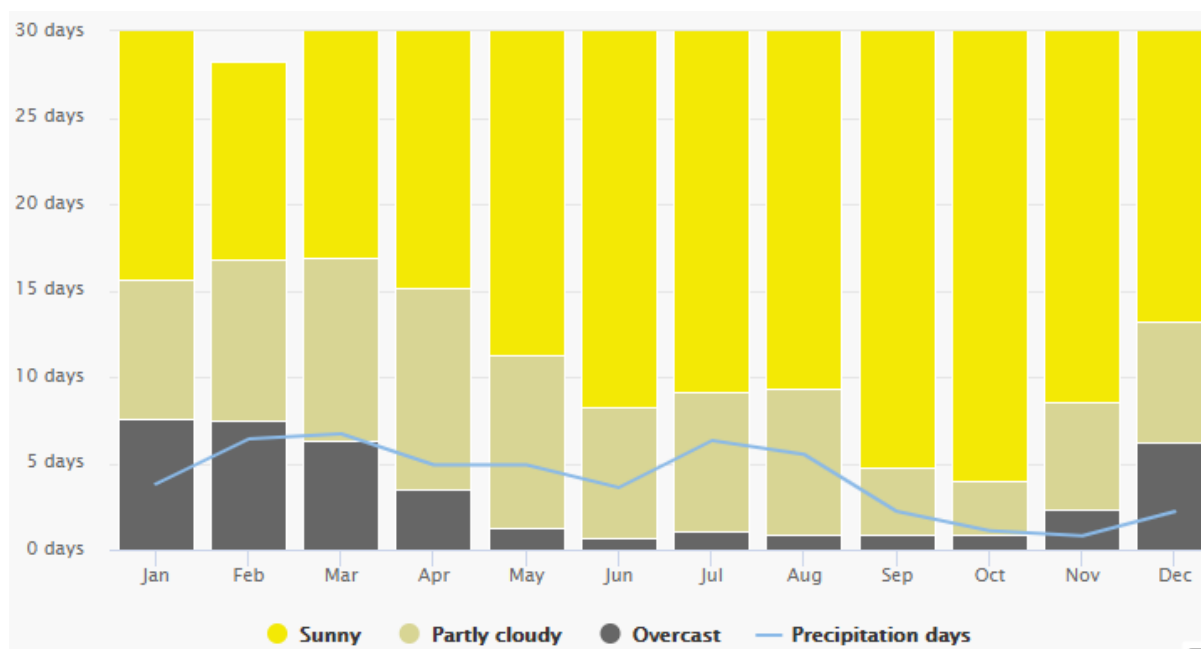


Figure 5: Annual cloudy, sunny and precipitation days in Gujrat

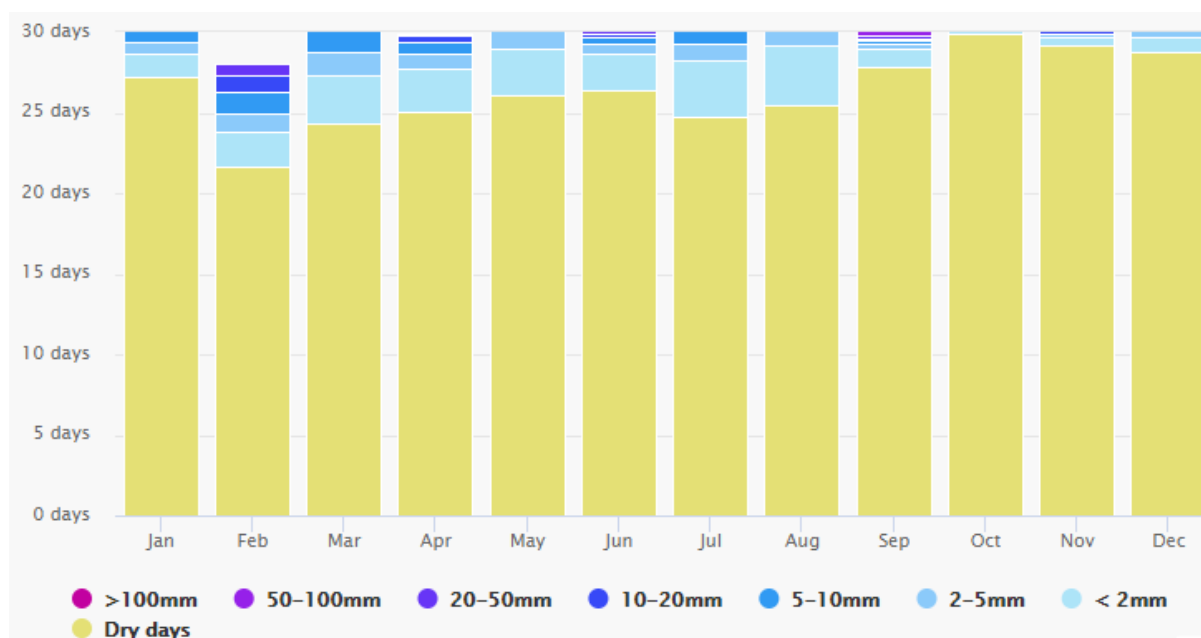


Figure 6: Annual Precipitation amounts in Gujrat

3.2.2.3 Wind

The region experiences westerly and north westerly winds during the winter and spring seasons, known usually as the dry stable times of year and southerly and

south easterly winds during summer and monsoons. Wind speeds are low during winter picking up during spring season and peaking during the summer months. The prevalent wind speed ranges from 10-25 km/h, however on some days, there appear storms of 60 km/h.

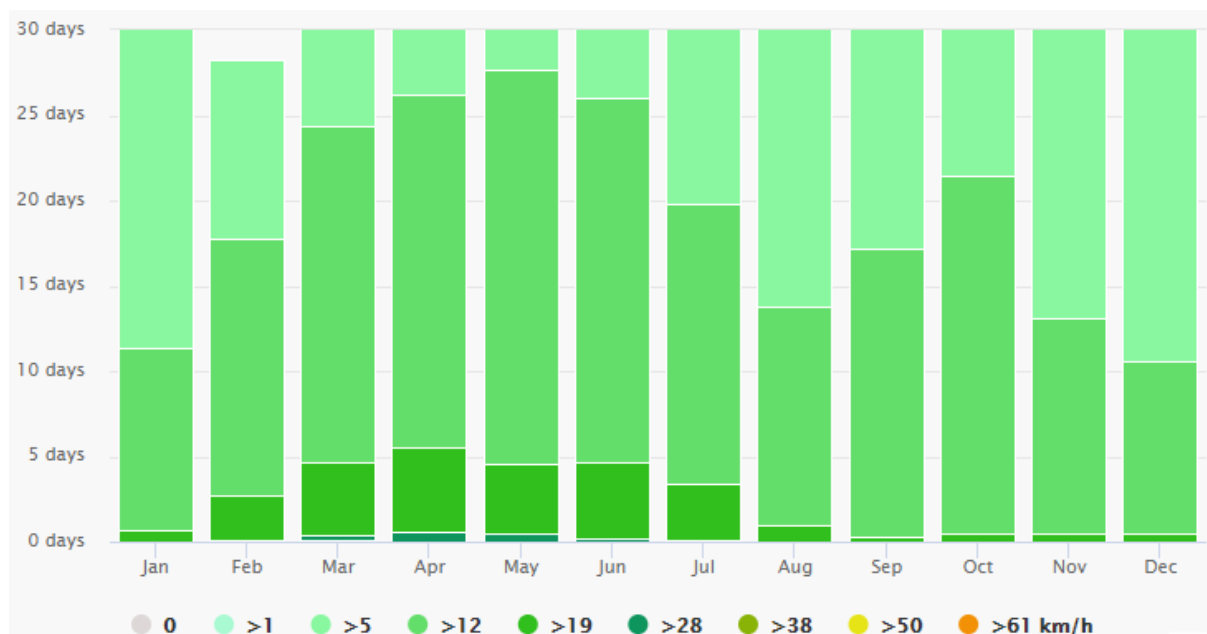


Figure 7: Annual average wind speed in Gujarat

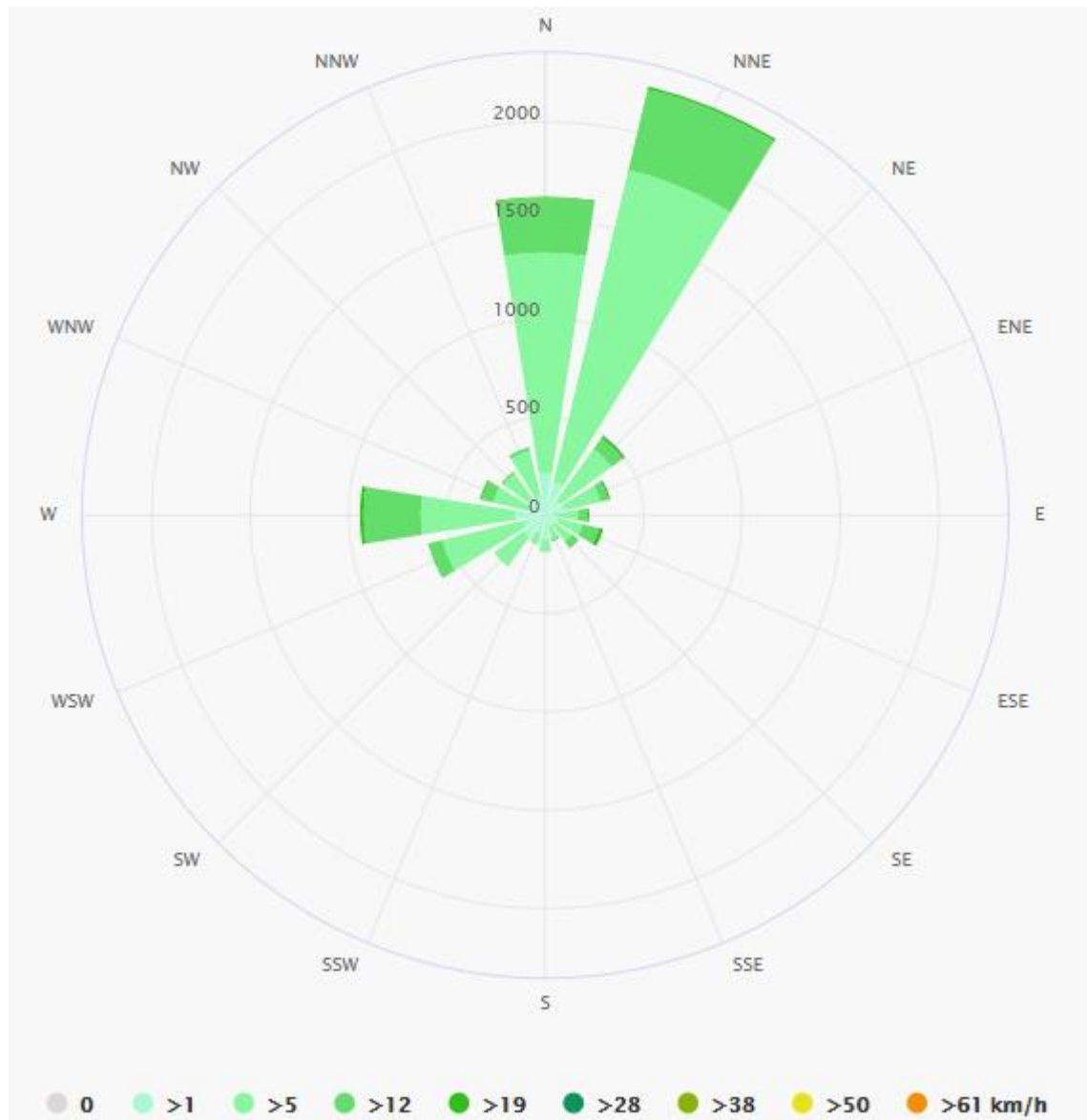


Figure 8: Wind Rose diagram of Gujrat

3.2.3 Surface water

No surface water body is present near the proposed site except river Chenab is flowing miles away from the project area. There is one barsaatinallah (Nallah-e-Bhimber) flowing approximately one and half kilometers away from this project which remains almost dry due to having no refueling from any surface water source. It is being used as a municipal and industrial sewage Nallah by TMA Gujrat as the sewage of majority of houses of city is being thrown in this Nallah round the clock through year.

3.2.4 Groundwater

The water requirements for the site for construction work will be extracted from groundwater aquifer by the help of turbines. Groundwater in Gujrat can be found at various depths ranging from 20 feet in depth in various villages and goes up to hundreds feet in depth like municipal water supply turbines of Gujrat extract water from 650 feet. The water table in the ground varies in depth according to the climatic conditions as water table surface is high in rainy season lowers in hot and dry season. The groundwater at proposed site area is extracted from 220 feet down.

3.2.5 Geology / seismology

Pakistan is basically divided into 5 earthquake zones, four of them ranging from zero to four (0-4) and one zone i.e. five which is intensively dangerous ranges from five to ten (5-10) which is shown in map 4.4. Zone zero describes least earthquake chances and destruction while 5-10 shows most chances of earthquake origination with extensive destruction like 08 October 2005 earthquake across the country. According to the map, district Gujrat comes under zone number two which is further divided into two zones i.e. zone 2A & 2B, more than half falls in zone 2A and remaining part in zone 2B and no tectonic or thrust fault line is passing underneath the district Gujrat thus making it less vulnerable to the destruction due to less seismic activity in the area

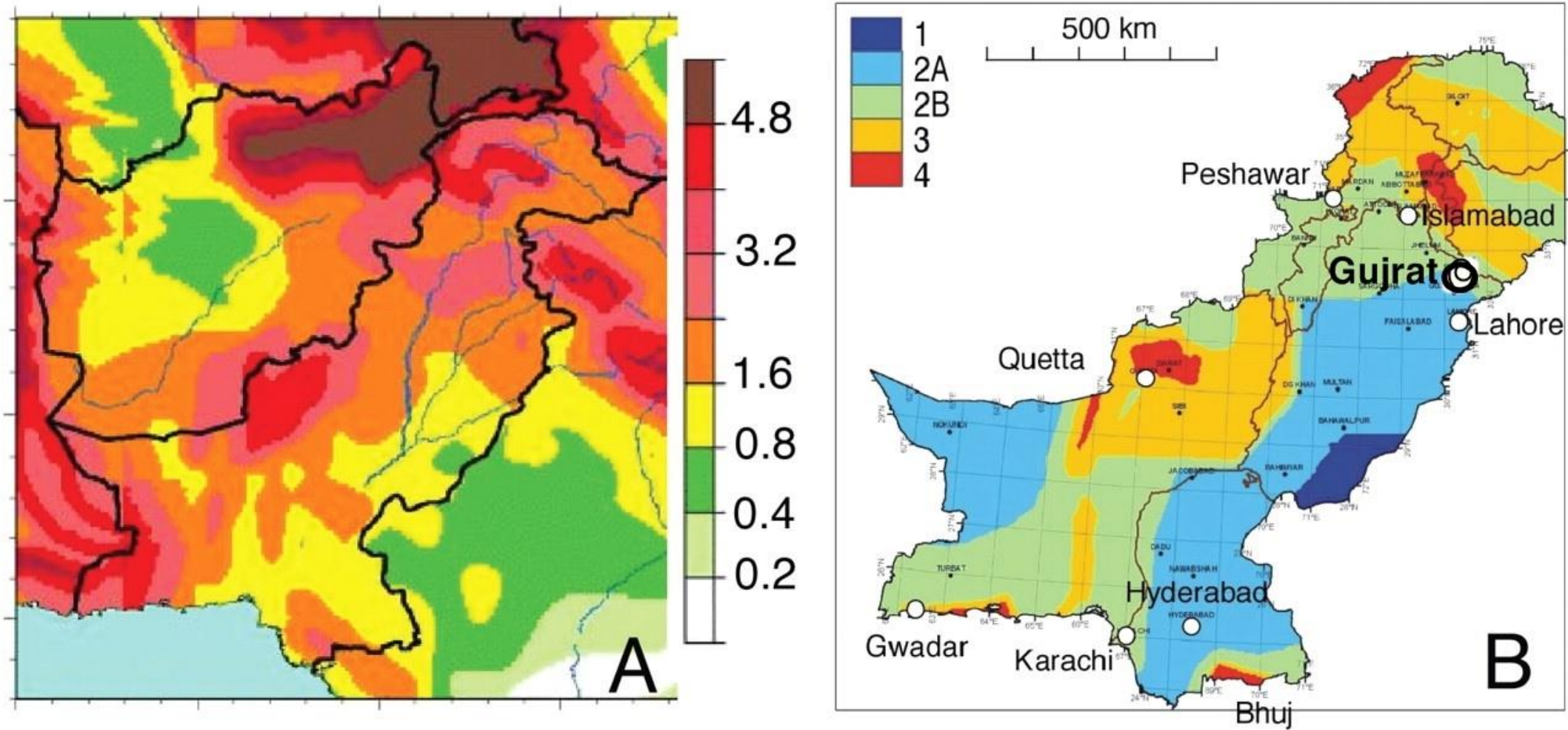


Figure 9: Seismic Zone Map of Pakistan

3.3 Description of the biological environment

The project area neither contain any forest nor falls in protected area or archaeological site and so no jurisdiction on the proposed site area of the relevant legislations.

3.3.1 Flora

The project area is surrounded by residential land, and does not support rare, endangered or threatened plant species. Plant species present in the site are cultivated like kekar (*acacia nilotica* L.), sheesham (*dalbergiasissooroxb.*), mango (*mangifera indica* L.), Phulai (*acacia modesta* wall.), amaltas (*cassia fistula* L.), dharek (*melia azadirach* L.), bohar (*figus benghalenses* L.), pepal (*figus religiosa* L.), kala toot or mulberry (*morus nigra* L.), eucalyptus (*eucalyptus camaldulensis*), guava (*psidium guajava* L.), jaman (*syzygium cumini* L.), pomegranate (*punica granatum* L.), bair (*ziziphus jujube* mill.), rose (*rosa indica* L.) and simbal (*bombax ceiba* L.) etc and some plants are ornamental like Alastonia, Golden Ficus, green Ficus, Dronta Weeds, and Palms etc. these are the tree species that are generally planted along the margins of fields. Among the above mentioned tree species mostly are used for landscaping purposes in houses some plants are used as biomass in homes outside the model town, Gujrat.

There are many plants in the area having herbal medicinal importance like puthkanda (*achyranthes aspera* L.), kanhera, oleander (*nerium indicum* mill.), ak (*calotropis procera* aiton.), kwargandal (aloe vera L.) and bhang (*cannabis sativa* L.) etc. none of the plant or tree mentioned above comes under rare, threatened or endangered species.

3.3.2 Fauna

The proposed project is located just adjacent to the urban area of Gujrat city and has been started to develop as residential colonies as well for years thus having no natural wildlife habitat in the vicinity. Only very common and adaptable animal

species are found in the project area. No threatened and vulnerable animal, birds and reptile species are reported in the area. As no surface water body is situated near the project site area so no fishing activity and aquatic biology are found in the surrounding localities

3.4 Socioeconomic resources and quality of life values

This section describes the key socioeconomic features of the study area like administrative setup, population and communities, education, health, transportation, infrastructure and archaeological sites etc.

3.4.1 Population and communities

The proposed project area comes under the administration of TMA Gujrat. The population of city is roughly 3,00,000 and the nearest villages are Mehmda and MadinaSayedani are just adjacent to the proposed site on the eastern South. The majority of the population comprised of farmers, office workers, merchants and labour community like daily wages. The building structures of typical Pakistani design made by bead brick, cement and concrete. Approximately 99% of the houses are well built with bricks, cement and concrete. Majority of the residents in the project area speak Punjabi along with Urdu.

3.4.2 Industries

The most prominent facility of the area is availability of state of the art marriage, party and catering services to the residents of the area which are provided by many marriage halls near the project site area. Gujrat is also known for its clay, with which the locals have long produced quality pottery. The city also produces fine furniture. Over the last few decades, Gujrat has also attained a name in the manufacture and export of electric fans including GFC fan, pak fan, royal fan and metro fan. Gujrat is also home to one of the two largest shoe manufacturing companies in Pakistan, namely Service Industries, which runs a large shoe factory in the city.

There are about 1,059 cottage-level and small- to large-scale industrial units operating in the district. Rice production and export is another major product of Gujarat. There are many other factories engaged in manufacturing of electrical goods, electric motors and rice cleaning mills. Most are cottage industries, providing employment to a large number of people and accounting, in aggregate, for more than 90 percent of the domestic market.

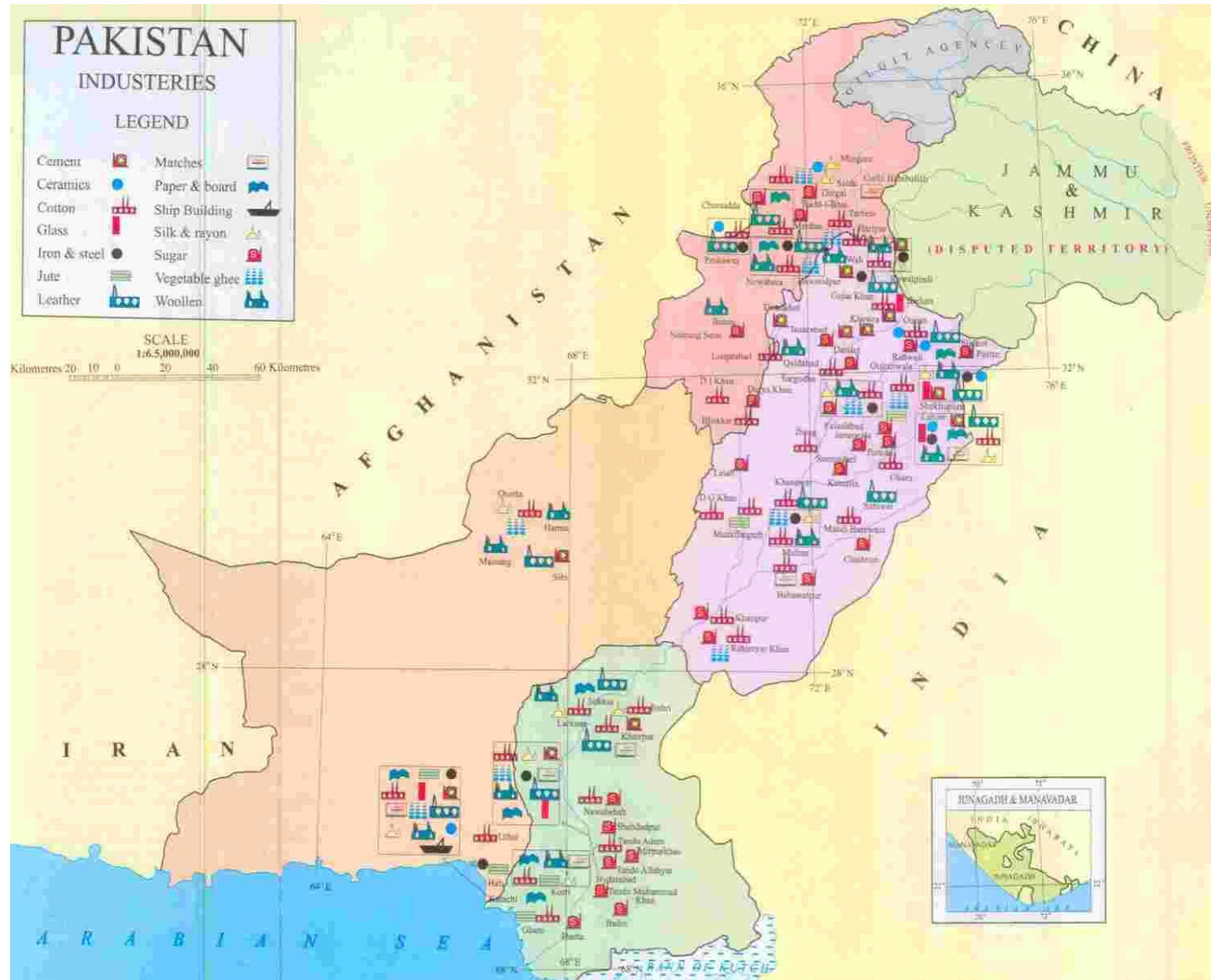


Figure 10: Industrial Map of Pakistan

3.4.3 Infrastructure

The project area is situated Mouza Samma, Dhereky, Khatala & Goral, Tehsil & District Gujrat and provides round the clock transport access. All the other villages in the area are connected with metalled roads. The buses, motorcycle rickshaws, motorcycles, vans and pickups provide very convenient mode of transportation throughout the area. All villages in the area have electricity provided by GEPCO along with telephone and natural gas facilities. Gujrat has well developed drainage system which fulfills the requirement of the town in rain season as well as in dry weather. The project site area will also be provided with the modern facilities like electricity by GEPCO, natural gas by Sui Northern gas pipelines limited, phone facilities by Pakistan Telecommunication Company limited, and very well designed drainage system along with a septic tank for primary treatment of sanitary water before throwing it to public sewerage. No surface water is available to the area and only source of water to the area is groundwater, which is extracted by means of motor turbines, tube wells and hand pumps

3.4.4 Educational institutions

The educational institutions surrounding project site area are Zamindar Govt. College Gujrat. Zamindar college is one the most significant colleges of Pakistan which provides human resource to every institution of the Pakistan, many well known personalities were educated from this college like Javed Chaudry, Anwar Masood etc. There are other educational institutions in Gujrat as well like Marghzar College for women, Fatima Jinnah College, Gujrat Law College, Science College, and Swedish College, Dar-E-Arqam school, Municipal Model School, Beacon House, the Roots School Systems, Chenab and Punjab group of Colleges. The area's largest institution is university of Gujrat with its own transportation for the students and employees and it is situated just few kilometers from Gujrat city

3.4.5 Transportation

The project area is situated on Mouza Samma, Dhereky, Khatala & Goral, Tehsil & District Gujrat which is 70 feet wide and provides round the clock transportation access. Transport services include buses, trucks, vans, cars, pickups, motorcycles, rickshaws, and bicycles. The site area can be accessed by airline via Sialkot international airport which is approximately 60 km away. For railway services, one can go to Gujrat from where rail service is available throughout the Pakistan

3.4.6 Power sources and transmission

Electricity services are provided by Gujranwala electric power company to the area and it shall provide same services to the proposed project as it is the only authority which deals with the electric power sources and their availability to the expected area

3.4.7 Agriculture

The project site area is agricultural in nature, various types of agricultural lands are present in nearby villages and many cash-crops are cultivated like wheat, rice, maize and seasonal vegetables along with fodder for the cattle. No major livestock activities are present in the area except farmers of the area manage some domestic animals for their daily routine needs. The animals are buffalo, cow, goats, sheep, donkeys and dogs. Except donkeys and dogs, other animals mentioned above are used for their milk and meat requirements while donkeys are used for labour purposes and dogs for the sake of safety. Few poultry farms are situated in the local surrounding thus fulfilling the requirements of eggs and chicken meat in the area.

3.4.8 Public health

The medical facilities are available within city as few very good hospitals are situated in Gujrat city like Aziz Bhati Shaheed Hospital, Gujrat hospital, Butt hospital, City hospital,

and Family hospital. In Gujrat city, from kachehry Chowk to district headquarter hospital, whole area is full of clinics and hospitals thus providing very good medical facilities to the people of area.

3.4.9 Recreational resources and development

There are many parks situated near the project site area like Nawaz Shareef Park along with Kinara resort on the bank of river Chenab. All these recreational places are just half an hour drive away from the proposed site. The proponent also has plans to develop a small park and children playing area within the project scheme area

3.4.10 Archaeological and cultural sites

No archaeological sites are observed in the vicinity of proposed project during the field survey

3.4.11 Gender analysis

The section describes the importance of role of women in the project area. Responsibilities of women in the area belongs to their household activities like cooking the daily meal, dishwashing, feeding and milking the cattle, cloths washing, bringing up the children as well as working in the fields. In the area, awareness regarding formal education is prescient and approximately every child in the area especially girls are getting education from the educational institutions. This is also because govt. of Punjab has made formal education totally free and also provides free of cost course books to the students till their matriculation. Majority of the working class women are teachers in govt. school as well as in private institutions while remaining are doctors and nurses in the hospitals. The female population is found to be 48% of the total population of Gujrat district. Violence against women is very less reported and tries to be sorted out domestically by the help of elders of the village.

3.5 SOCIO-ECONOMIC PROFILE OF PROJECT AREA

3.5.1 Demographic Characteristics of the Population

The field survey (including interviews, focus group discussions, census, and area profile) was carried out to collect the socioeconomic data from the project affected people as well as other general population to accomplish the baseline information, which will provide the basis for subsequent monitoring and evaluation studies.

The demographic features include the information on household's profile, gender composition, occupations, and literacy status of the population residing in the project area. The information relating to the demographic profile of the people in the project area are described below.

3.5.2 Family Size

Based on the field survey of local population, the average family size computed to be 7.5.

3.5.3 Age Groups

Ages of the consulted population were also recorded. The people interviewed for the socio-economic assessment belongs to different age groups i.e. 20-35 years, 36-45 years, 46-55 years, and 56 years and above.

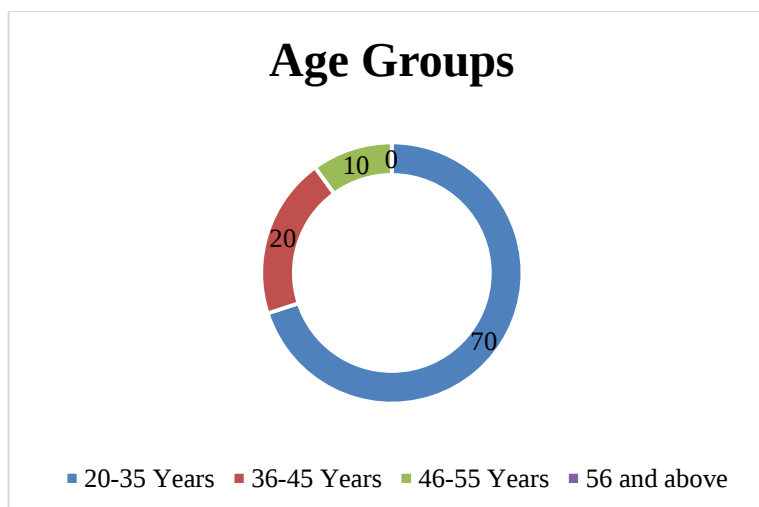


Figure 11: Consulted age groups in the area near project site

3.5.4 Occupation of Respondents

Majority of the respondents (55%) are attached with agriculture, 20% shopkeepers and remaining 25% are labors. During survey, efforts were made to interact with people representing all walks of life. The detailed graphic representation of occupational status is given below:

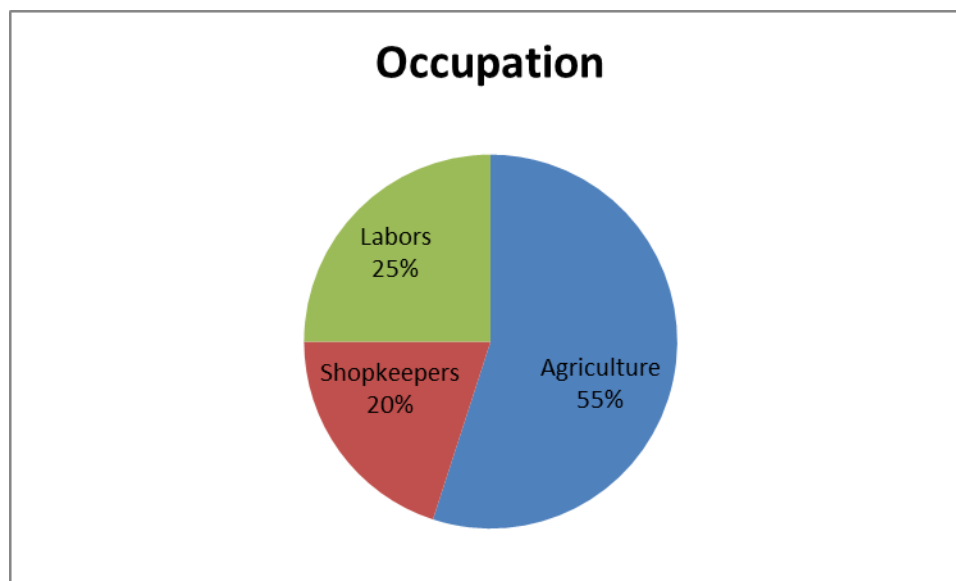


Figure 12: Occupation of Respondents

Literacy Rate

From survey results, it was found that 75 % of the studied population was illiterate, 15% was up to primary level, 10% studied up to middle level.

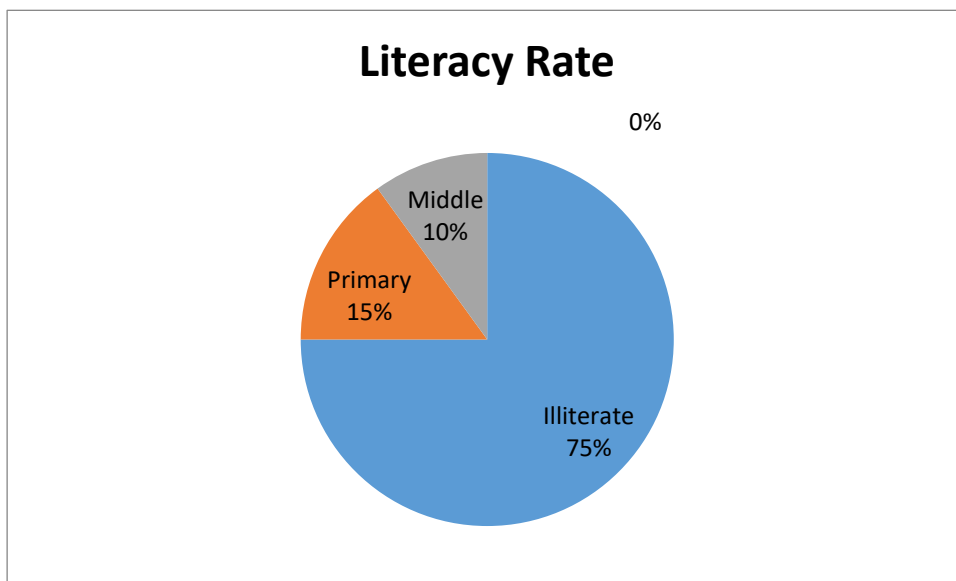


Figure 13: Literacy Rate

3.5.5 Common Diseases

According to the survey the common disease recorded in the project area is Hepatitis.

3.5.6 Cultural, Religious & Other Structures

No cultural, religious and other structures are present in the close proximity of the project area that needs to be relocated. Villages present around the project site have mosques and imam bargah.

3.6 SOCIOECONOMIC SURVEY AND PUBLIC CONSULTATION

For ascertaining the perceptions of different stakeholders about the project, meetings were held with them. These meetings were held in an open atmosphere, in which participants expressed their views freely. Informal group discussions were also held as an additional tool for the assessment of the perceptions of the stakeholders.

3.6.1 Methods of Public Consultation

Public Consultation was carried out for a day. Socio-economic survey forms are attached as Annexure with EIA report. The following methods were used for

public consultation with project stakeholders in order to ascertain their stakes regarding project implementation.

- Focused Group Discussion
- Scoping Sessions
- Formal Group Meetings
- Informal Group Meetings

3.6.2 Project Response

93% of the respondents were of the opinion that this project should be implemented. In their opinion, construction of the project will create labor opportunities for locals and it will help to improve economic conditions of area. The respondents also provided the mitigation measures like certified contractor must be hired, proper plantation should be done, proper procedures should be followed etc. They said, if mitigation measures will be implemented they would have no objection.

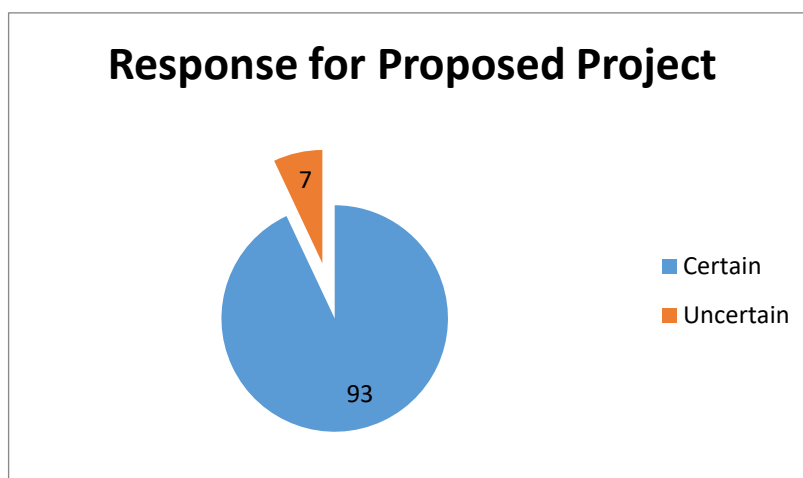


Figure 14: Percentage of people in favor or against the project

CHAPTER4: POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4. GENERAL

This section discusses the project's potential environmental impact on the area's geomorphology, soil, water resources, air, biological resources and socioeconomic condition and, where applicable, identifies mitigation measures that will reduce, if not eliminate, its adverse impact. The assessment carried out in this section is based on potential impacts on overall environmental receptors within the project area.

Objectives of screening out all possible impacts and then providing their mitigation measures are:

- To find different alternatives and ways of carrying out the project activities.
- To enhance the Environmental and Social benefits of proposal.
- To avoid, minimize and remediate adverse impacts.
- To ensure that residual adverse impacts are kept in acceptable limits

Table II: Environmental Impacts Matrix

Table III: Environmental Impacts Matrix																		
Sr. No.		Physical Environment							Bio-Environ ment		Socio –Economic Environment							
	Envi nmenta l compo nent Project Activities	Topography	Soil Quality	Landscape PC	Surface water Quality	Ground water quality	Air Quality	Noise and Vibration	Flora	Fauna	Agricultural land	Health & Safety	Disruption of public	Employment	Population	Social Disorder	Cultural/religious	Traffic Management
1	Constructi on camps, Workshop s etc.	O	L A	O	L A	O	O	L A	O	O	L A	L A	O	B	O	O	O	L A
2	Transport ation of constructi on	O	O	O	O	O	L A	M A	O	O	O	L A	O	B	L A	O	O	M A

	materials																
3	Open storage of construction materials, fuels etc.,	O	MA	LA	MA	LA	LA	O	O	O	O	MA	O	B	O	O	O
	Storage of chemicals or lubricants	O	LA	O	LA	LA	O	O	O	O	O	LA	O	O	O	O	O
4	Relocation	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
7	Use of generators	O	LA	LA	LA	LA	MA	MA	O	LA	O	LA	O	B	LA	O	O
	Stripping and leveling	LA	LA	LA	O	O	LA	LA	O	O	LA	LA	O	O	O	O	O
	Secondary development	O	LA	O	O	O	LA	O	O	O	LA	O	O	B	O	O	LA
	Land use change	O	LA	B	O	O	LA	O	O	O	B	LA	O	B	O	O	LA
Legends: O=Negligible/No Impact B=Beneficial LA= Low Adverse MA= Medium Adverse HA= High Adverse																	

4.1. IMPACTS ASSOCIATED WITH PROJECT LOCATION

The proponent has selected the site owing to the following reasons:

- The site is undisputed and under the ownership of the proponent
- There is no community or human settlement on the site
- There is no fauna flora (particularly belonging to an endangered species) on the site
- Main road network runs in front of the unit
- There is no ecologically sensitive or declared protected area (PA) like forest, fish hatcheries, Territorial Waters, wildlife or game reserves, any structure of socio-cultural significance (historical or archaeological site or religious structures; Masjid, temples, etc.) within 10 km of the selected site

It can be concluded in view of these reasons that the selected site is best suited for the project, and will not pose any adverse impact or threat on any component of the environment.

4.2. IMPACTS ASSOCIATED WITH DESIGN PHASE

At the design phase, no considerable impact will occur on land, soil, topography, ground water, and on people of the area. However in pre-construction phase a management system should be provided at design level so impacts can be reduced. Design of the building will adhere to all standard technical requirements in order to avoid adverse impacts on environment and human health.

Mitigation Measures at Design Phase

At design phase special attention should be given to the design of the project in the sense that it has been designed in such a way as to cause minimum disruption and deterioration of environment and surroundings.

4.3. IMPACT DURING CONSTRUCTION / DEVELOPMENT PHASE

The potential environmental impacts of the proposed project at site and surrounding area during the development / construction phase are described as follows:

4.3.1. Physical Environment

The main impacts of the project during development / construction of the new roads, civil works, development of parks, installation / laying pipelines, sewer system and installation of utility and equipment's will be the dust and noise from transportation of construction materials and equipment's. Standard Engineering Practices will be enforced on the construction / development site.

4.3.2. Traffic Congestion and Disturbance to People

Mitigation

Adequate parking facilities will be provided within the boundary of the project area for construction machinery and tractor-trolleys bringing the material into the project area.

4.3.3. Impact on Geology

The geology of the area is flat. No hills, mountains and slopes are present so during construction phase there will be no impact on geology of area.

4.3.4. Impact on Topography

The topography of project area is nearly flat and remains unchanged during construction phase.

4.3.5. Impact on Water Bodies

No fresh water bodies are known to exist in the vicinity of the project area. Therefore, there will not be any deterioration of surface water quality.

4.3.6. Impacts on Air Quality

During the development / construction vehicles and machinery will be deployed. These will generate some dust and smoke temporarily which will stop on completion of the construction work. Dust will be controlled by water sprinkling. Proper tuning, maintenance and usage of good fuel will control emissions of vehicles.

4.3.7. Health and Safety of Workers

During construction phase minor and severe injuries to workers due to operation activities may occur but if managed properly this impact can be mitigated.

4.3.8. Disposal of Construction Waste/Excavated Material

Construction waste will be reused and if not possible then sold to contractor.

4.3.9. Noise and Vibration

Mitigation

- Well maintained machinery and vehicles will be used to control noise
- Workers will be provided with PPEs
- Regular checkups and maintenance of the construction equipment, and oiling

and greasing of the noise making mechanical parts will be ensured.

4.3.10. Relocation of Utilities

The construction of the proposed infrastructure will not involve relocation of any public utilities.

Mitigation

Not required

4.3.11. Sanitation and Solid Waste Disposal

Mitigation

All the solid waste will be disposed off in accordance with the practices of area.

Table III: Environmental Impacts Matrix for the Construction Phase

Table III: Environmental Impacts Matrix for the Construction Phase																											
Sr.		Physical Environment						Biological Environment			Socioeconomic Environment																
		Environmental Components																									
		Topography	Soil Erosion/Contamination		Landscape	Air Quality		Hydrology and Drainage			Groundwater Quality		Habitat Change	Vegetation	Animal Movement	Health & Safety for Public and		Disruption of Public Utilities		Employment	Population Disturbance		Cultural/Religious Values	Noise & Vibration	Local Economy/Benefits to Community		Traffic Management
1	Construction camps, workshops etc.	LA	LA	O	LA	O	O	O	O	L	L	O	LB	L	LA	LA	H	O									
2	Excavation operations	LA	LA	L	M	L	O	L	L	L	L	L	M	L	O	M	LB	L									
3	Transportation of construction materials	O	LA	O	LA	L	O	O	O	L	L	O	LB	L	O	M	LB	L									
4	Use of construction materials etc.	O	LA	O	LA	O	L	O	O	O	L	O	O	O	O	L	LB	L									
5	Earthwork/concrete work operations	LA	LA	L	LA	O	L	L	O	L	L	L	M	L	L	M	M	L									
6	Operation of concrete batching plants	O	LA	L	H	O	O	O	O	O	L	O	M	O	O	M	M	O									
7	Disposal of Waste Water	O	M	L	M	L	L	O	O	O	L	O	M	L	O	M	LB	O									
8	Solid Waste Management (Disposal of Excavated Material)	O	LA	L	LA	L	L	O	O	O	L	O	LB	O	O	O	O	O									
9	Storage of oils/diesel	O	LA	O	LA	O	L	O	O	O	L	L	LB	L	O	O	O	O									
O - Insignificant / no impact LA - Low Adverse MA - Medium Adverse HA - High Adverse																											
NA - Not Applicable LB - Low Beneficial MB - Medium Beneficial HB - High Beneficial																											

4.4. IMPACTS OF OPERATIONAL PHASE

The anticipated impacts related to the proposed project have been studied for operational stage and is discussed as follows:

4.4.1. PHYSICAL IMPACTS

4.4.1.1. Air Quality

Mitigation

In order to minimize air pollution, following mitigation measures are recommended:

- Plantation will be provided throughout the Housing Scheme which will generate fresh oxygen;
- Vehicles with excessive smoke emissions will not be allowed to enter the proposed Housing Scheme.

4.4.1.2. Wastewater

Mitigation

All the wastewater will be discharged in nearby drain after passing through settling tanks.

4.4.1.3. Solid Waste

Solid waste generated from housing scheme will be mostly paper, plastics, polythene shopping bags and food waste. Total solid waste generated from the scheme will be approximately 380 kg per day which will have to be properly managed.

Mitigation

Small waste storage bins will be installed outside the boundary wall of each house. The waste from these bins will be collected by the sanitary workers. The waste will be disposed off in accordance with the procedures of Tehsil Municipal Administration.

4.4.2. Socio-economic Impact

When a development project is launched in a community, it helps in boosting up the socio-economic conditions by providing the people different economic opportunities. The construction of housing scheme would have a great impact on the commercial activities of the locals.

The socio-economic impacts like employment, education, life, style and cultural uplift are the direct benefits during this stage for the people of the Project Area. Local people will be hired for different jobs, i.e. gardening, housekeeping, cooking, tuitions, driving etc. Facilities like commodity market and medication will also generate working opportunities for the shopkeepers of nearby communities. The human resources will be developed at local level for future development activities in the area. The institutional facilities like roads, dispensaries, proper drainage and sewerage will help improve the lot of the people. Operation of the project will also result in the increase land values. All the Project related job opportunities will ultimately improve per capita income of the population in the area. This is a major positive impact.

Mitigation: Not required

Table IV: Environmental Impacts Matrix for the Operational Phase

Sr. No.	Environmental Components Project Activities	Physical Environment				Biological Environment		Socioeconomic Environment			
		Soil Erosion/Quality	Surface Runoff	Air Quality	Groundwater Quality	Flora	Animal Harassment	Public Transport	Employment	Community Development	HES Issues
1	Movement of people	O	O	LA	O	O	O	HB	MB	MB	LA
2	Transportation of Passengers	O	O	O	O	O	O	HB	O	MB	O
3	Traffic control/Signaling	O	O	MA	O	O	O	MB	O	MB	HB
O - Insignificant / no impact LA - Low Adverse MA - Medium Adverse HA - High Adverse											
NA - Not Applicable LB - Low Beneficial MB - Medium Beneficial HB - High Beneficial											

4.5. POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

4.5.1. Tree Plantation

Tree plantation and cropping within the premises have been planned by the proponent for environmental enhancement. Trees and plants will be grown in all parks and all open spaces. Greenery for beauty enhancement of housing scheme will be done. Shade trees including sheesham, neem will be grown outside boundary of project. Grasses, median plants and median shrubs will also be grown. Aesthetic and beauty plants including roses and jasmine will be grown. Trees height will be between 3-7 ft. Total number of plants and trees will be approximately 150-200. Spacing between plant to plant will be 6-8m. Tree plantation will be done in parks, open spaces and along boundary of project site.

4.5.2. Green Building

The design of the public and private building will be energy efficient i.e., sunlight will be use during the day-light hours and during dark-hours energy savers or solar-powered street lights may be installed. The building will have an adequate access to the proper ventilation and sunlight. The building will be insulated and design in such a way that the requirement of the cooling and heating will be decreased significantly.

CHAPTER 5: ENVIRONMENTAL MANGEMENT AND MONITORING PROGRAM

5. GENERAL

This EIA provides the Environmental Management Plan (EMP) of the project for its construction and operation phases to keep its environment benign as well as the monitoring plan to ensure the compliance of the established EMP.

5.1. INSTITUTIONAL CAPACITY

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

5.1.1. Primary Responsibilities

The primary responsibility for implementing EMP lies with the owner of M/S M/S River Garden Housing Scheme Phase IV.

5.1.2. Operation Management & Control

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

5.1.3. Supervision & Monitoring

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

5.1.4. Communications and Documentation

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

5.2. TRAINING SCHEDULES

As the project under reference to this report is about to construct a Housing Society so there is no need of Monitoring and training needs however firefighting system and Disaster management plan will be strictly followed and the contractors will properly monitored to implement such management plans.

However, in the interest of commercial viability of the Society, all necessary measures to keep the house and its surroundings environment neat and clean will be adopted.

5.3. SUMMARY OF IMPACTS AND MITIGATION MEASURES

A summary of impacts and Mitigation measures has been duly described in environmental management plan.

As per the environmental legislation in Pakistan, the EMP for the operations phase, along with other documents, is to be submitted to the Environmental Protection Agency to obtain confirmation for compliance and Environmental Approval for project operation.

Even after implementation of the suggested mitigation measures, the impact may remain significant, and require monitoring. This section also underlines the monitoring framework for both construction and operation phases to check compliance of the EMP and to take timely actions for correction in case any accident of significant criteria, requirements or goals are found.

5.3.1. OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified in the EIA.
- Define the responsibilities of the project proponent and contractor and provide a means of effective communication of environmental issues between them.

- Identify monitoring parameters in order to ensure the effectiveness of the mitigation measures
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations.
- Identify training requirements at various levels.

5.3.2. MANAGEMENT APPROACH

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

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

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

5.3.3. COMPONENTS OF THE EMP

The EMP consists of the following:

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

5.3.4. ENVIRONMENT MANAGEMENT PLAN

It lists all the mitigation measures identified in the EIA and the associated

environmental or social aspect, during construction and operation phase with the administrative framework involving all the responsible implementing authorities required to take the planned actions/measures. It enhances project benefits by reducing its impacts and making it environment-friendly.

Table 6: Environmental Management Plan for Pre-Construction, Construction and Operation Phase

PROJECT ACTIVITIES	TYPE OF IMPACT	POTENTIAL IMPACTS ON ENVIRONMENT	EXTENT / MAGNITUDE	MITIGATION MEASURE	INSTITUTIONAL RESPONSIBILITY	
					IMPLEMENTING BODY	SUPERVISION
PRE-CONSTRUCTION						
Land acquirement and land use	Physical , Social and Aesthetical	Positive use of land but proper planning will be required	More/at community level and to Proponent	- Land is owned by proponent and there is no settlement so no impact will be there. - Land will be improved from open land to residential land.	Contractor	Proponent*
Use of local manpower	Social	Employment Generation	Less Adjacent area /	Local people will be hired for less technical work or non-skilled work	Contractor	Proponent*
CONSTRUCTION						
Civil works	Physical, Social, Biological Aesthetical	Soil Erosion, Emissions, Water Contamination, Noise & Vibration, Wildlife	More/ Adjacent area	Minimization: Dust emission from soil piles and aggregate storage stockpiles will be reduced by keeping the material moist by sprinkling of water at appropriate frequency	Contractor	Proponent*

		affected, Employment, Health & Safety of Workers		Avoidance: - Covering the pile, - Noise control measures will be implemented		
Movement and fueling of vehicles	Physical & Aesthetical	Soil & Water Contamination due to Fuel Leakages & Spillage, Emissions, Noise & Vibration	Moderate/ at the site	Avoidance: - Periodic maintenance and inspection of vehicles - Vehicles with leaks will not be operated. - All vehicles will be maintained in good working condition - All vehicles will have properly functioning silencers (mufflers).	Contractor	Proponent*
Transportation of construction material	Bio- physical	Dust and Particulate Emissions, Noise Generation, Safety and Health Effects	Moderate/ Adjacent area	Minimization: - Excessive use of horns will be avoided - PPE's will be provided to workers Avoidance: - Covering of transporting material trucks - Night time driving of project	Contractor	Proponent*

				vehicles will be limited where possible - Low speed limit will be maintained on the section of the access road that is adjacent to the community and site. - The fence surrounding the site will be put in on during the construction to prevent access to the construction site		
POST-CONSTRUCTION/OPERATION						
Wastewater management	Physical/social	Degradation of water quality	Moderate/local	Reduction: Domestic Wastewater will be handled using settling tanks and will be discharged in drain.	Contractor	Proponent *
Air quality management	physical	Dust and PM	Moderate/adjacent areas	Avoidance: - No waste should be burnt at the premises. Reduction: - Tree plantation will also be done.	Contractor	Proponent*
Noise generation	Physical, social, biological	Psychological and hearing problems	Moderate/local	- There will be ban on the use of horn in the Scheme. - Proponent has planned a proper plantation plan which will also act as barrier for noise.	Contractor	Proponent*

Solid Waste Generation	Physical, Biological, Social	Soil Contamination, effecting GW Quality, vectors production, odor, Health, Welfare	Severe/ local and global	Reduction : • Solid waste will be managed entirely by the solid waste management contractor. • Provision of Separate waste bins for each house	contractor	Proponent*
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5.3.5. ENVIRONMENTAL MONITORING PLAN

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

Table 7: Environmental Monitoring Plan for Construction Phase

Components	Objective of Monitoring	Parameter to be Monitored	Measurement	Frequency	Location	Responsibility
Noise Levels	To determine the effectiveness of the noise abatement measures on the sound level	Noise level on the site and adjacent area on dB(A) scale	Noise level reading will be taken	Twice during construction	At least two locations on the scheme boundary	Environment Officer /manager
Waste Collection, Storage and Disposal	To check the availability of Waste Management System and Implementation	Inspection of Waste Generation, collection, Storage and Disposal at site	Visual inspection	Once daily	Construction site	Environmental officer/manager

Soil contamination	To determine the effectiveness of the control measures taken to minimize the spillage of oil and chemicals	Inspection of equipment and vehicles	Visual inspection and availability checks	monthly inspection	all vehicles and equipment's in use at construction site	Contractor/Environmental officer
Workers safety	To check and evaluate the effectiveness of the workers' safety plan	Injuries and accidents	Recording injuries	daily	Onsite	HSE/contractor

5.4. EQUIPMENT MAINTENANCE DETAILS

The proposed project is the development of the housing scheme no equipment will be kept on-site that need maintenance except fire-fighting equipment that would be installed in the public buildings. Only fire safety equipment such as; portable fire extinguishers will be installed which will need regular maintenance and check in order to eliminate hazards of associated risks in public buildings. Following is the maintenance details for the portable fire extinguisher:

Table 8: Maintenance Plan for Portable Fire Extinguisher

Task	Weekly	Monthly	Semi-Annually	Annually
Visual Inspection	✓			
Testing and Inspection			✓	
Check for Leakage		✓		
Recharging				✓
Fire Mains and Nozzles		✓		
Containers/Cylinders			✓	
Control and section valves			✓	

5.5. ENVIRONMENTAL BUDGET

The environmental budget consists of the cost of plantation, monitoring and reporting. During the construction phase few trees and shrubs species will be removed from the site and after completion of the development phase the area will be re-vegetated. The monitoring of the impacts associated with the proposed project construction and operation will be carried out as and when required. The environmental budget for the development of the proposed project is considered 2% of the total project cost.

Table9: Environmental Budget

Construction	
Ambient air monitoring	50,000/-
Noise monitoring	2000/-
Water quality monitoring	50,000/-
Health & safety	50,000/-
Workers training	50,000/-
Operation	
Solid waste management	0.2 millions
Wastewater management	0.3 millions
Plantation/green belt development	0.1 millions

CHAPTER 6: MITIGATION AND IMPACT ASSESSMENT

In the sections below the impacts assessment methodology for the establishment of housing scheme has been defined. It includes the magnitude, the extent of the impact and the nature of the anticipated impact.

6.1. METHODOLOGY

This Section discusses the project's potential environmental impact on the area's geomorphology, soil, water resources, air, biological resources and socioeconomic condition and, where applicable, identifies mitigation measures that will reduce, if not eliminate, its adverse impact. The assessment carried out in the sub-sections below is based on potential impacts on overall environmental receptors within the project area. Impacts are evaluated on the basis of magnitude, immediacy and sustainability. Evaluation criteria are as follows:

6.1.1. Magnitude

The magnitude of the impact includes the type of impact project will cause such as; direct, indirect and cumulative.

6.1.2. Immediacy

Immediacy focus on the following parameters:

- Temporal Extent (during construction and after construction)
- Spatial Extent (local, widespread)

6.1.3. Sustainability and Reversibility

It focused on the following parameters:

- Mitigability (Fully/Partially)
- Monitoring (Fully/Partially)

6.2. OBJECTIVES

Following are the objectives of screening out all significant environmental and social impacts as well as mitigation measures need to reduce the severity of the impact up to the extent possible:

- To find different alternatives and ways of carrying out the project activities
- To enhance the Environmental and Social benefits of proposed project
- To avoid, minimize and remediate the associated adverse impacts
- To ensure that residual adverse impacts are kept in acceptable limits

6.3. PURPOSE OF MITIGATION MEASURE

The basic purpose of mitigation measures is to reduce the impacts of the proposed project development on the socio-environment up to the maximum possible extent. The mitigation measures are suggested based on the following parameters:

6.3.1. What is the problem?

The proposed project is the establishment of housing scheme in the center of the residential area. The nature of the land is defined as the open land. So, the major impacts associated with the development of housing scheme during construction phase will include; Raw material storage and transportation, excessive consumption of water and noise generation from various constructional activities. During the operational phase solid waste management and wastewater disposal issues may arise.

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

The impacts from the development of the housing scheme will occur during the development and operation of the proposed project due to the civil work

involved and the people residing in the scheme. These issues included; noise generation, solid waste management, wastewater management and disposal, etc. These all problems should be addressed on-site where they are being generated, to avoid the residual or adverse impacts.

6.3.3. Where problem should be addressed?

The problem will be generated from the development as well as during the operation of the housing society. So, it should be addressed on source i.e. at site within the same timeframe.

6.3.4. How the problem should be addressed?

Proper mitigations measures will be provided according to the nature of the impacts/problems. Like for dust emissions sprinkling of water will be done, for solid waste proper solid waste management and disposal practices will be adopted, to manage liquid waste proper treatment will be done before discharging into the receiving body.

6.4. WAYS OF ACHIEVING MITIGATION MEASURES?

Following ways will be adopted to reduce the impacts of the development of housing scheme:

6.4.1. Changing in Planning Design

For the development of the housing scheme open agricultural area has been selected which is bounded by the residential area. In the project area or its vicinity no ecologically important area is present. However, no human settlement or infra-structure will be dislocated due to the development of the housing scheme. So, no adverse impact is being envisaged. Hence, there is no need to change the design of project.

6.4.2. Improved Management and Monitoring Practices

The anticipated impacts had been reduced significantly by adopting better management activities, as it will be carried out for betterment of the environment while monitoring will be conducted to keep the sources of the pollution and nuisances' in-check. Following practices that need to be adopted to reduce the impact significantly:

a. Compensation in Money Terms

There is no damage envisaged to fauna, flora or any other biological source due to the development of the housing society. However, agricultural land is being converted to the housing scheme. So, no compensation in monetary terms will be needed as the land is owned by the Client and the land ownership documents are attached at Annex-I of this EIA Report.

b. Replacement/Relocation/Rehabilitation

The proposed project is located in open land where there is no sensitive area, population or natural resource is present which could be impacted due to the development of the proposed project. No replacement, relocation and rehabilitation is requiring for the proposed project development.

6.5. Impacts Associated with Project Location

The proponent has selected the site owing to the following reasons:

- The site is undisputed and under the ownership of the proponent
- There is no community or human settlement present on-site
- There is no fauna or flora (particularly belonging to an endangered species) present on-site except crops
- The site has accessible road network.

- There is no ecologically sensitive or declared protected area (PA) like; Reserved Forest, Fish Hatcheries, Territorial Waters, Wildlife or Game Reserves. Moreover, there is no socio-cultural significant structure (historical or archaeological site or religious structures; Masjid, temples, etc.) located within 5 km of the selected site that could be impacted

It can be concluded in view of these reasons that the selected site is best suited for the project, and will not pose any adverse impact or threat on any component of the environment.

CHAPTER 7: Public Consultation

7. PUBLIC CONSULTATIONS (PCs)

Public consultations were held collectively and individual with the people of the project area. Even written views of the participants of the area were taken.

SUMMARY FINDINGS:

Socio-economic baseline conditions

Socio-economic status of the people of the project area is described hereunder.

The people whose interviews were record as a part of the public consultations come mostly from the areas situated within about 10 km radius of the project site.

Drinking water availability and educational and medical facilities surrounding the project site are well established.

Public transport is also readily available there.

Near project site major source of income of local people is Job.

Old social order of life prevails and by and large, social harmony prevails.

Elders are very much respected and they have great say in decision making.

Joint family system is the order of the day.

Some of the women help in job while others are restricted to housekeeping.

Majority of the old generation is uneducated. But new generation is showing interest in getting education.

On the overall basis it is concluded that socio-economic conditions of the people yet need drastic improvement. People do face hardship regarding basic amenities, education, health and employment.

Community awareness and perceptions about the project:

Many people of the area are well aware of installation of the project. Virtually all of them have positive attitude about the project.

They are well aware that the Town will provide them jobs.

Their perception is that the town area is very beneficial for the community and the area.

They foresee positive impacts out of it, like employment opportunities, business, development of the area etc.

The people perceive overall positive social impacts by the Project. They have highly positive attitude towards the project.

They are apprehensive of environmental aspects of the project.

At the same time they foresee that the project management will feel there, social, moral and legal obligation and bring in Environmental Management Order whereby the environment will not be tempered.

Social impacts:

It can be safely concluded that social and economic impacts clearly dominate the minor few negative impacts of environment.

Positive impacts:

The conclusions of the study prove that the positive economic and social impacts of the Project are far too dominant.

People foresee employment opportunities for them.

These employment opportunities will follow a chain of indirect benefits also i.e. the young people of these communities will get employment and business.

They feel that the Town and its related activities would provide a strong base for social change.

This trend will enhance family protection, socialization of the family members.

Commercially viable Town and long term sustainability

Improved and mechanized services for the community.

From the above discussion, one can conclude that positive impacts including improvement in employment, generating income resources and business opportunities.

Recommendations and mitigation measures

As result of the PCs the following recommendations are made:

The management of the Project should measure up to the positive expectations of the people of the area and offer them maximum employment opportunities.

Environmental protection according to the legal requirements should be ensured throughout the project operational life thus guaranteeing protection of the environment and human health.

Sustainable development approach through conservation of natural resources management would be the best strategy.

CHAPTER 8: CONCLUSION AND RECOMMENDATIONS

8. CONCLUSION

The report presents Environmental Impact Assessment (EIA) of the Establishment of Proposed housing scheme. Its main objective is to provide people with clean and green environment to live a comfortable life.

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

The performed EIA showed all anticipated impacts (both positive and negative), associated with the project. Appropriate mitigation measures as explained in the environmental study shall reduce, if not eliminate, these impacts so that these are within acceptable limits. Moreover, no deterioration, depletion or exploitation of local natural resources is expected to be caused by this project.

Based on overall assessment of the environmental impact of the project, it is concluded that the project is not likely to cause any significant adverse impact on the social, physical and biological environment of the area, provided that suitable mitigation measures as identified in this study are implemented.

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

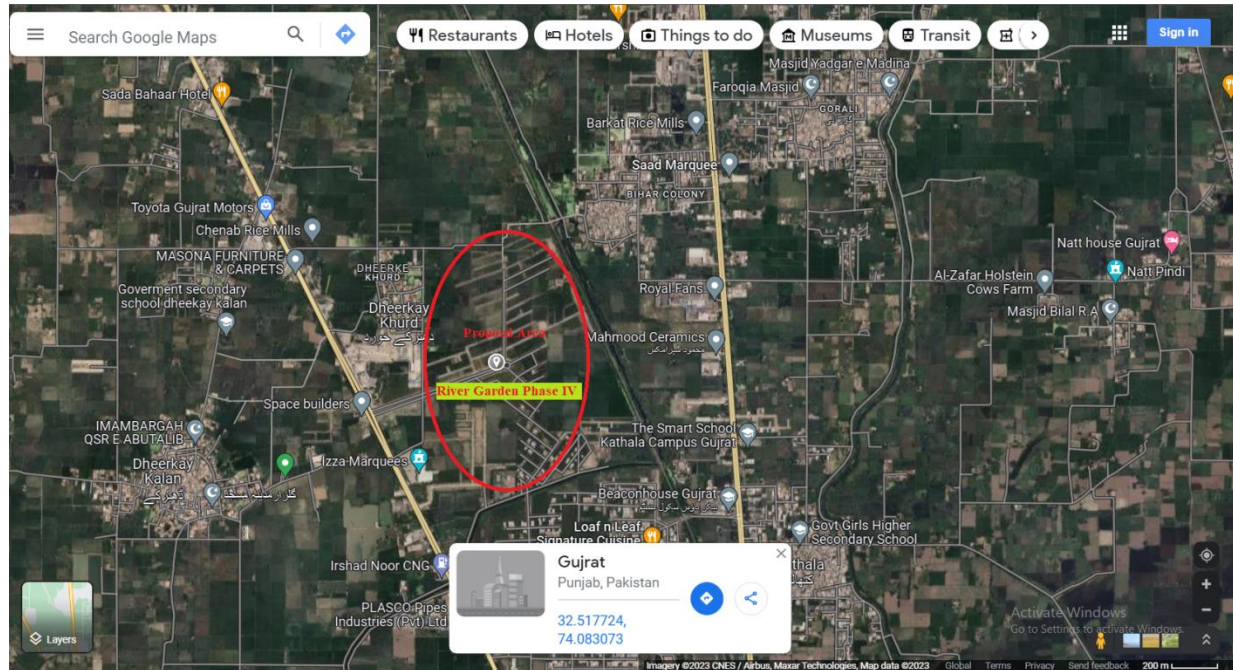
9. RECOMMENDATIONS

The Initial Environmental Examination study and survey results are finally evaluated to recommend the following:

- Implementation of EMP must be given top priority.
- During construction phase Create environmental awareness amongst the workers by training.
- Provide guidance to workers on use of PPEs and also make it compulsory for them to use PPEs during construction.
- Installation of fire extinguishers in the premises.
- Use of equipment's with low operating noise levels within PEQS limits and regular monitoring of machines used during construction phase.

ANNEX

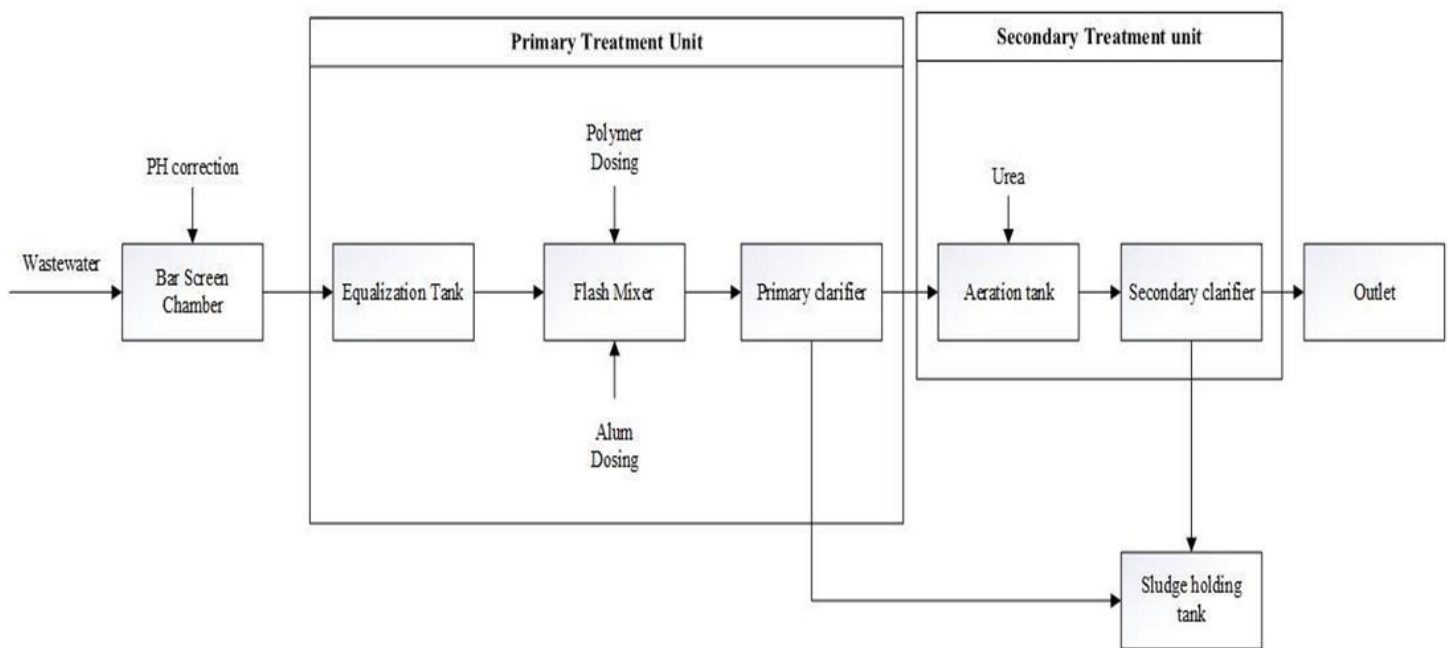
GOOGLE MAP



ANNEX

PROPOSED ACTIVATED SLUDGE PROCESS DESIGN

Effluent Treatment Process Flowchart



ANNEX

SOCIO-ECONOMIC QUESTIONNAIRE

Public Consultation Questionnaire

Environmental Impact Assessment (EIA)

Project Title:

“EIA for Establishment of M/S River Garden Housing Scheme Phase IV”

1- Name of the Person Interviewed _____

2- Age: _____

3-Profession: _____

4- Education: _____

5- Residential address: _____

6-Views about the Project:

Signature of the Interviewer

Signature of the Person Interviewed

ANNEX-IX

REFERENCES

List of References

Some of the documents, reports, among many others consulted during the preparation of this report are as follows:

- i- Data and information provided by client.
- ii- Project location maps etc.
- iii- Information gathered through discussions with the project related persons of the clients.
- iv- Guidelines for Self- Monitoring and reporting by the Industry (SMART),” Final Report, March 1998, approved by Pakistan Environmental Protection Council (PEPC), August 1999.
- v- Technical Design Data regarding the project.
- vi- National Environment Quality Standards for Municipal and Liquid Industrial Effluents, Statutory Notification (S.R.O.), Government of Pakistan, Ministry of Environment, Local Government and Rural Development, S.R.O.549 (1)/2000, Islamabad, the 8th August 2000.
- vii- National Environment Quality Standards for Ambient Air November 2010.
- viii- National Environment Quality Standards Noise Levels November 2010.
- ix- National Environment Quality Standards for Drinking Water November 2010.
- x- Punjab Environmental Protection Act, 2012,
- xi- The Punjab Environmental Protection (Amendment) Act 2011 covers aspects related to:
 - The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development;
 - Establishing complete regulatory and monitoring bodies, policies, rules, regulations and national environmental quality standards;

- To ensure enforcement, the act establishes regulating bodies i.e. Punjab Environmental Protection Council (PEPC) and responsible bodies i.e. Punjab Environmental Protection Agency (Punjab EPA) at Provincial level.

xii- Guidelines for Public Consultations

These guidelines cover:

- Consultation, involvement and participation of Stakeholders
- Techniques for public consultation (principles, levels of involvements, tools, building trust)
- Effective public consultation (planning, stages of IEE where consultation is appropriate)
- Consensus building and dispute resolution

Guidelines for the preparation and review of Environmental Reports, Pakistan

Environmental Protection Agency, Government of Pakistan, October, 1997 (revised—2000).

ANNEX

**PICTORIAL VIEW OF PROJECT SITE, MONITORING &
PUBLIC CONSULTATION**

