ETIHAD GARDEN PHASE-II

Manthar Road, Mouza Bindoor, District Rahim Yar Khan

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

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EXECUTIVE SUMMARY

1. INTRODUCTION

1.1 Title and Location of Project

M/s Punjnad Real Estates (Pvt.) Ltd. (Head office; 143-Ahmad Block, New Garden Town, Lahore-Pakistan) are in the process to establish/develop a housing project namely **"Etihad Garden Phase-II"** located at **"Manthar Road, Mouza Bindoor, Tehsil & District Rahim Yar Khan"**.

1.2 Name of the Proponent

The proponent of the proposed housing project is Mr. Syed Javaad Ali who is CEO of the company (M/s Punjnad Real Estates Private Limited).

1.3 Name of the Organization Preparing the Report

M/s Sustainable Environmental Solutions (SES) has performed this EIA Study. The name, qualifications & other details of persons / team members performing or carrying out the said environmental study has been discussed in the next section. However, contact details of company & representatives are as under:

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2. SCREENING

The standardized approach i.e. defined in applicable regulations was applied. The proposed project was assessed based upon a set of criteria determined by Environmental Protection Agency (EPA) i.e. "Punjab Environmental Protection (Review of IEE & EIA) Regulations, 2022 provided by Government of Punjab, were considered for the purpose of screening mainly.

"According to the Punjab Environmental Protection (Review of Initial Environmental Examination & Environmental Impact Assessment) Regulations, 2022; the nature of the proposed project is a housing scheme and the proposed housing project falls in "schedule II; Category H. Urban Development and Tourism; Serial 1. Housing Schemes more than 300 Kanals" of above mentioned regulations made under section 12 of Punjab Environment Protection Act 1997 (Amended 2012) under which the Environmental Impact Assessment (EIA) study is mandatory for obtaining Construction Phase Environmental Approval. The

Director General, EPA Punjab is the authority to issue the requisite Environmental Approval after proper review of the project."

3. SCOPING

Scoping is the process of identifying the key environmental issues and is perhaps the most important step in an EIA. It occurs early in the project cycle at the same time as outline planning and pre-feasibility studies. Several groups, particularly decision makers, the local population and the scientific community contributed in helping deliberate the issues, which should be considered, and scoping is designed to canvass their views. At this stage the option exists for cancelling or drastically revising the project; equally it may be the end of the EIA process if the impacts be found to be insignificant. Once this stage has passed, the opportunity for major changes to the project is restricted.

Before the scoping exercise can be fully started, the remit of the study was defined and agreed by the relevant parties depending on the institutional structure. At a minimum, those who contributed to determining the remit included those who decide whether a policy or project is implemented, those carrying out the EIA (Sustainable Environmental Solutions) and those carrying out parallel engineering studies relating to the proposal.

4. CONSIDERATION OF ALTERNATIVES

This section covers the project alternatives considered including site alternatives, design / technology alternatives, environmental alternatives & economic alternatives for establishment of the proposed housing project sustainable. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options are adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of the most feasible alternative in terms of economics, environment and health & safety.

5. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This EIA Study has been carried out in the light of the policy guidelines of the Government of Punjab/Pakistan, under the procedures and practices formulated by the Provincial/Federal Environmental Protection Agency (EPA).

The applicable laws for the environmental study of the proposed project are briefly given below:

- National Conservation Strategy, 1992
- PEPO,1983 & PEPA,1997
- Punjab Environmental Protection Act-1997 (Amended 2012)
- National Environmental Policy, 2005
- (Draft) Punjab Environmental Policy, 2015
- Punjab Environmental Protection (Review of IEE and EIA) Regulations, 2022
- Guidelines for Preparation and Review of Environmental Reports, 1997
- National Environmental Quality Standards
- Punjab Environmental Quality Standards

- Guidelines for Critical and Sensitive Area
- Policy and procedures for the Filling, Review and Approval of Environmental Assessments, 1997
- Guidelines for Public Consultation, 1997
- Factories Act, 1934
- Punjab Wildlife Protection Act, 1974
- Forest Act, 1927
- Explosive Act, 1884
- Pakistan Penal Code, 1860

6. DESCRIPTION OF THE PROJECT

M/s Punjnad Real Estates (Pvt.) Ltd. Are in the process to establish a housing project/society namely *"Etihad Garden Phase-II"* located at Manthar Road, Mouza Bindoor, Tehsil & District Rahim Yar Khan.

6.1 Brief outline of the Proposal

The subject proposed project is basically a housing scheme comprising of area measuring 696.9587 Kanals (696.96 Kanals). State of the art, green and environmental friendly housing scheme will be developed to provide modern living style, a clean and green environment to the residents. The said proposed society will be comprising of 04 blocks (Block A, B, C & D) and total numbers of plots will be 1320. Residential plots will be 1121 numbers whereas 199 numbers of plots will be commercial.

Residential plots of various sizes, commercial area, public building, school, masjid, clinic, roads & green belts, graveyard, etc. will be developed. Fool proof security, wide roads and streets, sewerage and drainage facilities, sewerage treatment, efficient solid waste collection & disposal system and complete administration setup for the operation of the society will be provided.

7. DESCRIPTION OF ENVIRONMENT

The environmental studies have been carried out in and around the project area to get baseline environmental data and to know its dimensions including physical, ecological and socio-economic conditions. The information has also been obtained through site visits, interaction/consultation with people living/working in and around the project area. The people have been interviewed and interaction has been made with other stakeholders.

Information has also been obtained from laboratory analysis, Govt. Departments and review of previous studies. During this study physical (topography, geology/seismology, stratigraphy, land use, climate, surface and ground water resources, air quality, noise level, traffic volume), ecological (flora and fauna) and socio-economic components (demographic studies, infrastructure of the area, social amenities, health, education, economic condition, employment in the area, women status, cultural, archeological sites and religious status) have been studied.

8. IMPACT ASSESSMENT

The primary function of an environmental impact assessment study is to predict and quantify the magnitude of potential impacts, assess and evaluate the magnitude. The impact assessment forms the basis for development of Environmental Management Plan. Environmental impacts could be positive or negative, direct or indirect, local or regional and also reversible or irreversible.

All the potential environmental impacts had been identified during literature review, visits of project site and nature & size of the proposed housing project. Various types of environmental issues likely to crop up during life cycle of project are grouped in different phases; project location related impacts, project design related impacts, construction phase impacts and operational phase impacts.

9. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The impacts during all of three phases design, construction and operation of the proposed housing project such as impacts on physical environments including changes in land use/appearance, seismic hazard, soils/geology, impacts on topography, impacts on air quality, noise pollution, impacts on ground water, water consumption, sewage/municipal wastewater generation, municipal solid wastes, emergency conditions; ecological environment including impacts on flora & fauna and socio-economic environment including health and safety of workers, etc. have been considered and estimated/assessed in the light of public comments, public interviews and in meetings with stakeholders.

The impacts of proposed project activities during all the phases (design, construction and operation) have been considered and their remedies have been suggested. These impacts may be on soil, topography, climate, water consumption, the health and safety of workers, surface and ground water, air quality, flora and fauna, existing utilities and impacts due to noise, sewerage, municipal solid waste generation.

Mitigation measures will be adopted during construction & operational phases of the proposed project such as treatment of sewage, development of solid waste management plan, implement environmental monitoring plan (ambient air / stack emissions monitoring, ground water quality, sewage/wastewater quality check & noise level monitoring) during construction & operational phases, overhauling / maintenance schedule & inspection plan, EMMP implementation, fire fighting arrangements, to ensure the health & safety of workers, emergency procedures / emergency preparedness plan, etc.

9.1 The Major Impacts

The major Impacts arising from the proposed housing project are as under in the following table:

IMPACTS	DETAILS / RISKS
Impacts on Air Quality	During operational stage of the proposed project, the continuous operation of air conditioners, exhaust fans, negligible level stack emissions from operation of standby power generator of society office,

	etc. may deteriorate the quality of air if not managed properly. Increase in traffic volume during office/school starting and closing times will also deteriorate the air quality. This will be a moderate negative impact.
Noise	During the operational stage, no as such noise levels are anticipated to be increased as the proposed project is a housing scheme. However, negligible levels of noise will be generated mainly due to movements of vehicles on the roads, for which proper mitigation measures will be required
Water Consumption	During operational stage of the proposed project when it will be fully occupied, approximately 594,000 gallons/day of water will be consumed by the households and commercial entities. The source of water will be groundwater; the groundwater available at proposed project site is sweet and fit for drinking purposes due to location of site near canal. Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table because the proposed housing scheme is located in agricultural area where irrigation channels situated and Sadiq Canal is also located in the proposed project area. Water table will be recharged from the sources like canal water, irrigation channels and rain water through agricultural fields
Sewage / Municipal Wastewater Generation	During operational stage of the housing project when it will be fully occupied, approximately 594,000 gallons/day of sewerage / municipal wastewater will be generated from households and commercial entities which needs proper treatment to comply with PEQS before its final drainage outside the scheme for proper final disposal into wastewater drain/sewer line.
Municipal Solid Waste Generation	Municipal solid waste in quantity of approximately 7.72 tons/day will be generated from households & commercial entities during the operational phase of the proposed housing project when it will be fully occupied, which needs proper collection, handling and disposal on daily basis otherwise it will create mess and moderate level negative impact on environment.
Emergency Response	There are always chances of emergency situations including fire emergency, earthquakes, flood and other manmade disasters such as fires due to electrical short-circuiting, over heating etc. it will be major negative impact.
Impacts on Flora	Operation of the proposed project will not exert any negative impact on flora of site and flora of local area as well because no any emissions will be generated. Furthermore, only sewage will be generated which will be treated first and then disposed properly in environment friendly manner and to avoid any indiscrimination disposal
Impacts on Fauna	Housing project will not impose any negative impact on fauna (wild birds). Because the housing scheme doesn't have any environmental issues like industrial entities including noisy operations, air emissions, hazardous nature wastewater generation, etc. But the beautiful landscaping in the societies would attract the fauna (wild birds) to nest here
Health & Safety of Workers	Certain types of jobs / works do have some health & occupational safety risks for the workers such as maintenance workers including infrastructure repairing; roads maintenance, sewerage system repairing, water supply system repairing, electricity repairing, etc. mechanical workers and security personals. The workers must be trained specific to their jobs and provided with complete PPEs as per nature of their jobs.

9.2 Recommendations for Mitigation Measures:

Following mitigation measures are recommended for the protection & safety of environment:

IMPACTS	MITIGATION MEASURES
Impacts on Air Quality	In order to minimize air pollution, following mitigation measures are recommended: ▪ Plantation will be provided on the main entrance and open places/parks and green belts of the Housing Scheme, which will generate fresh oxygen; ▪ An air quality monitoring and improvement plan will be developed to keep the air pollution levels within the permissible limits of PEQS; ▪ Level of air pollution (as specified in the PEQS) will be monitored on regular basis and appropriate mitigation measures implemented; and ▪ Vehicles with excessive smoke emissions will not be allowed to enter the proposed Housing Scheme/Society. ▪ Latest state of the art technology standby power generator(s), if needed in future during operational phase of the proposed project for society office, will be placed equipped with smoke arrestor, proper height of stack/chimney and sound proof canopy to avoid excessive smoke. ▪ Overhauling/maintenance schedule for standby power generator(s) will be developed and implemented ▪ Standby power generator(s) will be overhauled and maintained well within specific time period/overhauling schedule to avoid excessive smoke.
Noise	▪ World Bank's Pollution Prevention and Abatement Guidelines for ambient noise for the receptors are i.e. 55 and 45 dB (A) during daytime and night time respectively for residential, institutional and educational areas. ▪ There will be prohibition on the use of horns in the Housing Scheme. ▪ Extensive tree plantation along the boundary wall and at open places will also be done to act as sound barrier / sound absorber. ▪ Latest state of the art technology standby power generator(s), if needed during operational phase of the proposed project for society office, will be placed on concrete foundations with shock/vibration/tremor absorbing rubbers and also equipped with smoke arrestor, proper height of stack/chimney and sound proof canopy to avoid excessive noise/vibration/tremor. ▪ Overhauling/maintenance schedule for standby power generator(s) will be developed and implemented ▪ Standby power generator(s) will be overhauled and maintained well within specific time period/overhauling schedule to avoid excessive noise/vibration/tremor.
Water Consumption	Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table as mentioned earlier Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table because the proposed housing

	scheme is located in agricultural area where irrigation channels situated and Sadiq Canal is also located in the proposed project area. Water table will be recharged from the sources like canal water, irrigation channels and rain water through agricultural fields. However, following mitigation measures will also be adopted: ▪ It will be made sure that all faucets, circulating pumps etc. do not leak and are in good repair; ▪ Any leaking or dripping faucet, pump or toilet will be reported immediately; and ▪ Use of water-saving equipment will be practiced both in houses and green areas; ▪ The Proponent will introduce a system for efficient use of resources and will take measures for water conservation that include advice to the residents, the installation of low-flush water closet (1.6 US gallons per flush) instead of the traditional 4-gallons water closet in all the houses. ▪ Green belts, grassy lawns and parks will be developed to recharge the water table which will also help to control the surface runoff during rainy season.
Sewage / Municipal Wastewater Generation	For the treatment and safe/environment friendly disposal of sewage / wastewater following measures will be implemented: ▪ It will make sure to construct small scale septic tanks at every household for initial treatment. ▪ Sewage Treatment Plant will also be installed in the society for the treatment of sewage/municipal wastewater to comply with PEQS limits. ▪ After proper treatment, the treated sewage will be disposed off into wastewater drain/sewer line.
Municipal Solid Waste Generation	▪ Solid waste collection system will be developed for collection of municipal solid waste to be produced from the project during operational stage. ▪ Dust bins / drums / small scale containers will be placed at every street level. ▪ Area (2 numbers of plots) will be earmarked/allocated for collection MSW in the society. ▪ All the MSW from this area will be lifted on daily basis and will be disposed off in accordance with the procedure of TMA/District Govt. policies / law as well as environment friendly manners. ▪ Services of MSW contractor will be hired for lifting of MSW on daily basis ▪ And track record the MSW will be maintained
Emergency Response	▪ An Emergency Response Plan & Preparedness Plan for emergency situation including fire emergency, earthquakes and other manmade disasters will be prepared by the project management. ▪ Emergency Response Plan & Preparedness Plan will be review or revised annually as per need. ▪ Firefighting arrangements including Fire hydrant system connected with water tank reserved for emergency situation, fire extinguishers, fire alarm system, emergency signs, first aid boxes, etc. will be placed at appropriate locations to cop with emergency situations. ▪ Sufficient / appropriate firefighting arrangements as mentioned above will be undertaken according to the requirements of Civil

	Defense Department, Rescue Department 1122 and international standards. ▪ All firefighting, emergency and safety equipment will be frequently inspected, checked periodically, mentioned expiry date and properly maintained.
Impacts on Flora	▪ Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done in green belts and parks within the society. ▪ And maximum tree plantations will be done on available open spaces in and outside/around the project site after completion of project. ▪ To avoid any negative impact on flora of site in and around the site and off site, air emissions will be monitored and kept controlled within PEQS limits.
Impacts on Fauna	▪ Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which will attract the fauna (wild birds) to nest here. ▪ Noise level monitoring plan will also be developed to control excessive noise to avoid any negative impact on fauna which may disturbed them.
Health & Safety of Workers	▪ No worker aged below 18 years or over 60 years shall be employed ▪ The workers will be given information, instruction, training and supervision specific to their job and / or nature / requirement of their work, in safety precautions and procedures. ▪ Complete PPEs shall also be provided to workers such as gloves, hats/helmets, face mask, safety shoes, goggles, etc. as per nature and requirements of their jobs. ▪ First aid medical facility equipped with required antidotes shall be available in the premises, supervised by trained staff. ▪ Medical checkup of all workers shall be carried out at the time of employment and at least once a year thereafter.

10. ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

A complete Environmental Monitoring and Environment Management Plan are recommended to regulate the requirements of Punjab Environmental Protection Act, 1997 (Amended 2012).

A summary of mitigation measures suggested in this EIA Study will be implemented through Environmental Monitoring & Management Plan (EMMP) which will ensure the identification of adverse environmental impacts and help to minimize / eliminate the adverse environmental impacts. The implementation of Environment Management Plan (EMP) covers the possible impacts at design, construction and operational phases. For effective implementation of Environment Management plan an Environmental Management Team headed by an environmentalist will be formed/appointed for operational and construction phases. The contractor will be responsible for environment protection measures and apply good construction techniques to prevent negative environmental impacts.

The proponent / contractor will hire trained staff to ensure the enforcement of Environmental Management Plan. The equipments will be kept in proper condition to save the environment from damage. During construction phase air quality, ground water quality & noise level will be monitored on quarterly basis whereas, in operational phase air quality, ground water quality, wastewater quality & noise level will be monitored on quarterly basis.

The sewage / municipal wastewater to be produced from the proposed project will be treated through STP and disposed off properly to comply with PEQS. Horticulture Team will be formed to attend the issues relating to cleanliness, up-keeping, aesthetic beauty of the project site, general environmental enhancement, tree plantation, vegetation promotion, planting of flowers and ornamental plants on site.

10.1 Proposed Monitoring

To check the environmental performance of the project throughout its lifecycle and compliance of PEQS/NEQS environmental monitoring is essential part and tool which should be conducted to ensure effective surveillance of the environmental parameters at various stages of the project as development/construction and operational. The following environmental monitoring would be implemented:

a. Ambient Air Quality Monitoring

While construction and operational phases of the proposed project ambient air quality will be monitored as per PEQS/NEQS and report should be submitted to EPA.

b. Noise Level Monitoring

Noise levels will be monitored at different points and keep the noise levels will be within PEQS/NEQS limits and report should be submitted to EPA.

c. Groundwater Quality

Groundwater quality will also be monitored and check the compliance the parameters of PEQS/NEQS and report should be submitted to EPA.

d. Wastewater Quality

Wastewater quality parameters will also be monitored as per PEQS/NEQS limits and report should be submitted to EPA.

11. STAKEHOLDERS CONSULTATION

Consultations and discussions with stakeholders have been carried out on formal and special issues. Consultation is the tool of communication between project holder and public living / working around the project area. Its goal is to improve decision-making and build understanding with individuals, groups and organizations. Such involvement increases long-term viability of the project and helps to resolve constrains if any at the initial stage.

During the Social Impact Assessment study, stakeholders were consulted in groups and individuals were interviewed. Group discussions were held to obtain feedback from the stakeholders. The proximity of the project area is residential and commercial or urban setup; however, on the large scale the proposed study area is agricultural in nature. Discussions were held with Government and private offices and shops as well as EPA field office.

12. CONCLUSION & RECOMMENDATIONS

The mitigation measures recommended in the EIA Report are sufficient to commence, complete and operate the proposed housing project in environment friendly manner. The proposed project is suitable from environmental point of view. Recommendations have also been suggested for the safe operation of the society and for the protection of environment.

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Section 1: INTRODUCTION

1.1 General

This section of the report provides an overview of the project including purpose of the report, approaches and methodology, extent of EIA study, objective of the project, scope of study, consultant details, structure of the report etc. In addition, it depicts need for Environmental Impact Assessment (EIA) Report for the proposed housing project.

1.2 Proposed Project

M/s Punjnad Real Estates (Pvt.) Ltd. Are in the process to establish a housing project/society namely "Etihad Garden Phase-II" located at Manthar Road, Mouza Bindoor, Tehsil & District Rahim Yar Khan. The subject proposed housing project is spread over an impressive area of 696.9587 Kanal (696.96 Kanal).

1.3 Purpose of Report

The main objectives of this Environmental Impact Assessment (EIA) Report are to identify the baseline environmental profile including physical environment, ecological environment & socio-economic conditions, to examine project alternatives including alternate sites, and to study the potential impacts along with formulation of suitable mitigation measures for an environment friendly implementation of the proposed project site and around the project area.

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

1.4 Identification of Project and Proponent

a. Identification of the Project

The subject proposed project is basically a housing society located at Manthar Road, Mouza Bindoor, Tehsil & District Rahim Yar Khan.

b. Proponent

The proponent of the proposed housing project is Mr. Syed Javaad Ali who is CEO of the company (M/s Punjnad Real Estates Private Limited).

1.5 Need for Environmental Impact Assessment (EIA) Report

It is mandatory provision to carry out Environmental Reports (IEE / EIA) to obtain Environmental Approval from provincial agency for different projects before commencement of construction or operation.

- **Section 12 of PEPA-1997 (As Amended 2012):**

Initial Environmental Examination and Environmental Impact Assessment –
(1) According to the Section 12 of Punjab Environmental Protection Act, 1997 (As Amended 2012) *"(1) No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an initial environmental examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Provincial Agency approval in respect thereof*".
(2) The [Provincial Agency] shall:-
(a) review the Initial Environmental Examination and accord its approval, or require submission of an Environmental Impact Assessment by the proponent; or
(b) review the Environmental Impact Assessment and accord its approval subject to such conditions as it may deem fit to impose, require that the Environmental Impact Assessment be re-submitted after such modifications as may be stipulated, or reject as being contrary to environmental objectives.

- **Punjab Environmental Protection (Review of IEE & EIA) Regulations, 2022**

According to the Punjab Environmental Protection (Review of Initial Environmental Examination & Environmental Impact Assessment) Regulations, 2022 the proposed housing project falls in "schedule II; Category H. Urban Development and Tourism; 1. Housing Schemes more than 300 Kanals" for which EIA of the project is a mandatory requirement.

- **Environmental Approval / NOC Under Section 12**

So, in the light of above mentioned laws and regulations Environmental Approval under section 12 of Punjab Environmental Protection Act, 1997 (As Amended 2012) for the establishment of the said housing scheme is mandatory. To obtain the above mentioned Environmental Approval/NOC this EIA Study has been carried out.

This Environmental Impact Assessment (EIA) Study will cover the Section 12 of PEPA, 1997 (amended 2012) for obtaining the Environmental Approval for construction or operation of the project.

1.6 Approaches and Methodology

The existing information to establish a database for the EIA of the proposed project was collected from different government departments; review of previous studies and through site visits of the proposed housing project.

The SIA of the proposed project site was conducted through consultation with the community. The locals / stakeholders were interviewed to get their comments and views regarding the development of the proposed housing project. The proximity of the proposed site is residential cum commercial (though the area is of agricultural nature in the broad spectrum); the locals/stakeholders were interviewed.

1.7 Extent of EIA Study

Following factors during design, construction and operational phases have been taken into account to assess the Environmental Impacts of the proposed housing project:

- Environmental Impacts due to land use, location, wastes generation including solid waste, wastewater & air emissions, utility services consumption, noise, oil/fat generation etc.
- Environmental Impacts on physical resources i.e. soil, topography, geology, climate, air quality, etc. ecological resources i.e. flora & fauna and socio-economic environment like health and safety of workers.

1.8 Magnitude of Efforts

Visits to the project site and surrounding area have been done. All the potential/possible stakeholders such as locals, EPA (local officials), Govt. of Punjab and private community have been contacted to get the relevant data, for preparation of EIA Study. Primary & Secondary Data has been analyzed and previous studies have been reviewed.

1.9 Details of Consultants

M/s Sustainable Environmental Solutions (SES) has performed this EIA Study. The name, qualifications & contact details of persons / team members performing or carrying out the said environmental study is attached as annexure. The contact detail of representatives is as follows:

Consultant Company / Firm Details:

Contact: Sustainable Environmental Solutions (SES)
Address: Office S-9, 2nd Floor, Fazal Apartments, 5-Faiz Road, Muslim Town, Lahore - Pakistan
Tel: +92 42 35862622
Cell: +92 321 4111718

Team Members:

The details about team members including qualification & experience is as under:

Waheed Ahmad
Team Leader / Coordinator
Contact #: 0321-4111718

A. Qualification

- M. Phil Environmental Sciences (PU)
- M.Sc. Applied Environmental Sciences (PU)
- Post Graduate Diploma in Environmental Laws (PU)
- NEBOSH IGC *"Occupational Safety & Health"*
- IOSH *"Managing Safely"*
- One Year Diploma in Environmental Management (MIIM)
- HABC Level 2 in Fire Safety (QCF)
- International Workplace Health & Safety (British Safety Council)
- Occupational Health & Safety Management Training

	(OHSAS 18001) • Environmental Audit Training; ISO 14001 – Lead Auditor Course **B. Experience** 10 years of experience as Environmentalist for carrying out EIA Studies, IEE Studies, EMPs, Environmental Compliance Status Reports for various projects.
Yahya Aslam Bambal Team Member / Environmental Consultant	**A. Qualification** • M. Phil Environmental Sciences (PU) • M.Sc. Applied Environmental Sciences (PU) • Post Graduate Diploma in Environmental Laws (PU) • NEBOSH IGC *"Occupational Safety & Health"* • IOSH *"Managing Safely"* • HABC Level 2 in Fire Safety (QCF) • International Workplace Health & Safety (British Safety Council) • Occupational Health & Safety Management Training (OHSAS 18001) • Environmental Audit Training; ISO 14001 – Lead Auditor Course • Training in *"Skills in Administration"* (Pakistan Institute of Management) • *"Value Based Management"* (Pakistan Institute of Human Development) **B. Experience** 09 years of experience as Environmentalist for carrying out EIA Studies, IEE Studies, EMPs, Environmental Compliance Status Reports for various projects.
Zia-Ud-Din Kasuri **Advocate Supreme Court** (Member Legal)	• M.A • LLM, M. Phil • LLB (Shariah & Law) • Post Graduate Diploma in Environmental Laws (PU)

1.10 Brief Description of Nature, Size and Location of Project

a. Nature & Size

The subject proposed project is basically a housing scheme comprising of area measuring 696.9587 Kanals (696.96 Kanals). State of the art, green and environment friendly housing scheme will be developed to provide modern living style, a clean and green environment to the residents. The said proposed society will be comprising of 04 blocks (Block A, B, C & D) and total numbers of plots will be 1320. Residential plots will be 1121 numbers whereas 199 numbers of plots will be commercial.

Residential plots of various sizes, commercial area, public building, school, masjid, clinic, roads & green belts, graveyard, etc. will be developed. Fool proof

security, wide roads and streets, sewerage and drainage facilities, sewerage treatment, efficient solid waste collection & disposal system and complete administration setup for the operation of the society will be provided.

b. Location of the Project

The proposed housing project site is located at Manthar Road, Mouza Bindoor, Tehsil & District Rahim Yar Khan

1.11 Roles and Responsibilities

The executing firm/company of the proposed project will be the M/s Punjnad Real Estates (Pvt.) Ltd. (Etihad Garden Phase-II). Roles and responsibilities have been proposed in the EIA report.

1.12 Implementation of Mitigation Measures

Proposed mitigation measures as defined in the EMP will be implemented with responsibilities assigned to various departments and agencies.

1.13 Role of Environmental Protection Agency, Punjab

The main responsibility of Environmental Protection Agency, Punjab will be to monitor the mitigation measures, which will be taken up or implemented by M/s Punjnad Real Estates (Pvt.) Ltd. (Etihad Garden Phase-II).

1.14 Structure of the Report

Section 1 **"Introduction"** Briefly presents the project introduction, purpose of report, identification of project & proponent, details of consultant and brief description of nature, size & location of project.

Section 2 **"Screening"** this section covers the need of environmental study EIA or IEE and describes in which category the project falls as per Punjab Environmental Protection (Review of IEE & EIA) Regulations, 2022.

Section 3 **"Scoping"** briefly presents the scoping of impacts and mitigation measures, spatial and temporal boundaries of environmental assessment, important issues and concerns raised during consultation and significant impacts and factors to be determined.

Section 4 **"Consideration of Alternatives"** covers the different alternatives their selection and rejection criteria which includes Site alternatives, Design / Technology alternatives and environmental alternatives

Section 5 **"Policy, Legal and Administrative Frameworks"** Comprises the policy, guidelines, statutory obligations and roles of institutions concerning EIA study of the proposed project.

Section 6 **"Description of the Project"** Presents relevant information about objectives of project, location and site layout of the project, land use on the site, road access, vegetation features of the site, cost and magnitude of operation, schedule of implementation, description of the project and restoration & rehabilitation plans

Section 7 **"Description of Environment"** presents clear cut picture of existing environmental resources including baseline physical environment, baseline ecological environment & baseline socioeconomic environment. Moreover, this section also covers lab reports of environmental analyses and suitability of the site.

Section 8 **"Impact Assessment"** briefly presents the primary function of an environmental impact assessment study and includes methodologies for impact identification and characteristics of impacts (nature, magnitude, extent & location, timing, duration, reversibility, risk).

Section 9 **"Screening of Potential Environmental Impacts and Mitigation Measures"** Deals with the potential environmental impacts and mitigation measures, which have been proposed to mitigate the environmental impacts of the proposed project including project location, design, construction phase, operational phase and potential environmental enhancement measures.

Section 10 **"Environmental Management & Monitoring Program"** Outlines description of proposed mitigation actions, schedule for implementation and environmental budget, environmental management team, proposed monitoring program to assess performance or output of EMP, proposed EMP reporting & reviewing procedure and any training needs required to ensure implementation of EMP and Monitoring Plans.

Section 11 **"Stakeholders Consultation"** consists of consultation with stakeholders, objectives of consultation, methodology of consultation, categories of stakeholders consulted, findings of overall discussion, etc.

Section 12 "**Conclusions & Recommendations"** This chapter will conclude the whole report.

Section 2: SCREENING

2.1 General

The subject proposed project is an establishment of housing scheme namely "Etihad Garden Phase-II" located at Manthar Road, Mouza Bindoor, Tehsol & District Rahim Yar Khan. The housing society is spread over an area of 696.9587 Kanals (696.96 Kanals).

Screening was performed at the first stage of the EIA process which resulted in a key EIA decision, namely to either conduct the assessment (based on the likely significant impacts) or not conduct it (in the anticipated absence of such impacts). Screening was done as early as possible in the development of the proposal in order for the proponent and other stakeholders to be aware of possible EIA obligations.

2.2 Requirement of Environmental Report for the Proposed Project

The standardized approach i.e. defined in applicable regulations was applied. The proposed project was assessed based upon a set of criteria determined by Environmental Protection Agency (EPA), Punjab i.e. Punjab Environmental Protection (Review of Initial Environmental Examination & Environmental Impact Assessment) Regulations, 2022 provided by Government of Punjab were considered for the purpose of screening mainly.

"According to the Punjab Environmental Protection (Review of Initial Environmental Examination & Environmental Impact Assessment) Regulations, 2022; the nature of the proposed project is a housing scheme and the proposed housing project falls in "schedule II; Category H. Urban Development and Tourism; Serial 1. Housing Schemes more than 300 Kanals" of above mentioned regulations made under section 12 of Punjab Environment Protection Act 1997 (Amended 2012) under which the Environmental Impact Assessment (EIA) study is mandatory for obtaining Construction Phase Environmental Approval. The Director General, EPA Punjab is the authority to issue the requisite Environmental Approval after proper review of the project."

Moreover, following factors were also considered at the earlier stage;

- Magnitude of change in environmental conditions
- Diversity of new features with the existing environment
- Potential for trans-boundary or over large area impact
- Number of people effected
- Likelihood of effecting receptors of other types (fauna and flora, properties such as businesses, facilities) be affected
- Probability of affecting valuable or scarce features or resources be
- Risk of breached environmental standards

- Risk of affected protected sites, areas, features
- High/low probability of the effect occurring
- Long/short duration of effect
- Either effect is permanent or temporary
- Is the impact continuous rather than intermittent?
- If it is intermittent will it be frequent rather than rare
- Reversibility of impacts
- The likelihoods to avoid, or reduce or repair or compensate for the effect

After detailed analysis based on these factors; the proposed housing project was found suitable for Environmental Impact Assessment (EIA) Study rather than Initial Environmental Examination (IEE) Study.

Section 3: SCOPING

3.1 General

Scoping is the process of identifying the key environmental issues and is perhaps the most important step in an EIA. It occurred early in the project cycle at the same time as outline planning and pre-feasibility studies. Several groups, particularly decision makers, the local population and the scientific community contributed in helping deliberate the issues, which should be considered, and scoping is designed to canvass their views. At this stage the option exists for cancelling or drastically revising the project; equally it may be the end of the EIA process if the impacts be found to be insignificant. Once this stage has passed, the opportunity for major changes to the project is restricted.

Scoping for this particular proposal was carried out with two main objectives

i. To pinpoint the problems early allowing mitigating design changes to be made before expensive detailed work is carried out.
ii. To ensure that detailed prediction work is carried out for important issues. So that after identifying the key issues, a full-scale EIA is considered and it incorporates terms of reference for further studies.

3.2 Methodology

Before the scoping exercise can be fully started, the remit of the study was defined and agreed by the relevant parties depending on the institutional structure. At a minimum, those who contributed to determining the remit included those who decide whether a policy or project is implemented, those carrying out the EIA (Sustainable Environmental Solutions) and those carrying out parallel engineering studies relating to the proposal. Following is the step-wise methodology adopted for the scoping of subject proposal.

- The key interest groups, both governmental and non-governmental, were identified – they include EPA, locals / surrounding community and stakeholders

- Since, the people who can be affected by the project need to hear about it as soon as possible; so, scoping session was held inviting the representatives from identified groups and briefing them about the proposal while establishing good lines of communication. Their concerns are discussed in the coming sections.

- The main EIA techniques used in scoping were baseline studies, checklists and matrices. These techniques collected and presented knowledge and information in a straightforward way so that logical decisions can be made about which impacts are most significant.

- The concerns of the stakeholders were listened and noted down. If possible, negative ones were resolved at the spot whereas others area incorporated in the EIA study and decisions are made accordingly.

3.3 Spatial and Temporal Boundaries of Environmental Assessment

Temporal and spatial boundaries for the effects assessment are defined by the characteristics of the project and the Environmental and Cultural Components (VECC) being assessed. These boundaries encompass time period and areas during and within which the VECCs are likely to interact with or be influenced by the project.

Spatial boundaries vary according to the nature of the VECC but generally are defined in terms of:

- A local study area (LSA), where project effects can be predicted with a reasonable degree of accuracy and confidence and impacts are likely to be most concentrated – most of the subject project impacts are local e.g. air emissions, increased noise levels, wastewater and solid waste management, etc.
- A regional study area (RSA) where, depending on conditions (e.g., seasonal conditions, habitat use, more intermittent and dispersed project activities) – subject proposal does not impose any regional impacts

Following table represents the characterization of potential impacts of subject proposal based upon the spatial boundaries;

Table 3.1: Characterization of Potential Impacts Based Upon the Spatial Boundaries

Sr. No.	Potential Impacts	Spatial Boundaries	
		LSA	RSA
1	Air Quality	✓	✓ (if beyond limits)
2	Increased noise levels	✓	
3	Groundwater degradation	✓	
4	Surface water deterioration	✓	
5	Soil quality	✓	
6	Working personnel's Health & Safety	✓	
7	Lowering of ground water table		✓
8	Flora & Fauna	✓	✓

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

- **Baseline** – covers ecological, physical and human-related characteristics of the environment, prior to the initiation of the construction phase;

- **Construction** – includes all activities associated with project construction and before commencement of operational phase such as:

  - Infrastructure development;
  - mobilization of machinery / equipment and supplies to the site by road and air;

- Construction of site facilities including camp, infrastructure, stockpile, waste rock storage dump, water management facilities (diversions, settling ponds, seepage collectors) etc.

- **Camp operations** and personnel transport during construction;

- **Operations** – includes ongoing operational activities of the housing project, construction of houses & commercial entities, residing of residents, generation of sewage and solid waste/MSW.

- **Restoration & Rehabilitation** – includes all activities after completion of project construction stage and before operational phase; the exposed areas of the site will be resurfaced and landscaping will be done to uplift the aesthetics of the project.

Temporal boundaries are also defined for the cumulative effects' assessment, spanning baseline to a point in the future, within which project effects on VECCs are predicted to overlap with effects of other projects or activities.

3.4 Important Issues and Concerns Raised during Consultation

The different stakeholders, surrounding community & locals attended the scoping session. They were briefed about the objective of session, the proposal and its type, applicable regulations and potential environmental and socioeconomic impacts that can be anticipated. Following is a list of concerns raised during the session;

What are checks and balances that exist to make sure mitigation is implemented correctly and how will follow-up happen?

- Will the locals be preferred for every sort of employment – skilled or un-skilled?
- How health & safety of workers will be ensured throughout the construction and operational phase?
- How to eliminate dust / PM pollution throughout the construction phase of the proposed project?
- What arrangements will be made for firefighting / emergency situations?
- How water will be conserved?
- How process solid waste and wastewater will be disposed of to not harm the environment?
- How noise levels will not be let increased?

All of these issues were sorted out during the session and recommendations are incorporated in the EIA study. However, most of the concerns were positive as the proposed housing project is believed to provide employment to a lot of local people thus contributing to national GDP. Also, it will bring urban development in the country at the time when it is already trying to cope up with economic challenges.

3.4. Significant Impacts and Factors to be Determined

Substantial impacts that can be caused by the establishment of subject proposed housing project were identified and discussed with the key stakeholders. Recommendations for appropriate mitigation measures were also exchanged to be incorporated well in EIA study.

Following is the criteria adopted for determining significance of the potential impacts such as acceptability and mitigation measures requirement in relation to Ecological importance, Social importance, and Environmental standards;

Table 3.2: Criteria for Significance of Impacts

Categories	Impacts	Characteristics
Nature	Direct (D)	The environmental parameters are directly affected by the project construction or operation.
	Indirect (ID)	The environmental factor changes as a result of alteration in another parameter.
Duration of Impact	Short Term (ST)	The impact that last only during the construction of the proposed project e.g. noise from the construction activities.
	Medium Term (MT)	Lasting for a period of few months of a year; the project before naturally returning to the original condition such as loss of vegetation due to clearing of campsite, contamination of soil or water by fuels or oil.
	Long Term (LT)	Lasting for period much greater than medium term impact before naturally reverting to the original condition such as loss of soil due to erosion.
Geographical Extent	-	The geographical extent may be local or regional.
Project Phases	-	Designing (Pre-construction Phase), Construction Phase & Operational Phase
Reversibility of Impact	Temporary (T)	The impacts those don't cross ecosystem threshold value of resilience.
	Permanent (P)	The impacts that exceed ecosystem threshold value of resilience.
Likelihood of the Impact	Likely (L)	Impact will probably occur under most circumstances.
	Unlikely (UL)	Impact could occur at some time
	Possibly (P)	Impact may possibly occur at some time
	Rare (R)	Impact may occur but only under exceptional circumstances.
Impact Consequences Severity	Major (M)	When an activity causes irreversible damage to a unique Environmental feature; causes a decline in abundance or change in distribution over more than one generation of an entire population of species of flora or fauna; has long-term effects (period of years) on socio-economic activities of significance or regional level.
	Moderate (Mo)	When an activity causes long-term (period of years), reversible damage to a unique environmental feature; causes reversible damage or change in abundance or distribution over one generation of a population of flora or fauna; has short-term effects (period of

		months) on socio-economic activities of significance on regional level.
	Minor (Mi)	When an activity causes short-term reversible damage to an environmental feature; slight reversible damage to a few species of flora or fauna within a population over a short period; has short term effects on socio-economic activities of local significance.
	Negligible (N)	When no measurable damage to physical, socio-economic, or biological environment above the existing level of public concern; and conformance with legislative of statutory requirements.

Following table represents the significance of determined impacts based upon above given criterion;

Table 3.3: Significance of the Potential Impacts

Categories	Impacts Significance	Potential Impacts						
		Air Quality Deterioration	Increased Noise Levels	Lowering of Groundwater Table	Surface Water Degradation	Soil Quality	Health & Safety	Flora & Fauna
Nature	Direct (D)	✓	✓			✓	✓	✓
	Indirect (ID)			✓	✓			✓
Duration of Impact	Short Term (ST)		✓				✓	
	Medium Term (MT)	✓				✓		✓
	Long Term (LT)			✓	✓			
Geographical Extent	Local	✓	✓			✓	✓	✓
Project Phases	Regional			✓	✓			
Reversibility of Impact	Temporary (T)	✓	✓		✓	✓	✓	✓
	Permanent (P)			✓				
Likelihood of the Impact	Likely (L)	✓					✓	
	Unlikely (UL)							
	Possibly (P)		✓					✓
	Rare (R)			✓	✓	✓		
Impact Consequences	Major (M)							

Severity	Moderate (Mo)		✓				✓	
	Minor (Mi)	✓		✓				✓
	Negligible (N)				✓	✓		

Based upon this identification; mitigation measures are proposed in EIA study. Environmental Management and Monitoring Plan (EMMP) is prepared defining the monitoring program as well to effectively implement the recommended measures.

Section 4: CONSIDERATION OF ALTERNATIVES

4.1 General

This section covers the project alternatives considered including site alternatives, design / technology alternatives, environmental alternatives & economic alternatives for establishment of the proposed project sustainable. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options are adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of the most feasible alternative in terms of economics, environment and health & safety. In particular, it outlines the following options that were considered for this project;

4.2 Site Alternatives, their Selection and Rejection Criteria

4.2.1 Selection Criteria

Selection of the site for the proposed housing project was governed by many considerations, both the economic analysis of the estimated costs as well as judgment as to the modifying effects of other factors which are more the matter of judgment rather than mathematical calculations, and have considerable effect on the smooth working of the project.

The sites were considered for the establishment of proposed housing scheme in Rahim Yar Khan however, there is a rapid trend of urbanization in the subject proposed project area. In the light of general discussion of the factors influencing the industrial location; the sites were evaluated based upon the following criteria;

Land: Suitability, adequacy, and comparable cost of the sites to establish the housing project whenever feasible.

Labor: Availability and affordable wage rates – taking cost to benefit analysis into consideration – of the skilled, semi-skilled, un-skilled person is required.

Transportation: Regular and sufficient transportation facilities for delivery of materials and for the use of the employees.

Market (Attraction of Clientage): Size of the local market and the best available site for the subject proposed project which may attract the customers.

Auxiliary Facilities: Character of community regarding taxes, legal regulations, public up lift services, financial facilities, educational opportunities, etc.

In the light of this criteria; it was found most feasible to establish the proposed project (housing scheme) in the said project area because there is rapid trend of urbanization in this area moreover residential/population/community center and commercial entities are present around the proposed housing project site. The decision was made based upon the following merits:

a) Residential & Community Centers

As mentioned earlier, there is a rapid trend of industrialization in the subject

proposed housing project area as the site is located near residential areas, community centers and urban units. There are numbers of residential entities situated in the neighboring and surrounding of the proposed housing scheme / housing project site like Manzorabad, Etihad Garden Phase-I, Air View Villas, Basti Babbran, Chak No. 113/P, Tibba Alipur, etc. and commercial entities/urban units like Allama Iqbal Open University, Sheikh Zayed International Airport, Etihad Club, HIH Shiekh Khalifa Public School, HIH Sheikh Khalifa Hospital, MacDonald's, Petrol Pumps/filling stations, RYK Hospital, Earles Café, Taj Mahal Marquee, Shahjahan Banquet & Marquee, Chand Event Garden, etc.

All the above mentioned residential areas/community centers and urban units/commercial entities are located in the close proximity of the project and no any type of industrial units/industrial area is present near the proposed project site hence the present site is most suitable for the development of the housing society.

b) Roads and other basic infrastructure:

Basic infrastructure like roads, water, power, telephone, Internet, etc. is available near the project site. Other considerations are the availability of approach road to the project site and good road facilitates for freely movement in the area. The basic facilities are vitally important for the entire project to be run. These facilities also go in favor of the present site selection for the project siting.

c) Trend of urbanization in the area

As mentioned earlier, there is a rapid trend of urbanization in the subject proposed project area.

d) Availability of Manpower

Technical, skilled and unskilled labor is required for construction and operation of the proposed project. All categories of the labor required for the subject project are available conveniently and plentifully at affordable cost at the present site. This factor also supports the selection of present site for establishment of the project.

e) Market for the project:

There is lot of potential in the said area and in Rahim Yar Khan, the people will purchase the plots in the said proposed housing project so it will also ensure the success of the project.

f) Water:

Underground water aquifer in the proposed project area is fit for potable purposes, hence this is very much important factor to choose the said site for developing the housing society at the same

g) Environment:

And lastly, environmental considerations are extremely important for the proposed housing project siting. The project site is situated in the residential/urban area however the area is agricultural nature in a broad spectrum.

Therefore, settings around the project area do not show any sensitivity of environment. The area is residential/urban and there are limited species of flora and fauna.

These factors carried important weightage in selection of the present site for the project. This factor too supports for the selection of the said site. Taking into consideration all the above-described factors the selected site is the most suited for installation of the project.

4.2.2 Rejection Criteria

Many alternate sites have been considered which have been rejected due to following reasons:

a) Non availability of basic infrastructure

One of the basic reason to reject the other sites were non availability of basic infrastructure like water / sewerage system, roads network, and other basic infrastructure which is essential for running of project.

b) The site surrounded by or near industrial settings

Second reason to reject the other alternate sites is surrounded by industrial settings.

c) Non availability of labour

To run a project man power is basic / major requirement of the project so the others sites were rejected due to non-availability of labor in these areas.

d) Non availability of Electricity / transmission lines in the area

Many sites of those have not even electricity supply in the area.

4.3 Design / Technology Alternatives, their Selection and Rejection Criteria

As the proposed project is development of housing scheme so no as such technology alternatives involved. However, the design of the society is state of the art which make the project green and environment friendly. Moreover, sewerage system of the society has been designed at maximum level to keep consideration for catering the sewerage to be produced from the society without any problem or any stoppage or blockage and also cater the rainwater runoff. Roads, green belts and parks have been designed spaciously according to the

mandatory requirements and international standards to make the society green and uplift the aesthetics of the project.

Etihad Garden Phase-II will provide excellent facilities to its residents. Residents will have access to the basic life facilities within the housing scheme and they will not have to go far for their everyday needs. A large area has been reserved for facilities and open spaces (parks and Green Belts). Housing scheme has its own graveyard. Scheme will have fool proof security system with guards at entrance of scheme.

A Complaint Cell will be formed that will take immediate action to solve the problems related to water/sanitation, solid waste, electricity, gas, telephone, etc.

4.4 Environmental Alternatives, their Selection and Rejection Criteria

The main environmental issue from the housing societies is to generation of sewage in a huge quantity from households which require proper treatment to comply with PEQS otherwise it may become reason to pollute the environment having moderate effect. So, the proponent will install sewage treatment plant for the treatment of sewage before its final disposal into wastewater drain/sewer line.

4.4.1 Selection Criteria

The Sewage Treatment Plant is selected on the different factors which are as follows:

Less Bad Odor
Operation of wastewater treatment plants produce bad odor, as the proposed project is a housing society lot of people will reside so, the proponent and the residents of the society can't afford such type of treatment facility which may produce high levels of odor.

Less Sludge Production
Second factor is sludge production, operations of treatment plants also involve sludge generation, handling and disposal in an environmental friendly manner. It also requires to construct drying beds or installation of sludge pressing machines. So that type of treatment plant or facility will be selected which may produce low levels of sludge.

Low Operation & Maintenance Cost
Every treatment facility needs operation and maintenance cost so low operation & maintenance cost treatment plant will be compatible for the proposed housing project.

Treating the Sewerage to desired levels
This factor is very much important the sewage treatment plant must be efficient and compatible to treat the domestic/municipal wastewaters to the desired levels as prescribed by PEQS.

Low labor cost
Waste water treatment systems usually have a group of people handling the daily operations. So that type of STP would be prefer which requires low levels of group of people.

Low foot prints
A common problem for the proponents of the project is to allocate large volume of space for installations of STP and tank requirements so low foot print required STP will be selected.

Low need of Digesting Enzymes
In the biological waste water treatment plants dosing of digesting enzymes and chemicals are involved which may add up the cost of daily operations of STP. So low need of digesting enzymes or chemicals type of STP will be selected.

4.4.2 Rejection Criteria

Numbers of factors may play vital role to reject the Sewage Treatment Plants which are as follows:

Required Large Space
Many types of treatment systems required large foot prints in terms of intensive land use for installation their components specially construction of tanks. So, these types are not compatible the proposed project to install.

High Capital Acquisition
Usually waste water treatment plants require large numbers of electro-mechanical equipment sometimes import from other countries which may not only be high levels of capital acquisition but also required large group of people to handle the daily operations of treatment plant.

Dosing of Chemicals Requirement
Many types of waste water treatment plants have the requirements to add chemicals and digesting enzymes for daily operations which may raise the daily operation cost.

Bad Odor
Many treatment plants operation may produce bad odor those are not compatible with the housing projects to install.

Large Volume of Sludge Generation
This is also very important factor to consider while selecting the best type of STP which may not produce large quantity of sludge. It will be difficult to handle the large volume of sludge and finally it proper disposal.

High O & M Costs
Those type of treatment plants which may involved large volume of installation of elector-mechanical equipment and dosing of chemicals & digesting enzymes require group of people to handle daily operations having high costs of daily operations. Parallel they also have the high maintenance costs.

4.4.3 Sewerage Treatment Plants for Housing Schemes

Different types of Sewage Treatment Plants are installed in housing societies those discussed as follow:

a. Activated Sludge Process (ASP) with MBBR

This type of treatment system is designed on Activated Sludge Process (ASP) with addition of MBBR media. The treatment system pumps are centrifugal, with minimal sound and maintenance. This is latest technology treatment plant and compacted shape like in a container. That's why it prefer in societies and apartments for installation because it is container type and concealed.

Sewerage water first enters the Eq tank, with 8 hours HRT. From the Equalization (Eq) tank, our pumps take water at -3.5 m, and pump water into aeration zones through pumps. Aerobically degraded contaminants are removed in the aeration tank and then water flows into the Lamella clarifier. In lamella clarifier settling of remaining sludge takes place. After the lamella clarifier, the water then flows to the break tank. From break tank wastewater is feed into sand & carbon filters for final cleaning and the water flows towards the drain. The sludge from the sludge holding tank is feed to the filter press. The liquid residue of filter press is then again added to the aeration tank-I and Eq tank.

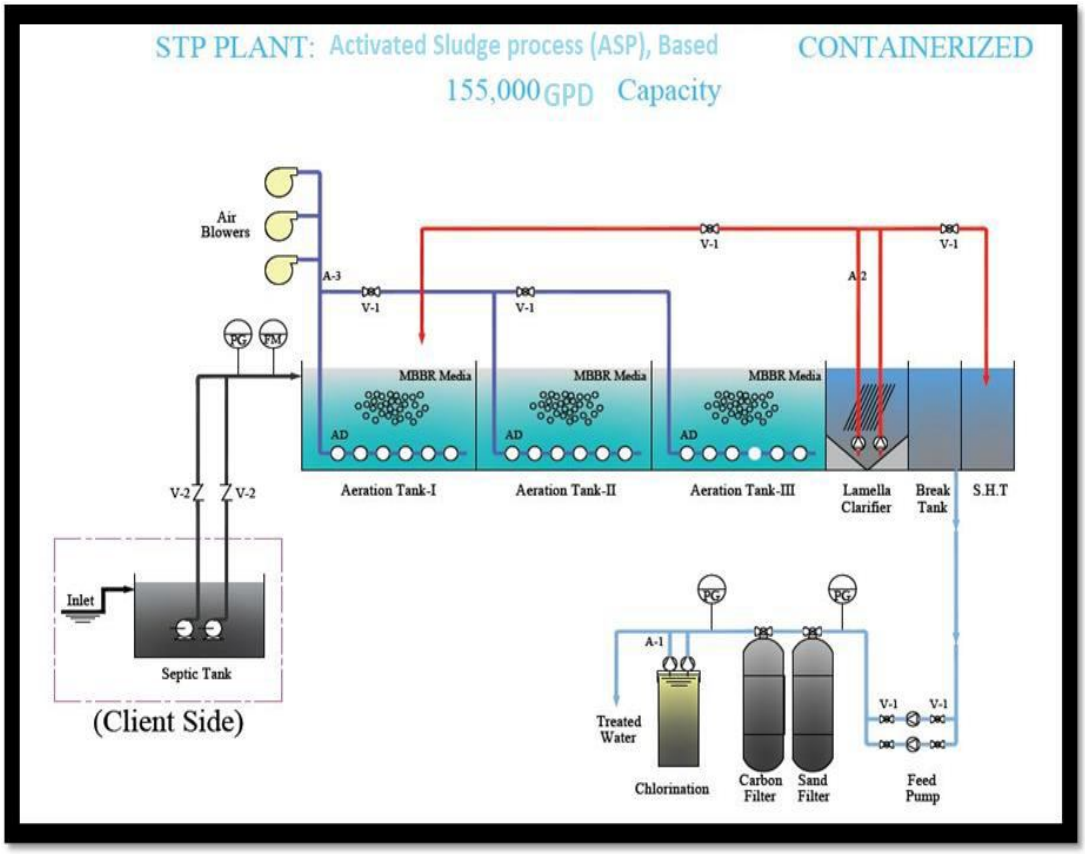


Figure: 4.1: Design Diagram of ASP with MBBR

b. Activated Sludge Treatment Plant (ASTP)

This type is simple activated sludge treatment system as mentioned above type. The activated sludge process is a type of biological wastewater treatment process. For treating sewage or industrial wastewaters using aeration and a biological floc composed of bacteria and protozoa. It uses air or oxygen and microorganisms to biologically oxidize organic pollutants, producing a waste sludge or floc containing the oxidized material.

The general arrangement of an activated sludge process for removing carbonaceous pollution includes the following items: An aeration tank in sewage treatment plant where air is injected in the mixed liquor. This is followed by a settling tank usually referred to as “final clarifier” or “secondary settling tank” to allow the biological flocs that is the sludge blanket to settle. Thus, separating the biological sludge from the clear treated water. Part of the waste sludge is recycled to the aeration tank and the remaining waste sludge is removed for further treatment and ultimate disposal.

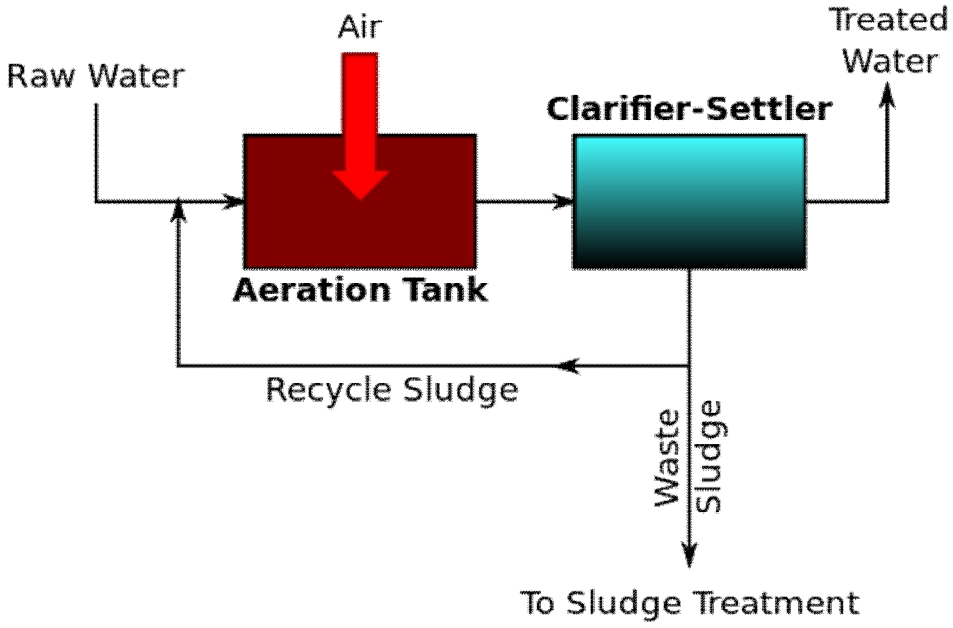


Figure: 4.2: Design Diagram of ASTP

c. Trickling Filter

A trickling filter is a type of wastewater treatment system. It consists of a fixed bed of rocks, coke, gravel, slag, polyurethane foam, sphagnum peat moss, ceramic, or plastic media over which sewage or other wastewater flows

downward and causes a layer of microbial slime (biofilm) to grow, covering the bed of media. Aerobic conditions are maintained by splashing, diffusion, and either by forced-air flowing through the bed or natural convection of air if the filter medium is porous. The treatment of sewage or other wastewater with trickling filters is among the oldest and most well characterized treatment technologies.
The fundamental components of a complete trickling filter system are:

- a bed of filter medium upon which a layer of microbial slime is promoted and developed;
- an enclosure or a container which houses the bed of filter medium;
- a system for distributing the flow of wastewater over the filter medium; and
- a system for removing and disposing of any sludge from the treated effluent.

d. Membrane Bioreactor

Membrane bioreactor (MBR) is a combination of membrane processes like microfiltration or ultrafiltration with a biological wastewater treatment process, the activated sludge process. It is now widely used for municipal and industrial wastewater treatment. In general, there are two different MBR configurations;

- Submerged membrane bioreactor (SMBR) and
- Side stream membrane bioreactor.

In the first configuration, the membrane is located inside the biological reactor, submerged in the wastewater. In the latter configuration, the membrane is located outside the reactor, as an additional step after biological treatment.

e. Rotating Biological Contactor (RBC)

A rotating biological contactor or RBC is a biological fixed-film treatment process used in the secondary treatment of wastewater following primary treatment. The primary treatment process involves removal of grit, sand and coarse suspended material through a screening process, followed by settling of suspended solids. The RBC process allows the wastewater to come in contact with a biological film in order to remove pollutants in the wastewater before discharge of the treated wastewater to the environment, usually a body of water. A rotating biological contactor is a type of secondary (biological) treatment process. It consists of a series of closely spaced, parallel discs mounted on a rotating shaft which is supported just above the surface of the wastewater. Microorganisms grow on the surface of the discs where biological degradation of the wastewater pollutants takes place.

Rotating biological contactors (RBCs) are capable of withstanding surges in organic load. To be successful, micro-organisms need both oxygen to live and food to grow. Oxygen is obtained from the atmosphere as the disks rotate. As the micro-organisms grow, they build up on the media until they are sloughed off due to shear forces provided by the rotating discs in the sewage. Effluent from the RBC is then passed through a clarifier where the sloughed biological solids in suspension settle as a sludge.

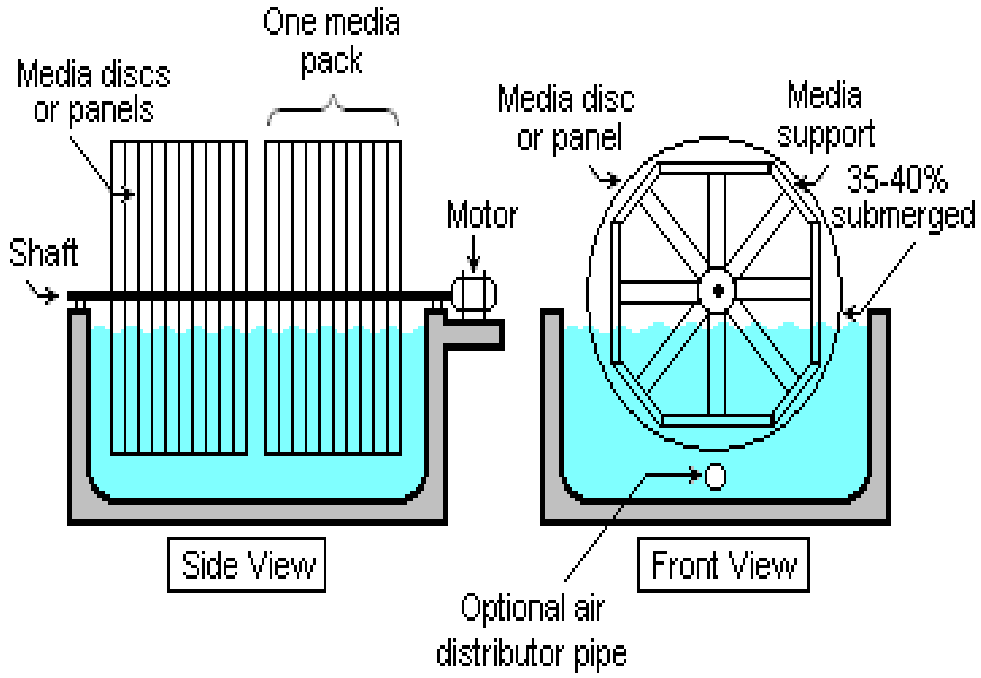


Figure: 4.3: Design Diagram of RBC

4.4.4 Treatment Plant for Proposed Housing Project (Waste Stabilization ponds)

Waste stabilization ponds (WSPs or stabilization ponds or waste stabilization lagoons) are ponds designed and built for sewage treatment to reduce the organic content and remove pathogens from wastewater. They are man-made depressions confined by earthen structures. Sewage / municipal wastewater or "influent" enters on one side of the waste stabilization pond and exits on the other side as "effluent", after spending several days in the pond, during which treatment processes take place.

Waste stabilization ponds are used worldwide for sewage treatment and are especially suitable for developing countries that have warm climates. They are frequently used to treat sewage and industrial effluents, but may also be used for treatment of municipal run-off or stormwater. The system may consist of a single pond or several ponds in a series, each pond playing a different role in the removal of pollutants. Waste stabilization ponds involve natural treatment processes which take time because removal rates are slow. Therefore, larger areas are required than for other treatment processes with external energy inputs. Waste stabilization ponds described here use no aerators. High-performance lagoon technology that does use aerators has much more in common with the activated sludge process. Such aerated lagoons use less area than is needed for traditional stabilization ponds and are also common in small towns.

WSP Systems comprise a single series of following ponds:

- **Anaerobic Ponds**
- **Facultative Ponds**
- **Maturation Ponds**

in essence, anaerobic and facultative ponds are designed for BOD and SS removal and maturation ponds for pathogen removal.

a. Anaerobic Ponds

Anaerobic ponds receive raw sewage / municipal waste water. They have a smaller surface area compared to facultative ponds and are also deeper (usually 2.0 to 5.0 m). The depth decreases the influence of oxygen production by photosynthesis, leading to anaerobic conditions. Depending on loading and climatic conditions, these ponds are able to remove between half to two thirds of the influent BOD. This significantly decreases the load of organic matter that goes to the facultative ponds, and thus decreases their required size.

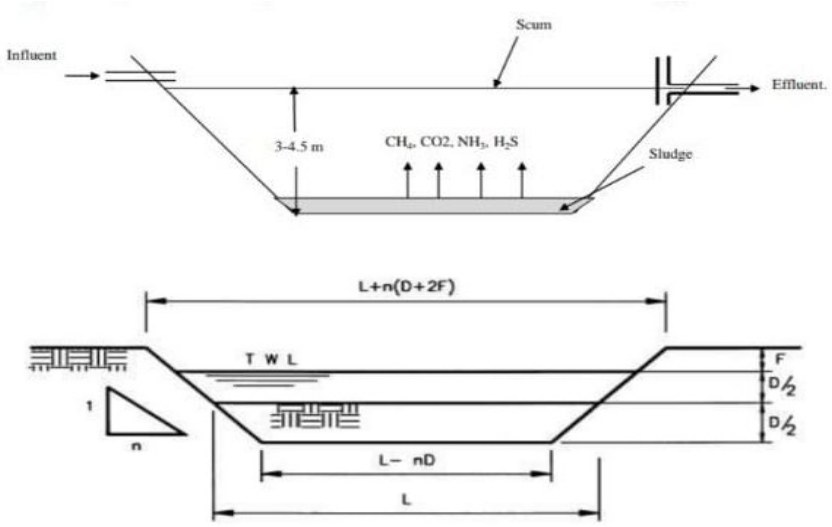


Figure 4.4: Diagrams of Anaerobic Pond

b. Facultative Ponds

Facultative stabilization ponds that receive raw sewage are called primary facultative ponds. If they are receiving sewage that has already been treated in anaerobic ponds, they are called secondary facultative ponds. Compared with anaerobic ponds, facultative ponds are shallower (1 to 2 m deep) and have much larger surface areas. They are designed for BOD removal on the basis of a relatively low surface loading rate to permit the development of a healthy algal population. The surface area is important because it allows atmospheric oxygen to dissolve and sunlight radiation to penetrate the water. This allows for photosynthetic activity to occur which produces more oxygen.

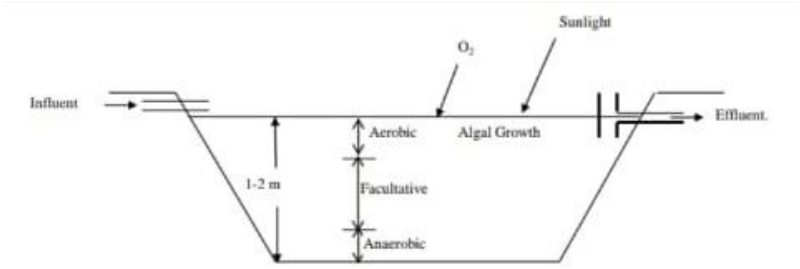


Figure 4.5: Diagram of Facultative Pond

c. Maturation Ponds

The primary function of the Maturation Ponds is the removal of excreted pathogens. A series of maturation ponds receives the effluent from facultative ponds. Maturation ponds must be shallow (around 1.0 m depth or less) with a great surface area so that more oxygen can dissolve into the water giving the bacteria enough oxygen to properly function. The size and number of maturation ponds is governed mainly by the required bacteriological quality of the final effluent. Maturation ponds are well oxygenated throughout the day.

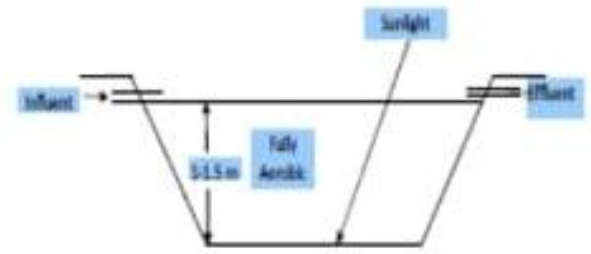


Figure 4.6: Diagram of Maturation Pond

4.5 Economic Alternatives, their Selection and Rejection Criteria

Among consideration of alternatives of economic / business, many factors have been considered including first of all practical experience in hand & already involved in the current business, investment in hand of owner / proponent, current rate for potential of success rate of project in the market, etc.

4.5.1 Selection Criteria of Housing Project

The current business of housing scheme has been selected after consideration of above mentioned reasons / factors. The owner / proponent has vast experience of housing schemes running because Etihad Garden Phase-I is successfully running in the area. Moreover, the proponent has a specious piece of already its own land which is best and suitable for the current housing project. Further the following factors also goes in favor for selecting the current project of housing society development:

- The proponent already has its own land located at prime location which is best for the current housing project
- The proponent has vast experience of housing schemes development and

running

- Increasing demand of housing project in the area / all over the Pakistan due to increasing in population and change of trends and traditions because people want clean and green environment for better living standards, fool proof security system 24 hours, spacious parks, roads, green belts, etc.
- Etihad Garden Phase-I running successfully in the proposed project area
- Housing projects have very low levels of pollution load on environment
- Housing schemes uplift the aesthetics of the area as well as socio-economic conditions

4.5.2 Rejection Criteria of other Economic Activities

There are many reasons to reject the other economic activities / businesses / industrial activity because of no practical experience in hand of proponent, causing pollution / negative impact on environment including its dimensions physical environment, ecological environment, socio-economic environment, low market potentials, etc. The details are as under:

a) Cement Plant

Keeping in view of Lucrative Margins in the Cement Sector with ever rising demand in Construction Industry the Management also conducted a study on the prospects of investment in a Cement Plant. There were hurdles in operating the Cement Plant effectively, like the Market is highly saturated with Big Players that do not let the new entrants operate in the Market. On the other hand, the company had no prior experience of doing business in this sector. So being a highly risky project management rejected the proposal.

Secondly in cement industry there are significant negative impacts on environment form cement industry operations especially in context of air emissions. Furthermore, mining leases for basic ingredients such as lime stone & clay stone have also a parallel full-time operation/business which is part of cement industry.

b) Textile Industry

The third alternative was to invest in any particular sector of Textile Industry. A study was conducted by the team. The project was thoroughly discussed and was rejected by the senior management of the Company on the grounds of the adverse Power supply, high Production Cost and depressed foreign demand of Pakistani products. So, considering the high-risk profile of the project it was rejected.

Secondly, Textile industry (dyeing & printing) has lot of environmental problems as compare to Induction Furnace such as huge amount of wastewater generation.

c) Car Manufacturing Unit

The third business alternative was in an establishment of car manufacturing unit. A study was conducted by the team and the project was thoroughly discussed and rejected due to requirement import and the current situation of the country is not helpful in this context.

Further, renowned manufacturing companies are working in the market so there would be no market for new comer. The car manufacturing plants also have significant impacts on environment in terms of air emissions and liquid wastes.

d) Leather Manufacturing Unit / Tanneries

The fourth economic alternative was investment to establish a tanning unit / leather manufacturing. A thorough study was conducted and it is decided, this business is not suitable from many points of views. Huge numbers of chemicals are used in the manufacturing of leather from first step to final as well as huge consumption of water is others ultimately reason for generation of severe nature hazardous wastewater.

Further, no market in the Rahim Yar Khan for this business and proponent has no experience to run this business.

Section 5: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

5.1 General

This section deals with the current policy as well as legal and administrative framework related to carrying out of Environmental Impact Assessment (EIA) study of various projects.

Like other Projects, the proposed Project, before its execution, is required to go through an Environmental Impact Assessment, in accordance with the provisions of the Punjab Environmental Protection Act, 1997 (Amended 2012).

5.2 Existing Regulations and Legal Framework

This EIA Study has been carried out in the light of the policy guidelines of the Government of Pakistan and Government of Punjab, under the procedures and practices formulated by the Federal / Provincial Environmental Protection Agency (EPA).

5.3 Relevant Legal / Institutional Framework

The applicable laws for the environmental study of the proposed housing project are briefly given below. The proponent of the proposed project will abide by the applicable laws and regulations.

5.3.1 National Conservation Strategy, 1992

On March 1, 1992, the Cabinet of Pakistan approved the National Conservation Strategy. It describes the stark reality of the country's deteriorating resource base and its implications for what is still largely a natural resource-based economy. It sets forth the beginnings of a plan to integrate environmental concerns into virtually every aspect of Pakistani economic life.
The strategy has three overriding objectives: conservation of natural resources, sustainable development, and improved efficiency in the use and management of resources.

5.3.2 PEPO, 1983 and PEPA, 1997

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO), which has now been replaced by the PEPA, 1997, through an Act of Parliament.

Under Sec. 8 of Environment Protection Ordinance (EPO) 1983, it was necessary to carry out IEE / EIA for all development projects, but there were no IEE / EIA regulations under that ordinance.

Under section 12 of the Pakistan Environmental Protection Act (PEPA, 1997), it is mandatory to carry out an IEE / EIA of all development projects causing significant environmental impacts.

5.3.3 Punjab Environmental Protection Act, 1997 (As Amended 2012)

On 18th April 2012, the Government of Punjab has notified the above mentioned environment act after minor amendments. So, the section 12 of the same act is also for obtaining of Environmental Approval. The section 12 is as under:

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

5.3.4 National Environmental Policy 2005

Government of Pakistan (GOP) has notified National Environmental Policy 2005, for different projects / aspects in which guidelines/priorities have been given to undertake/commence the projects having significant environmental impacts.

5.3.5 (Draft) Punjab Environmental Policy, 2015

The Punjab Environment Policy 2015 provides an overarching framework for addressing the environmental issues facing Punjab, particularly pollution of fresh water bodies, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, water logging, natural disasters and climate change. It also gives directions for addressing the cross sectoral issues, underlying causes of environmental degradation to meet national and international obligations. The theme of the Punjab Environment Policy 2015 is sustainable development in the sense of enhancement of human well being.

The Punjab Environment Policy provides broad guidelines to Provincial Governments and Local Governments for addressing environmental concerns related to them and ensuring effective management, restoration, enhancement of environmental resources and ensuring their sustainable use. The Punjab Environment Policy is a guide for actions in regulatory reform, programs and projects for environmental conservation; and will review and ensure the enactment of legislation, by Provincial and Local Governments. The policy has been approved by the Punjab Environmental Protection Council headed by the Chief Minister Punjab under Section 4 (b) of the Punjab Environmental Protection Act 1997 (amendment Act 2012) and is enforced with immediate effect.

Goal

The Punjab Environment Policy aims to protect, conserve and restore Punjab environment in order to improve the quality of life of the citizens through sustainable development.

Objectives

The objectives of the Policy are:

a. Protection, conservation, rehabilitation and improvement of the environment, prevention and control of pollution and promotion of sustainable development and efficient management and enhancement of environmental resources.
b. Integration of environmental considerations in policy making and planning processes through environmental governance.
c. Integration of environmental concerns in Economic and Social Development.
d. Capacity building of government agencies and other stakeholders at all levels for better environmental management.
e. Meeting national and international obligations effectively in line with the Provincial aspirations.
f. Creation of a demand for environmental protection through mass awareness and community mobilization.

5.3.6 Punjab Environmental Protection (Review of IEE and EIA Regulations, 2022)

The Government of Punjab has issued Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment Regulations 2022) to review the Initial Environmental Examination (IEE) / Environmental Impact Assessment (EIA) Reports.

5.3.7 Guidelines for the Preparation and Review of Environmental Reports, 1997

The GOP has also framed guidelines for the preparation and review of IEE/EIA of projects in various developmental sectors.

5.3.8 National Environmental Quality Standards (NEQS)

According to PEPA, 1997, National Environmental Quality Standards (NEQS) were established for municipal and industrial effluents and air emissions. The latest revision of NEQS carried out in year 2001 is attached as Annexure to this Report.

5.3.9 Punjab Environmental Quality Standards (PEQS), 2016

Under PEPA, 1997 (as amended 2012), Punjab Environmental Quality Standards including for Municipal & Liquid Industrial Effluents, for Industrial Gaseous Emissions, for Ambient Air, for Drinking Water, for Noise, for Motor Vehicle Exhaust and Noise and for treatment of Liquid & Disposal of Bio-medical Waste have been established since 2016. It is mandatory to comply with these standards.

5.3.10 Guidelines for Sensitive and Critical Areas

GOP has issued Guidelines for Sensitive and Critical Areas in October,

1997. The objective of the guideline is to provide guidance to project proponents and other stakeholders in the environmental assessment process, so that the proposed projects are planned and sited in a way that protects the values of sensitive and critical areas.

5.3.11 Policy and procedures for the Filing, Review and Approval of Environmental Assessments, November-1997

Environmental Assessment is the Primary means of managing the approval of new development proposals in Pakistan. Environmental Assessment allows for the systematic examination of proposals, clear procedures which provide for the interests of relevant Government Departments and other stakeholders to carefully considered.

5.3.12 Guidelines for Public Consultation, Pakistan Environmental Protection Agency October, 1997

This guideline is part of a package of regulations and guidelines which include:

- Punjab Environmental Protection Act, 1997 (As Amended 2012)
- Policy and Procedures for filing, review and approval of environmental assessments
- Guidelines for the preparation and review of Environmental Reports
- Guidelines for sensitive and critical areas
- National Environmental Quality Standards (NEQS)
- Detailed sectoral guidelines

5.3.13 Factories Act, 1934

This act was framed in 1934. The Factories Act, 1934 is still the basic charter for the betterment of labour. Chapter III (Health & Safety) of this act provides guidelines for working conditions including occupational health and safety issues in factories.

5.3.14 Punjab Wildlife Protection Act, 1974

This act was framed in 1974 by the Province Punjab and is about of protection and conservation of Wildlife.

5.3.15 Forest Act, 1927

This act was framed in 1927. The Forest Act, 1927 is still the basic charter for the forest departments in Pakistan. This law empowers provincial governments to manage forest areas.

5.3.16 Explosive Act, 1884

This act deals with explosives in prohibiting either absolutely of subject to conditions, the manufacture, possession or importation of any explosive

which is so dangerous in character that, in the opinion of the appropriate Government, it is expedient for public safety to issue the notification.

5.3.17 Pakistan Penal Code, 1860

This defines the penalties for violations concerning pollution of air, water bodies and land. Sections 272 and 273 of this Act deal with the adulteration of food or drink. Noise pollution has been covered in Section 268, which defines and recognizes noise as a public nuisance. *"A person is guilty of a public nuisance who does any act or is guilty of an illegal omission which causes any common injury, danger or annoyance to the public or to the people in general who dwell or occupy property in the vicinity, or which must necessarily cause injury, obstruction, danger or annoyance to persons who may have occasion to use any public right."*

SECTION 6: DESCRIPTION OF THE PROJECT

3.1 General

This section of the report depicts the overview of detailed information about proposed housing project objectives of the proposed project, location and site layout, project description, work force / manpower & machinery requirements, land use on the site, road access, vegetation, cost and magnitude of operations, schedule of implementation, restoration and rehabilitation plans, etc.

3.2 Proposed Project

M/s Punjnad Real Estates (Pvt.) Ltd. Are in the process to establish a housing project/society namely *"Etihad Garden Phase-II"* located at Manthar Road, Mouza Bindoor, Tehsil & District Rahim Yar Khan. The subject proposed housing project is spread over an impressive area of 696.9587 Kanal (696.96 Kanal).

3.3 Objectives of the Project

The main objectives of the proposed project are as under:-

- The aim of the proposed housing project is to build a modern living style housing society for providing to the residents a clean and green environment so that they could live a comfortable life
- Responding to the national and project area priorities, as increase in the demand for housing projects due to population increase and change of trends or traditions
- To enhance / uplift aesthetics of the area
- To provide the employment to the people
- To change the social life style of the area
- To uplift the socio-economic conditions of the area
- Revenue generation for the Government
- To earn profit for the business
- To give a lift to national economy in due course

3.4 Location & Site Layout of the Project

The proposed project site is Manthar Road, Mouza Bindoor, Tehsil & District Rahim Yar Khan. Physical coordinates of the site are as under:

North: Airport Road & Sheikh Zayed Airport, Allama Iqbal Open University
South: Basti Manzorabad
East: Manthar Road
West: Airport, Basti Bindoor

Further, the Site Location Plan and Google Earth Map of the project are as under:

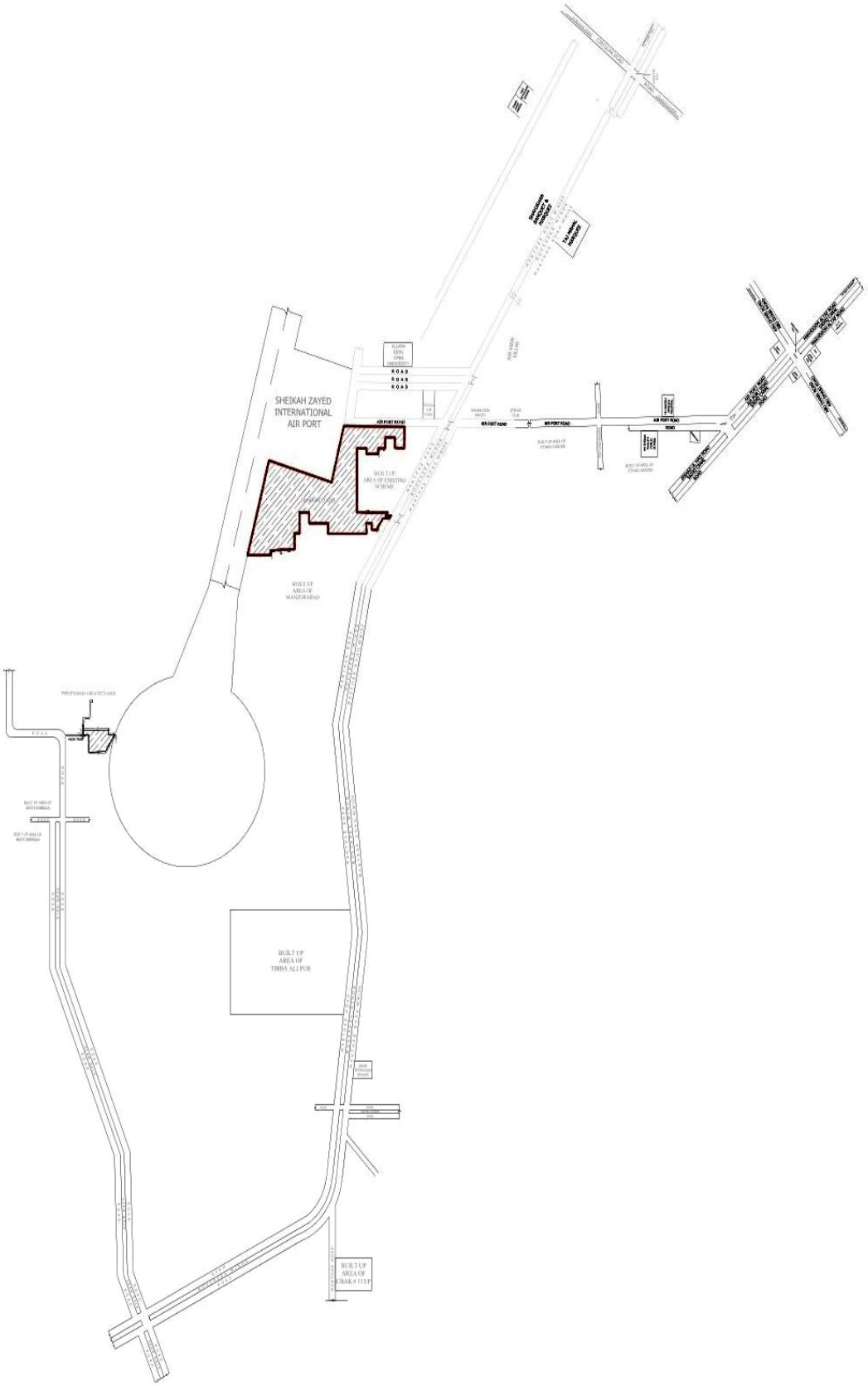


Figure 6.1: Site Location Plan



Figure 6.2: Google Earth Map

3.5 Land use on the Site

At present, the proposed project site is open/vacant land. The construction of the proposed housing project will be started after issuance of Construction Phase Environmental Approval. The pictorial evidence of the site is as under:





View of Proposed Project Site

3.6 Road Access

The project site has access of road from two sides one from Manthar Road and second from Airport Road.

3.7 Vegetation features of the site

As mentioned earlier the proposed housing project site is open/vacant piece of land no as such vegetation is present currently.

3.8 Cost and Magnitude of Operation

The estimated capital cost of the proposed housing project is Rs. 2439.36 Million.

So far as magnitude of operation is concerned the developmental / construction work will be undertaken for the establishment of housing scheme during construction phase and houses will be constructed and residents will be resided during operational phase of the project.

3.9 Schedule of Implementation

Currently proponent is seeking Environmental Approval from EPA Punjab and construction work will be started after issuance of Environmental Approval. The construction work will approximately be completed within 03 years. The various phases involved in the implementation of the project at different levels are given below:

Town Planning: It includes the activities like:

- Town planning work
- site survey & geotechnical investigations
- site clearing work
- infrastructure development
- electrical and mechanical works,
- Building Management and Control System.

Construction Work: Activities of construction include:

- Site clearing
- Demarcation of the Area for various facilities and plots
- Infrastructure works (roads, water supply, sewerage and drainage, gas, electrical works etc.)
- Installation of street lights
- Plantation of plants and grass

3.10 Description of the Project

Project description is given in some detail in the preceding Sections 1 and 3; additional information is provided as under:

6.10.1 Component of Project

The designing of the **"Etihad Garden Phase-II"** has been done in such a way that it should be remarked as one of the most modern and beautiful housing

societies in Rahim Yar Khan due to its pleasing look, unique facilities including green areas that will keep the air fresh all the time. The roads, green belts and parks are spacious and most attractive.

a. Plots Breakup

The details of plots including total number of plots, residential plots, commercial plots and plots in each block are as under in the following table:

Table 6.1: Plots Breakup

PLOTS BREAKUP	
Total Number of Plots	1320 Numbers
Residential Plots	1121 Numbers
Commercial Plots	199 Numbers
BLOCKS	**NUMBERS OF PLOTS**
Block-A	235
Block-B	181
Block-C	466
Block-D	438

b. Statement of Area

Land use / distribution of housing scheme including type of land use, area in Kanal and square feet is given in the following table:

Table 6.2: Statement of Area

SR NO	STATEMENT OF AREA					
	LAND USE		**KANAL**	**MARLA**	**SFT**	**%AVG**
1	Area of Residential Plots		313	00	00	44.91
2	Area of Commerical Plots		36	13	00	5.26
3	Area of Public Buildings	PB Authority	10	15	92	1.54
		PB Sponsors	11	08	174	1.64
4	Area of Parks		50	12	267	7.27
5	Area of Roads		224	17	156	32.27
6	Area of Parking		30	08	24	4.36
7	Area of Society Office		01	00	213	0.15
8	Area of Solid Waste Plot x2		01	02	119	0.16
19	Area of Disposal Plot		01	19	124	0.28
10	Area of Water Works Plot		01	00	239	0.15
11	Area of Graveyard		14	00	00	2.01
Total Area			**696**	19	47	**100.00**
Total area of Land 696.9587 Kanals (696.96 Kanals)						

c. Salient Features of the Proposed Housing Scheme

Following are the main features of the society:

- Fool proof security system
- Optimum use of space
- Wide roads and streets with street lights
- Independent water source with adequate storage in one (01) over head water tank
- Excellent sewerage and drainage facilities with provision of septic tank for each home.
- Sewerage treatment through septic tanks
- Efficient solid waste collection and disposal system.
- Provision of commercial, recreational and religious facilities, i.e. Mosque etc.
- Provision of graveyard for the residents.
- Landscaping of open areas i.e., trees, park, fountains etc.
- Complete administration set up for the operation of society

In short, "Etihad Garden Phase-II" will be a place, which will open a new era in the housing trend of Rahim Yar Khan. It will be a location, where people will get maximum satisfaction.

d. Facilities for the Residents

"Etihad Garden Phase-II" will provide excellent facilities to its residents. Residents will have access to the basic life facilities within the housing scheme and they will not have to go far for their everyday needs. As mentioned in above Tables, a large area has been reserved for facilities and open spaces (parks and Green Belts). Housing scheme has its own graveyard. Scheme will have fool proof security system with guards at entrance of scheme.

A Complaint Cell will be formed that will take immediate action to solve the problems related to water/sanitation, solid waste, electricity, gas, telephone, etc.

e. Environment Friendly Society

"Etihad Garden Phase-II" will be an environmentally friendly scheme. Sewerage water from the houses and commercial facilities will be disposed off into the sewer line after treatment through the septic tanks. The residents will not be allowed to throw their wastes in the open area. The scheme will have its own solid waste collection system. Sanitary workers will be hired by the scheme for this purpose. Final disposal of the solid waste will be done in accordance with the environmentally friendly way.

f. Utilities

All basic infrastructure i.e. roads, water supply, sewerage, electric, gas supply etc. will be provided in this housing scheme. However, as mentioned earlier the water will be supplied from the independent source.

To cater for the water demand, turbine/tube well will be installed with water tank. For handling any unforeseen/accidental fire emergency, fire hydrants will be provided at various locations throughout the scheme.

6.10.2 Manpower and Machinery Requirements

For the development of proposed housing project the following manpower and machinery will be required shown in Tables 6.3 and 6.4:

Table 6.3: Estimated Manpower Requirement

SR	MAN POWER	STRENGTH
1	Project Manager	01
2	Construction Manager	01
3	Supervisor Civil (day)	05
4	Supervisor Civil (night)	02
5	Quantity Surveyor	02
6	Security Guards	08
7	Surveyor	05
8	Manager Admin	01
9	Material Engineer	01
11	Electrician	03
12	Mechanical Foremen	01
13	Mechanics	03
14	Loader Operators	02
15	Store Keepers	05
17	Heavy Duty Drivers	05
18	Batching Plant Operator	05
19	Semi-skilled and unskilled laborers (approx.)	150 - 180

Table 6.4: Machinery Requirements

SR	EQUIPMENT	CAPACITY	NOS.
1	Light Vehicles		02
2	Dewatering Pumps	20 HP	01
3	Air Compressor	10 HP	01
4	Power Generator	70 KVA	01
5	Welding Plant and Gas Cutter Set		01
6	Concrete Transit Mixer	06 m^3	02
7	Grinder (Hand Operator)		01

8	Batching Plant	30 m^3/hr	01
9	Excavator		02
10	Steel Cutting & Steel Bending Machine		01
11	Pay Loader		01
12	Concrete Vibrator		02
13	Tractor with Trolleys		01
14	Rig Machine		01
15	Road Rollers		01
16	Asphalt paver		01

All activities will be carried out in accordance with prevailing environmental management laws and controls so as to avoid any damage to any segment of environment or human health around the project site.

6.10.3 Number of Employees (During Operation Stage)

Approximately 50 numbers of workers will be engaged for the look after of daily operations of society during the operational stage of the proposed project.

6.10.4 Electricity Connection/Load & Standby Power Generator(s)

Approximately 6 MW electricity load will be required to run the proposed housing project during its operational phase.

One new latest state of the art technology; diesel fired stand by power generator with capacity of 200 KVA for society office will be placed to cope with electricity load shedding.

6.10.5 Water Balance; water consumption & source of water

During operational stage of the proposed project when it will be fully occupied, approximately 594,000 gallons/day of water will be consumed by the households and commercial entities. The source of water will be groundwater; the groundwater available at proposed project site is sweet and fit for drinking purposes due to location of site near canal. Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table because the proposed housing scheme is located in agricultural area where irrigation channels situated and Sadiq Canal is also located in the proposed project area. Water table will be recharged from the sources like canal water, irrigation channels and rain water through agricultural fields.

Water Conservation Strategies:

Water consumption by the proposed project (housing society) while its operational phase will not exert any negative impact on water table because the proposed housing scheme is located near canal and also located in agricultural lands. Water table will be recharged from both sources canal water and rain

water through agricultural fields. However, following mitigation measures will also be adopted:

- It will be made sure that all faucets, circulating pumps etc. do not leak and are in good repair;
- Any leaking or dripping faucet, pump or toilet will be reported immediately; and
- Use of water-saving equipment will be practiced both in houses and green areas;
- The Proponent will introduce a system for efficient use of resources and will take measures for water conservation that include advice to the residents, the installation of low-flush water closet (1.6 US gallons per flush) instead of the traditional 4-gallons water closet in all the houses.
- Green belts, grassy lawns and parks will be developed to recharge the water table which will also help to control the surface runoff during rainy season.

6.10.6 Sewage / Municipal Wastewater Generation its treatment & disposal

During operational stage of the housing project when it will be fully occupied, approximately 594,000 gallons/day of sewerage / municipal wastewater will be generated from households and commercial entities which needs proper treatment to comply with PEQS before its final drainage outside the scheme for proper final disposal into wastewater drain/sewer line.

Treatment & Disposal:

- It will make sure to construct small scale septic tanks for every household for initial treatment.
- Sewage Treatment Plant will also be installed in the society for the treatment of sewage/municipal wastewater to comply with PEQS limits.
- After proper treatment, the treated sewage will be disposed off into wastewater drain/sewer line.

6.10.7 Municipal Solid Waste Generation & its disposal

Municipal solid waste in quantity of approximately 7.72 tons/day will be generated from households & commercial entities during the operational phase of the proposed housing project when it will be fully occupied, which needs proper collection, handling and disposal on daily basis otherwise it will create mess and moderate level negative impact on environment.

Disposal*:*

For the proposer, safe and environment friendly disposal of municipal solid waste following measures will be adopted:

- Solid waste collection system will be developed for collection of municipal solid waste to be produced from the project during operational stage.
- Dust bins / drums / small scale containers will be placed at every street level.
- Area (2 numbers of plots) will be earmarked/allocated for collection MSW in

the society.
- All the MSW from this area will be lifted on daily basis and will be disposed off in accordance with the procedure of TMA/District Govt. policies / law as well as environment friendly manners.
- Services of MSW contractor will be hired for lifting of MSW on daily basis
- And track record the MSW will be maintained

6.11 Restoration and Rehabilitation Plans

The estimated life of the first phase of the project is 10-15 years. Much before the project approaches end of its first life cycle it will be completely renovated. All civil structures and related infrastructures will be extensively renovated. Even during its first life cycle, pre-emptive modifications, replacements and refurbishing will be carried from time to time under the "order of the day principle". This will ensure enhancement of the life of the project at very nominal costs. In this way the project life will be further enhanced for another fifty years or so.

All activities will be carried out in accordance with prevailing environmental management laws and controls so as to avoid any damage to any segment of environment or human health around the project site.

6.12 Govt. Approvals and Leases Required by the Project

As far as concerned the Government Approvals / NOCs, the Environmental Approval from the EPA, Punjab is the major requirement. However, the proponent will also obtain relevant NOCs / approvals / permissions from other concerned departments per legal requirements.

SECTION 7: DESCRIPTION OF ENVIRONMENT

7.1 General

This section of IEE Study describes the baseline environmental conditions, which cover the existing environment including its dimensions physical, biological/ecological and socio-economic environment of the project site as well as District Rahim Yar Khan. Data was collected by reviewing secondary data from different universities research articles and publications, Governmental department studies, Non-Governmental organization reports and primary data was collected from the field visit and survey at different timed intervals.

This segment of the study describes the baseline conditions, which cover the existing physical, ecological and socio-economic environment of the project area. Information on these aspects has been derived from the desk study of available data, field visits to the project area as well as information obtained through visits to the Governments departments and other agencies. Information regarding physical environment was collected from within the project area as well as study area. While in case of biological and social environments, effort was made to collect the information from within 2 km around the project area and even upto 10 km in case any direct or indirect impacts were envisaged.

7.2 Introduction

Rahim Yar Khan District is a district in the Punjab province of Pakistan, the city of Rahim Yar Khan is the capital. The district lies between 27°40'-29°16' north latitudes and 60°45'-70°01' east longitudes. The riverain area of the district lies close to eastern bank of the river Indus and Panjnad. The Rahim Yar Khan District is bounded on the north by Muzaffargarh District, on the east by Bahawalpur District, on the south by Jaisalmer (India) and Ghotki District of Sindh province, and on the west by Rajanpur District.

7.3 Baseline Physical Environment

7.3.1 Topography

This district is divided into three main physical features: (a) Riverside area, b) canal-irrigated area, and (c) desert area which is called Cholistan. The Riverside area of the district lies close on the southern side of the Indus River mainly falling in the river bed. The canal-irrigated area lies on the south and is separated by main Minchan Bund. The approximate height of the irrigated area is 150 to 200 meters (490 to 655 ft) above sea level. The third part of the area, called Cholistan, lies in the south of the irrigated tract up to the Indo-Pak border. The surface of the desert consists of a succession of sand dunes rising at places to a height of 150 meters (492 ft) and covered with the vegetation peculiar to sandy tracts





7.3.2 Geology & Geomorphology

Pakistan can be divided into five broad regions on the basis of physical environment and geology, which are the Northern Mountainous Region, the North-western Hills and Balochistan, the Sub-mountain Indus Region, the Potohar Plateau and the Salt Range and the Indus Plain.

The land of Pakistan provides a fascinating exhibition of geological. It is a bonanza of different lithospheric plates, which have been accreted together in such a way that has a rare parallel in the world with respect to its structure, relief, rock types, and landscape. It has an assemblage of rock, which probably has a

complete succession rock ranging from the deep mantle of the earth to rock of the upper lithosphere.

The Northern Mountainous Region consists of the Western Himalayas, the Karakoram and the Hindukush. The region contains a series of high mountains, separated by intervening valleys. The North-western Hills start south of the Kabul River in the Khyber Pakhtunkhwa Province, and extend into Balochistan and Sindh on the right bank of the River Indus and include Kohat Hills, Waziristan Hills, Sulaiman Mountains, Bugti and Marri Hills and Kirthar Hills. The Sub-mountain Indus Region comprises the three plains of Peshawar, Kohat and Bannu, all located west of River Indus. These plains are alluvial filled basins surrounded by low hills and mountain ranges.

The Potohar Plateau has a flat to gently undulating surface, broken by gullies, typical of accelerated erosion. The plateau slopes from north-east to south-west, and mostly drains into River Indus through River Soan, its main hydrological artery. The Salt Range presents a complete geological sequence from Pre-Cambrian to the late Tertiary periods. The Indus Plain essentially forms the western extension of Indo-Gangetic Plain, and is made up of silt, sand and clay brought by the Indus and its numerous tributaries, such as Jhelum, Chenab, Ravi and Sutlej on the east bank, and Kabul, Kurram, Tochi and other smaller rivers on the west bank. The project site is located in the Indus Plain, east of Chenab and Ravi rivers. The Indus Plain covers an area of about 200,000 square miles and is the country's most prolific and prosperous agricultural domain. It is an unrelieved featureless plain of fertile alluvium extending for 650 to 700 miles from the rim of the Potohar Plateau southward to the Arabian Sea. Punjab is located in the northern zone of the Plain, divided into several interfluves, or lands situated between streams, called *doab*s. The quality of groundwater in the Indus Plain varies, being mostly saline and unfit for agricultural use in the south. Extensive areas in both the northern and southern zones of the Indus Plain have been affected by water-logging and salinity.

District Rahim Yar Khan:

Punjab province mostly comprises of plain areas lying in the Indus basin. The Rahim Yar Khan district lies in the Indus basin which is alluvial deposit formed due to river action. Ground is almost flat and 40% of the area is desert of cholistan.

7.3.3 Soils

Soils form major part of environment; their fertility and other special characteristics have close relationship with environment. Climate has great influence on the formation of soils; therefore, study of these factors is of great importance. Soil is a dynamic layer in which many complex physical chemical and biological activities are taking place. Therefore, soil is a dynamic changing body.

Soil scientists restrict the word soil or solum to the surface materials, which over the ages have adopted the distinctive layers or horizons. Soils are made up of

solids, liquids and gases. The solid part of the soil is made up of both in organics and organics. While weathering of rocks produces inorganic particles, the organic solids consist of living and decayed plants. In order to classify the entire soils in Pakistan, the Soil Survey of Pakistan has divided the entire country into nine ecological zones.

Major portion of the Punjab province falls in the Indus plain, which geologically originated in late Pleistocene period by deposition of sediments from the Himalayas into the abyssal sea. In early days the sediments were carried by two river systems, Viz, Indus and Ganges. Later in the geological history, the Ganges River changed its course eastwards. Later, the Indus River and its five major tributaries, viz, Jhelum, Ravi, Beas and Sutlej, carved the deposits of the early river systems. These river systems are spread in the Punjab plains like fingers of a hand, consequently dividing the whole province into four masses of lands called Doabas (meaning the lands between two rivers).

Soils of Proposed Project Area:

The proposed project area is an agricultural nature in a broad spectrum, however site is located within urban area; numbers of residential and commercial entities are located in the close vicinity of the site. Cultivated crops are being grown by irrigation water as well as ground water through tube wells. The main crops being cultivated in the study area include wheat, sugar cane, cotton, rice and maize, etc.

7.3.4 Seismology

According to the seismic map of Pakistan and the Pakistan Building Code Seismic Provisions 2007, Rahim Yar Khan falls in Seismic Zone 2A, i.e. minor damage zone corresponding to Intensity V and VI of the Modified Mercalli Intensity Scale. Distant earthquakes with fundamental periods greater than 1.0 second may cause damage to structures in this zone. A moderate to high intensity earthquake at the project site can adversely impact on the development.

Fig-4.1

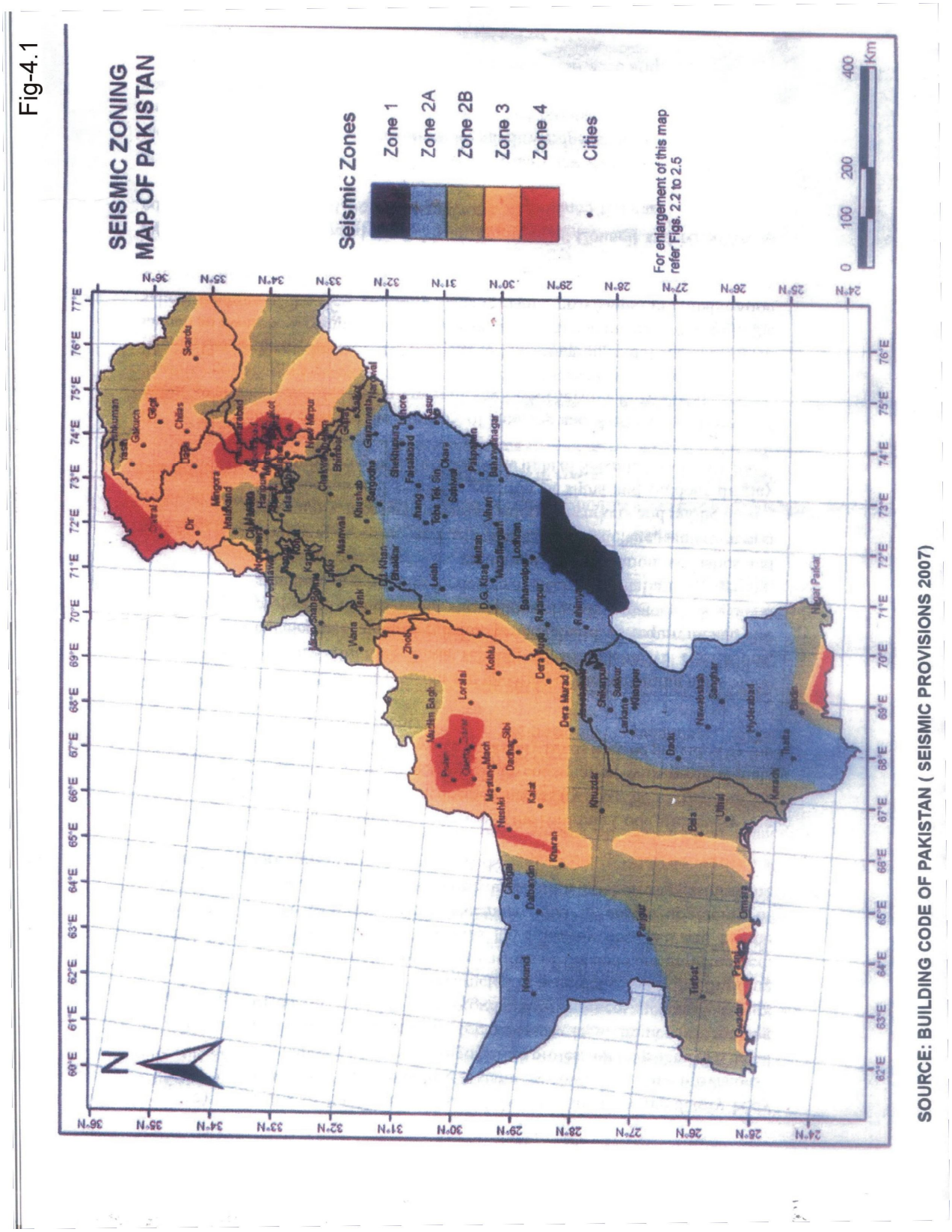


Figure 7.1: Seismic Zoning Map of Pakistan

7.3.5 Hydrology

Hydrological details from surface & groundwater point of view is as under:

a. Surface Water

The social and economic life of the country mainly revolves round this Indus Basin plain and it generates about 90% of the Punjab's total agricultural income.

The Indus Plain does not have a well-defined natural drainage. The introduction of irrigation system therefore resulted in surface and sub-surface drainage problems resulting in water logging and salinity, which has continued to aggravate over the period. This has adversely affected the socio-economic conditions of the large rural population by impairing agricultural production and also creating health hazards. Massive efforts have been undertaken since 1960 to overcome this problem by implementing a large number of surface and sub-surface drainage projects. In spite of these efforts, water logging has not been completely eradicated. Consequently, pockets of wetlands resulting from the water logging are encountered in plains of Punjab. Main canal and its distributory runs across near the project.

b. Ground Water Quality

The microbiological analysis results of ground water are not up to the mark. Groundwater is brackish and not fit for use. Only a few places the sub-soil water is sweat and fit for drinking purposes.

7.3.6 Climate

Pakistan's latitudinal and longitudinal extents and its northern rim of lofty mountains are the two factors having great bearing not only on temperature and rainfall patterns, but also on general circulation of the atmosphere in South Asia. As per widely-used climate classification system developed by Wladimir Koppen, Pakistan has five types of climate. The first type is tropical semi-arid with dry winter, which prevails in the former Karachi, Hyderabad and southern Khairpur divisions. Mean annual temperature is above 18° C. Tropical arid climate characterised by average annual temperature of about 18° C with dry winters is experienced in southern Kalat and the whole of the Indus Plain. The Cold Semi-arid with Dry Summer climate type prevails over Central Kashmir, Peshawar, Dera Ismail Khan, Quetta and northern half of the former Kalat Division. Snow Forest Climate is characterised by average temperature of coldest month below 3° C. Mean temperature of the warmest month is between 9° C and 21° C. This climate covers the northern mountainous areas and parts of Kashmir. Finally, the Extreme Cold climate, with average temperature of the warmest months between 10° C and 0° C, is experienced in eastern and northern parts of Kashmir, Chitral and Northern Areas. The project area falls in the tropical arid climate zone.

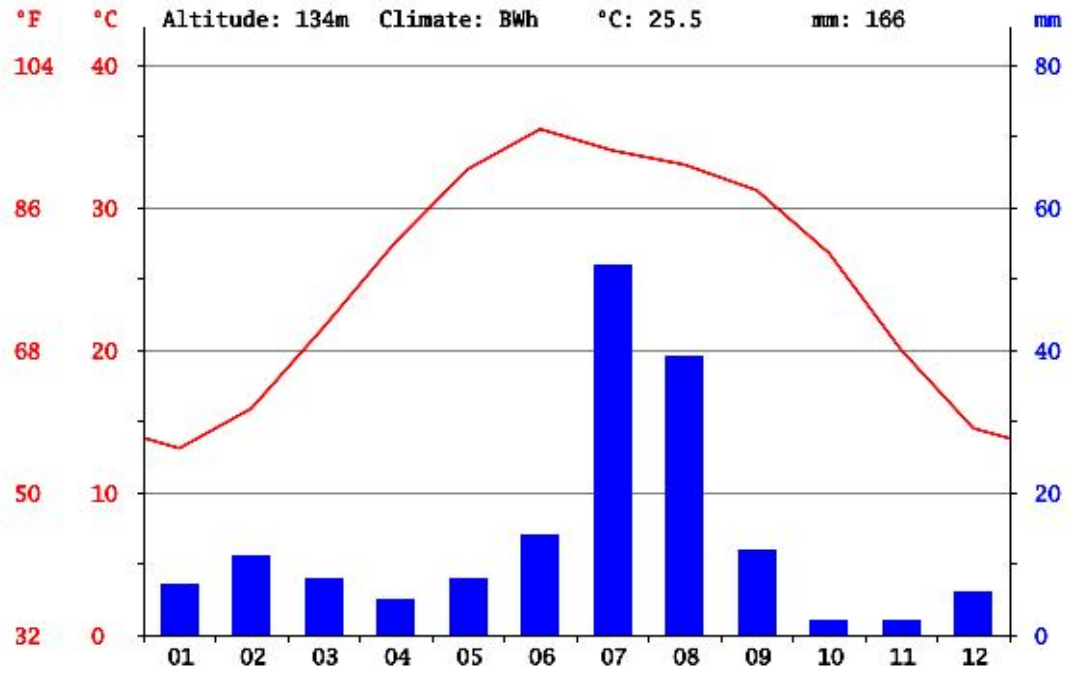
- **Climate of District Rahim Yar Khan**

The climate here is "desert" hot and dry in the summer and cold and dry in the

winter. The summer season is comparatively longer. It starts in April and continues until October. The winter season goes from November to March. However, the month of March and November are pleasant. During the year, there is virtually no rainfall in Rahim Yar Khan. This climate is considered to be BWh according to the Köppen-Geiger climate classification. In Rahim Yar Khan, the average annual temperature is 26.2 °C. Dust storms are frequent during the summer season. The average rain fall is about 101 millimeters (3.9 in).

The following graph and figure show the climate conditions of Rahim Yar Khan District and Pakistan:

Graph 7.1: Climate Conditions of Rahim Yar Khan District



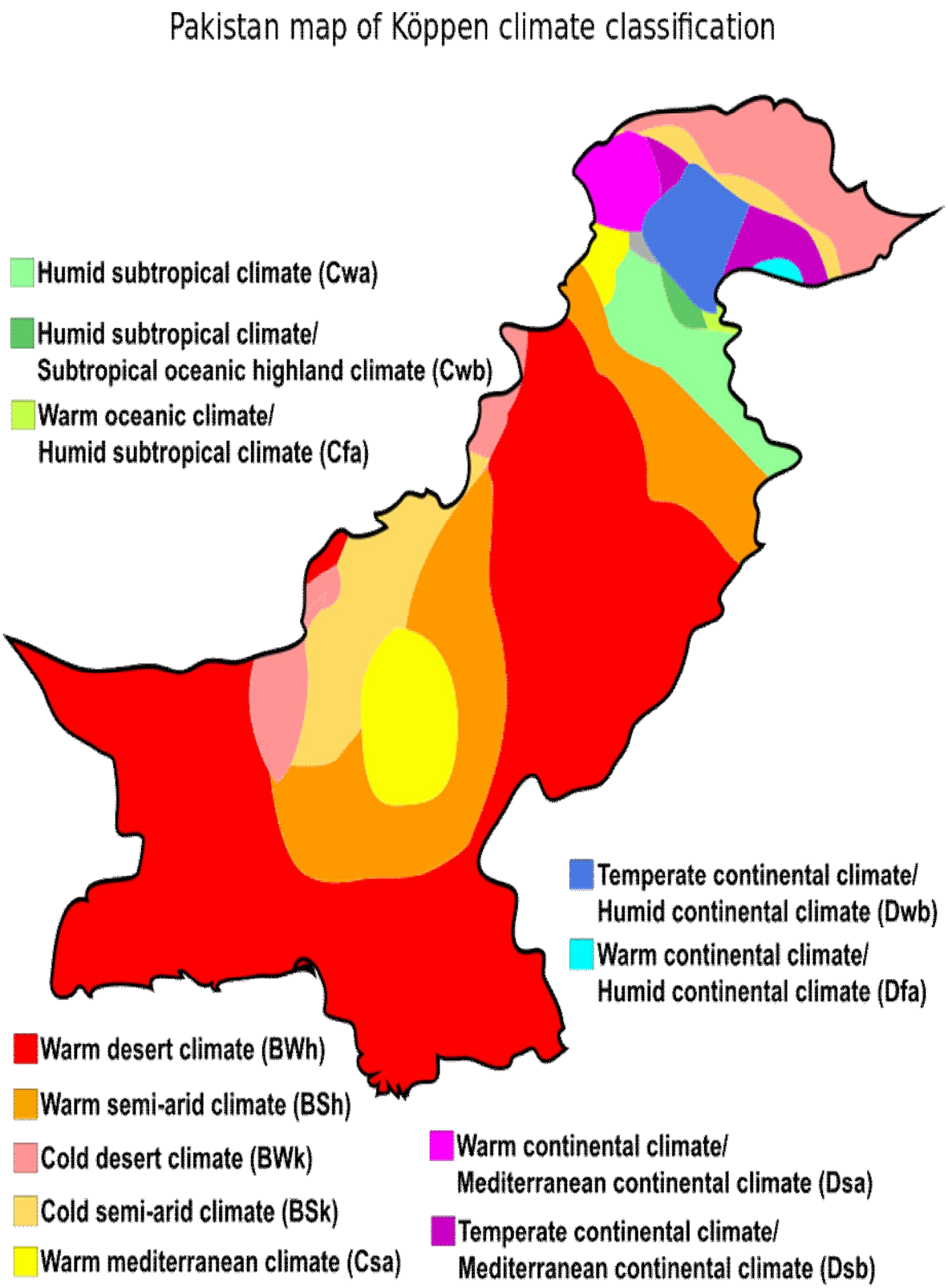


Figure 7.2: Map of Pakistan's Climate Classification

7.3.7 Weather of District Rahim Yar Khan

The climate of the district is hot and dry in the summer and cold and dry in the winter. The summer season is comparatively long. Its starts in April and continues till October. The winter season extends from November to March. However, the months of March and November are pleasant. Dust storms are frequent during summer season. The average rain fall is about 100 millimeters.

Following table (Table 7.1) shows minimum and maximum temperature, precipitation and relative humidity:

Table 7.1: Month wise Temperature, Precipitation and Relative Humidity

Month	Avg. Temperature		Precipitation (in millimeters)	Relative Humidity (%)
	Maximum	Minimum		
January	21.8	4.4	4.4	57.5
February	24.4	7.3	5.3	52.0
March	30.2	12.8	5.5	46.4
April	37.0	18.5	2.7	35.2
May	41.7	23.6	5.1	33.4
June	42.4	27.2	2.8	41.7
July	30.9	27.3	27.5	53.4
August	38.4	26.3	23.0	57.7
September	37.0	23.1	15.5	56.9
October	4.8	16.3	1.2	50.0
November	20.4	10.1	0.7	53.7
December	23.5	5.3	3.3	59.5

Source: Data processing Centre, Pakistan Meteorological Department

7.3.8 Rainfall

Out of the eight climatic zones of Pakistan, Rahim Yar Khan District is located in hot arid climatic zone, associated with 100 mm rains. 100% of the site falls in this zone. Broadly, there are four well marked seasons in Pakistan. These are:

1. Cold season (December to March)
2. Hot season (April to June)
3. Monsoon season (July to September)
4. Post-Monsoon season (October and November)

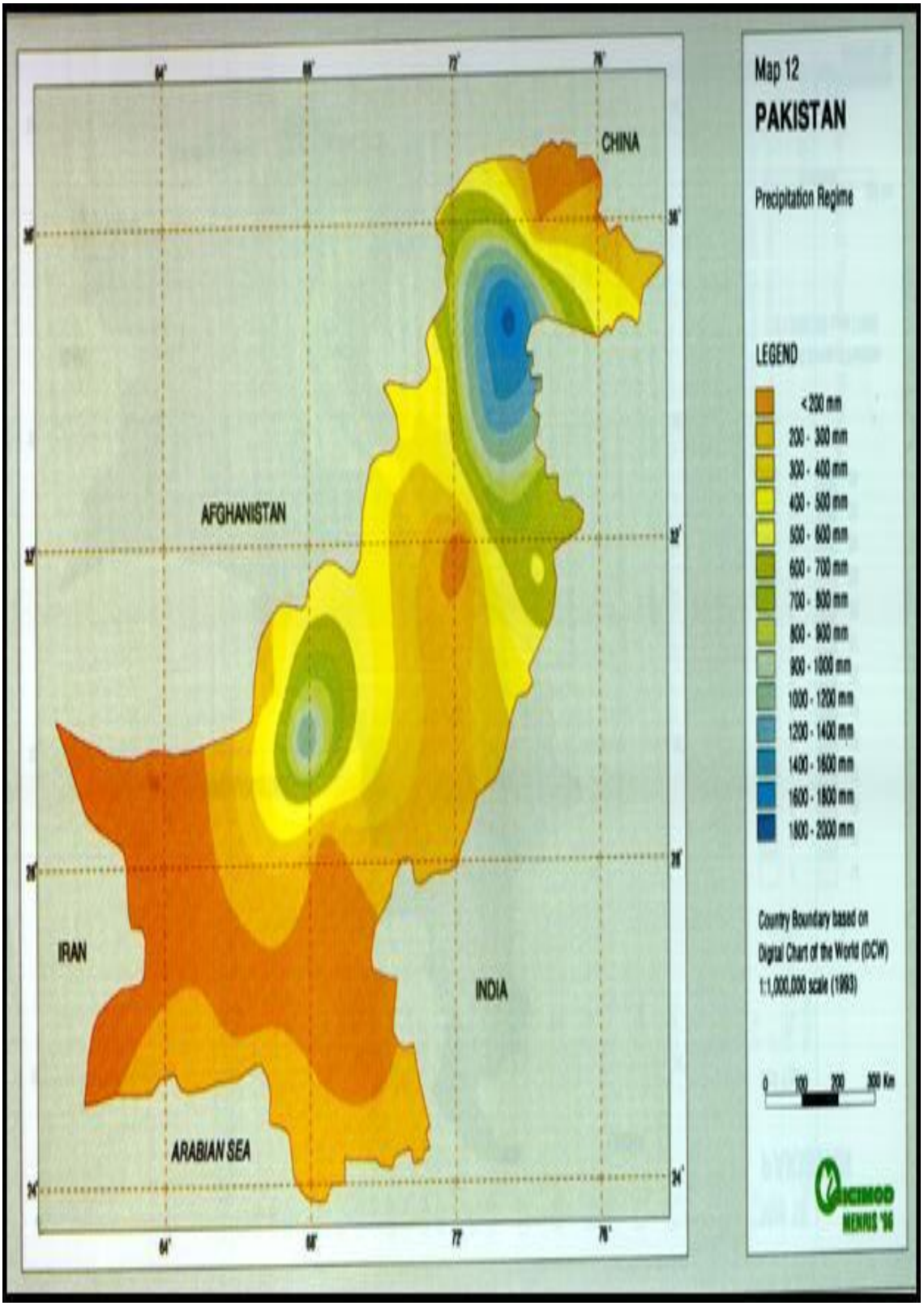


Figure 7.3: Precipitation Regime of Pakistan

7.4 Baseline Ecological Environment

7.4.1 Fishery and aquatic biology

Sadiq Canal is flowing near the proposed project site which is not the source of fishery and aquatic biology in a real sense. Otherwise, no river or other water body with aquatic biology located near the proposed project site. And there are no fish farms around the proposed project site.

7.4.2 Biodiversity

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

7.4.3 Forestry

There is no reserved forest in the area where the project is located.

7.4.4 Wildlife

The project site is situated in the urban area and the said area is surrounded by the agricultural lands. Natural habitat conducive to wildlife to flourish is nowhere for long distances. Consequently, there is no wildlife in the true sense in the area.

7.4.5 Flora

Once rich in natural vegetation the land use pattern of the Indus Basin and other areas has greatly been modified for want of land for cultivation. This has changed the pattern of flora wherever irrigation was possible.

The flora of the district can be divided into two major ecological divisions, northern and southern. The botanical life found in the northern half is the same as in the rest of the irrigated tracts of central Punjab. The human interference in the form of irrigation network has virtually wiped out the old flora without much revolutionization of the phyto-physiography in the area. Due to factors such as water logging and salinity, only the salt resistant plants can survive in affected areas. The southern half is characterized by sand dunes, more of less barren of vegetation except in the rainy season when multitudes of ephemeral or short lived plants come up and transform the bare land into a lush green carpet. In general, the vegetation in this part of the arid reign is sparse. The bulk of the vegetation consists of stunted, thorny, or prickly shrubs and perennial herbs capable of withstanding drought, which grow in open clump formation with plenty of vacant spaces between them. Distinctly scattered trees with stunted growth

are found along the depressions. Such vegetal tracts are technically known as desert scrub. Plants found in Cholistan are as under:

- Phatokar: Cholistan aborigines use its puddings (halva) for the removal of worms from the alimentary tract.
- Katran: A shrub with aromatic leaves (fragrance). Its ark is used for the treatment of asthma and the Sharbat is given to patients suffering from prolonged fever.
- Chapri: In Cholistan it is considered it as a soghat (special gift). It is used in rheumatic pain and as a diuretic. It is believed to increase sexual potency.
- Baren Dandi: it is a medicinal plant, particularly useful in liver trouble.
- Gor gopan: it is considered as a Thandi Booti. It is used in liver trouble. Some take it as substitute of tea.
- Bo phalli: Cholistanis take it for the cure of urinary tract troubles.
- Rat Sat: It is believed that this weed contains ingredients of certain minerals. Chemists are generally found interested in this plant, perhaps due to some minerals of medicinal significance.
- Phalli: Indian bustard's favorite food (seeds), also eaten by camels.
- Olatee: seeds eaten by desert partridges.
- Phag: The flower is cooked as pot herb (sag) and tastes like eggs.
- Khip: It is being tried as a substitute of jute: its seeds are considered to be a rich source of fat.
- Pelu: The fat from Pelu seeds is being studied for its utilization in soap making.
- Boara: Gum is extracted from this plant.
- Pepoon: lt is a fungus which grows on decaying roots of capperis and is eaten as a vegetable. Chatni is also prepared from it.
- Agaricus: (khumbi) this fungus is also cooked and taken as food.
- Monyan: Serves as fodder for animals.



View of Flora at Desert Area









View of Flora at Desert Area







View of Flora at Irrigated / Agricultural Area

7.4.6 Fauna

An unblemished geographical feature of a vast arid land, popularly known as Cholistan desert provides an ideal opportunity for a variety of wildlife. A wild cat still exists in the area which as the desert traditions say, is very fond of ripping apart the newly born young ones of Chinkara deer. Pig known as Hirhoon, Jitama, Bhoondin or Soor in this area is found in fairly large numbers in government plantations near the desert. Jackal (Geeder), wild rat badgers (Bijjoo), also exist in the desert. Wolf locally known as Mahr is a threatened species. Porcupine (Seh), squirrel (Golhari Fubhri) and jeerbils musk rat (chhachhoondar), wild rat (Chooha) of brownish color and mongoose (Neola), are generally visible. Mangoose has half a dozen varieties in this area. Though small, it readily attacks much larger animals. It kills large number of poisonous snakes and rodents. A duel between mangoos and cobra used to be a familiar attraction in village festivities generating enthusiasm no less than that of a bull fighting.

Some of the animals such as hog deer (Parha), blue bull (neel Ghaee) and ravine deer (Heron) are more or less non-existent now and are rarely witnessed and that too, close to or across the Indian borders. Black buck, once a beauty of the desert has been totally eliminated. Chinkara is a fine specimen of antelopes, though not as original as the black buck, commonly known as Ghazaal.

Black crow, sparrow and dove are numerically common as in other parts of Punjab. Green parrots are also found and generally damage the crops. Myna is however a useful bird for cultivators. Lark is another bird which charmingly charts in the early morning hours. Owl has also established its existence in the specific types such as Chibri and Ghug. Falcons here are of various species known as Baz, Shikra and Shaheen etc. Tanny eagle, spotted eagle, bonelli's eagle, lagger eagle, white and black vultures, mash harrier and kestrel are generally spotted in the area. Falcon used for hunting the bustard is especially trained for this purpose. It is caught hold of at tender age, through interesting indigenous methods which are otherwise banned under the law protecting the wild life.

Wild lizards are witnessed here in a number of species including Goh, Kirli and Kirla. Another specie is locally called gohira and yet another is known as Sanda. A very deadly poisonous snake Padam is also found in the district as the local saying goes " Jen Ko dangia Padam, Chalan Na Ditha Qadam", (he whom Padam has bitten, will not go another step). White egrets, little egrets and black wing stilts are common and feed on insects and fish. Amphibians generally include only frogs and toads. Over 40 varieties of fish are found in the district. Rahu, Mori, Mullee, Khagga and Sanghara are however found in abundance in river, canals and ponds.





View of Fauna

7.5 Baseline Socioeconomic Environment

7.5.1 Socio-economic Values

The project site is situated in the urban area however the proposed project / study area is located in the rural setting. Virtually most of the land around the project site is under agricultural use. Modern agricultural implements like tractors and trolleys are in use. These are owned by a few well to do persons and are provided on rent. Majority of the people depend upon agriculture as their main source of life support system.

Most of the people belong to middle economic order. There is also a fairly large cross section of poor people. While a small percentage of the residents are little above the poverty line. The population of the area is undergoing transformation in almost all walks of life i.e. socioeconomic and cultural. Old traditions are being replaced by new social order under the influence of electronic and print media. Elders are the most respected segment of society. They even now have great say in decision making.

In spite of transition, old customs and traditions are still surviving in the society. Arranged marriage system is followed and it is quite successful. People are proud of their traditions and customs in spite of a change.

Joint family system is intact in most of the cases. Families are quite coherent. People are very hospitable specially to aliens. However, lifelong old traditional enmities are also going side by side. Sometimes a lot of money is wasted on litigation on matters which could be resolved through negotiation or arbitration.

Due to awareness about the importance of education, most of the younger generation, including both sexes, is now enamored of the values of education and are struggling to get education. There is a rising trend in the society to change their old traditional socioeconomic pattern of life.

7.5.2 Population and communities

The proposed project site is located in the residential area however population and communities' centers also located in the surrounding area. Moreover, there is a rapid trend of urbanization in the said area and commercial entities also existed.

7.5.3 Administrative Setting

Rahim Yar Khan comprises of 4 Tehsils, 3 Muncipal Administrations and Town Committees and 136 union councils. Project site is located in Rahim Yar Khan Tehsil. Its area is 1715 sq. Km. and population was 985655 in the year 1998. Total (male and female) population consists of more than 90% Muslims and Majority is Punjabi or Saraiki. Total population of Tehsil is 274666, literacy is 60.4%. number of persons with primary education (Male + Female) is 46000 and those with Metric & above education is 39000. Most of the houses are pacca. Potable water is available to 11774, electricity to 32503 and latrine facility to 21919 persons. Average household size is 7.4

7.5.4 Administrative Setup

The total area of the district is 11,880 square kilometers. The district comprises four Tehsils namely Rahim Yar Khan, Sadiqabad, Liaquatpur and Khanpur. All the Tehsils are under Tehsil Muncipal Administratin (TMA).

Table 7.2: Tehsil wise area in Acres

Name of Tehsil	Total area (Acres)	Cultivated Area	Uncultivated Area
Rahim Yar Khan	4,94,497	4,44,098	50,399
Sadiqabad	5,33,179	4,50,804	82,375
Khanpur	3,77,003	3,00,930	76,073
Liaquatpur	3,62,805	3,30,860	31,945
Total	**17,67,484**	**15,26,692**	**2,40,792**

7.5.5 Industries

No any type or nature of industrial activity/unit is working near the proposed project site, however there are numbers of industrial units working in the overall District Rahim Yar Khan of various nature e.g. cotton & textile, soaps & shampoos, vegetable oil mills, rice processing mills, etc. which play a vital role on the subject of human and economic development in the district.

7.5.6 Infrastructure

Electricity from WAPDA, grid station is available in the project area. There is a network of roads in the entire area. Private buses and wagons are available as public transport. Surface water is available for irrigation purpose.

7.5.7 Institutions

The proposed project area falls under the boundaries of Rahim Yar Khan City where numbers of private & government schools & colleges and university is also available for education.

7.5.8 Transportation: roads, rail, airports, navigable rivers:

There is a vast network of roads connecting the proposed project to market. Railway track is not also far from the project site

7.5.9 Land use planning

The entire land use planning is carried out according to the provincial laws. Under the present Government system, the District Government is responsible for all land use planning.

7.5.10 Power sources and transmission

District Rahim Yar Khan falls under the operational area of MEPCO which is the largest distribution Company of PEPCO. Its area of operation is complrising of 13 districts of south Punjab including District Rahim Yar Khan. MEPCO provides electricity to the proposed project area. Transmission of power is through overhead electric transmission lines.

7.5.11 Agricultural and mineral development:

Proposed project area is agricultural in nature. Land holdings are very small. Agriculture mainly depends upon canal water. About 50% of the area is uncultivated while remaining 50% is being cultivated by irrigation water as well as ground water through tube wells. The main crops being cultivated in the study area include wheat, sugar cane, cotton, rice and maize, etc.

7.5.12 Public Health / Health Facilities

200 Bed Sheikh Zayed Hospital & Medical College & District Headquarter Hospital and Tehsil wise health units are located in the district in government sector. Moreover, there are numbers of private hospitals are also providing services to the public.

7.5.13 Cultural and Esthetic Values

Though cultural and aesthetic values are in the transitional stage towards modern ones, yet old traditional cultural and aesthetic values are strong. Old customs are the integral part of the day-to-day life. It will take very long time to see a tangible change in the old customs, virtues, and rituals.

There are a large number of people living below the poverty line. Media is playing some role to bring change in the traditional aesthetic values presently prevailing among a large cross section of the society. A tangible change is appearing among a very small cross section of the society which is trying to pursue the modem aesthetic values of life.

Financial and religious factors influence aesthetic and cultural values of the society. People have strong commitment to Islam. This relation contributes to good aesthetic and cultural values among the people.

7.5.14 Places of Interest (Historical and Archeological)

Archaeological sites which are located nearby the project area are listed below:

- **Rahim Yar Khan**

  Rahm Yar Khan City is situated in the center of the district. It is an important railway junction, on the main like of Pakistan Railways, between Lahore and Karachi. It is at a distance of 634 kilometers from Karachi, 566 kilometers from Lahore and 176 kilometers from Bahawalpur.

  Shahi road, Railway road, Colony road, Gulberg road, and Hospital road are important roads in the city. Zaffar Market, new Sadiq Bazaar, Sadar Bazaar, etc. are the shopping Centers in the city. Mahmud stadium is situated at a distance of one kilometer from the city. It has a seating capacity for 15,000 persons and has grounds for cricket, football, hockey and volley ball. There is Sadiq Club, which is located in Officers Colony and has spacious grounds for various games. It has a swimming pool and big halls. There are three swimming pools in the city.

- **Abu Dhabi Palace**

  It was built by Sheikh Zayad Bin Sultan Al-Nahyan, ruler of Abu Dhabi. It is situated in sandy desert of Cholistan at a distance of 18 kilometers south-east of Rahim Yar Khan. It has large and spacious buildings having two separate portions for ladies and gentlemen. Each portion contains rooms and

chambers. There are beautiful lawns in it having different beds of flowers along the well-shaped roads. Many domestic birds like peacocks are also kept there. Sheikh of Abu Dhabi visits this district for hunting and stays in this place. The design has been carefully prepared so that there are no adverse impacts on nearby located archaeological sites.

Chinkara Breeding Center about 5,000-acre area is also established adjacent to Abu Dhabi Palace by UAE President Sheikh Zayed Bin Sultan Al-Nahyan.

7.6 Environmental Conditions

Environmental conditions of project area in context of air quality and noise level is as under:

7.6.1 Air Quality

According to a position paper of Pakistan Environmental Protection Agency, air pollution is an emerging environmental issue in the larger cities, due mainly to high growth rate of the economy, urbanisation, growth of infrastructure and an increase of almost four hundred percent in the number of vehicles. Experts consider that vehicles account for sixty to seventy percent of degradation of air quality in urban areas.

A study funded by the Japanese International Cooperation Agency in 2000, which remains the most authentic ambient air quality survey for the city, reveals that particulate matter is the main problem surrounding ambient air quality. Major sources of Suspended Particulate Matter, not especially in the project area, are vehicles, industry, burning of solid waste, brick kilns and natural dust. The origin of Suspended Particulate Matter in rural areas is mainly from unpaved roads and areas not covered with grass or plantation. Accordingly, fine particles of soil are raised in the form of dust cloud by driven vehicles and by strong wind. The second air pollutants are nitrogen and nitrogen oxide, which occur mainly due to combustion of fossil fuels, particularly boilers and furnaces in industry. This however is less of an issue in the project area as it is not highly industrialized.

Information on ambient air quality in rural areas particularly related with the traffic on the highways and the roads is not available. This is mainly because air pollution is primarily a hazard for urban areas where the increasing number of industries and vehicles is increasingly concentrating the pollutants in air and also prevents them from being quickly dispersed. As far as rural areas are concerned the air quality has not been a problem, except near sources of noxious and large emissions, such as cement factories. Major sources of air pollution in immediate vicinity of the project site are vehicular emissions.

Air Quality at Project Site:

Ambient air quality of the proposed project area is neat and clean because the area is agricultural in nature however, PM_{10} & $PM_{2.5}$ are slightly high because of overall high in air quality index in Pakistan. The ambient air quality monitoring reports are attached with this study as appendices.

7.6.2 Noise level

As the proposed housing project site is surrounds by agricultural lands the noise level is far low than PEQS limits. However, some negligible noise is produced from vehicles or from traffic on roads however it is also beyond the limits of PEQS.

7.7 Lab Reports of Environmental Analyses

Lab reports of environmental monitoring including ambient air quality, ground water quality and noise level monitoring are attached with this IEE Study at the end as appendices.

7.8 Suitability of the Site

Site selection is very important because site should not be prohibited, environmentally sensitive, incompatible to surroundings and unsuitable. Following factors have been considered while site selection:

- **Land use Planning:**

The proposed project will be developed as housing project. Site is located at agricultural nature area in a broad spectrum whereas it is rapidly developing as urban area.

- **Presence of Hazardous Conditions**

The site is free of any natural and anthropogenic hazardous conditions.

- **Environmentally Sensitive Areas**

Environmentally sensitive localities don't exist in the project area as mentioned above site is located in urban area adjacent to the existing project.

- **Availability of Essential Services / Utilities**

Essential services / utilities which are basic requirement to run the project like Electricity Supply, Gas Supply, Water Supply, Sanitation System have been well served in the area.

- **Basic / Communication Infrastructure**

Basic infrastructures like road networks are present near the site and or in and around the project area.

- **Availability of Construction Materials**

The contractors provide the construction materials like cement, steel, crush and bricks at the site on as required basis or these are procured by the proponent. All these material are available locally.

- **Skilled and Unskilled Labour**

The people are available at economical rates all the time. The project provides jobs to the local residents as well as those from suburban areas.

Section 8: IMPACT ASSESSMENT

8.1 Assessment of Impacts

The primary function of an environmental impact assessment study is to predict and quantify the magnitude of potential impacts, assess and evaluate the magnitude. The impact assessment forms the basis for development of Environmental Management & Monitoring Plan. Environmental impacts could be positive or negative, direct or indirect, local or regional and also reversible or irreversible.

8.2 Identification of all impacts

All the potential environmental impacts had been identified during literature review, visits of project site and nature of the proposed project. Various types of environmental issues likely to crop up during life cycle of project are grouped in different phases; project location related impacts, project design related impacts, construction phase impacts and operational phase impacts.

8.3 Methodologies for Impacts Identifications

Methodologies for impacts identifications are including checklists, matrices, networks, overlays and GIS & Computer expert system. The details of methodologies for impact identifications are as under:

a. Checklist

Project impact evaluation checklist have also been developed to identify the potential environmental impacts during the proposed project's various phases including design phase, construction phase and operational phase. These impacts have been categorized as follows:

- None
- Minor
- Medium
- Major

Table 8.1: Project Impact Evaluation Checklist

Potential Impacts	Possible Risk / Damage to Environment	Mitigation Measures	Significance of Impact			
			None	Minor	Medium	Major
A. Potential Environmental Impacts Relating to Design Phase						
a. Physical Environment						
Changes in Land Appearance	No significant change in land appearance	Beautiful landscaping will be done	X			
Seismic Hazard	Damage due to earthquake	To design the building / structure in such a way to moderate large				X

		scale earthquake				
Emergency Response	Damage due to emergency situation fire, earthquake, etc.	To design the building in such a way which incorporates emergency exits				X
Traffic Congestion	Due to the construction / development activities, the traffic in the Project Area will increase.	Adequate parking facilities will be provided within the proposed project site			X	
b. Ecological Environment						
Impacts on Flora	Construction activity may affect the flora	Site selection and designing of structure will be done to avoid tree cutting or other type of flora		X		
Impacts on Fauna	Fauna (wild birds) may be disturbed from proposed project during construction phase	Planning of construction activities of the proposed project in such a way to avoid disturbance to fauna at design / planning phase		X		
B. Potential Environmental Impacts Relating to Construction Phase						
a. Physical Environment						
Change in land use	No significant change in land use due to proposed project	Beautiful landscaping will be done on open places	X			
Change of land appearance	No significant change of land appearance also due to proposed project	Beautiful landscaping will be done on open places	X			
Impacts on Topography	No major changes regarding topography of the site while construction phase	Resurfacing of exposed areas to avoid any negative impact	X			
Impacts on soil	Overall geology/soil quality of the site is not expected to be adversely	Plantation needs to take place so that soil may become stabilized	X			

	impacted					
Impacts on Air Quality	Negligible change may occur in ambient air quality due to construction activities	Regular ambient air monitoring plan Regular water sprinkling Maintenance of construction machinery		X		
Disposal of Mucking Material	Mucking material / solid waste from construction activities may be haphazard	Utilization of muck/construction solid waste within project site as earth fill work Transportation of muck material in covered loaders		X		
b. Ecological Environment						
Impacts on Flora	Construction activity may impose some impacts on flora	To avoid any negative impact on flora		X		
Impacts on Fauna	Negligible impact on fauna	To avoid any disturbance to fauna		X		
c. Socio-Economic Environment						
Health & Safety of Workers	Construction activities can impose certain negative impact on health & safety of workers	Training of workers Regular checks to ensure that contractor is following safety measures Provision of PPEs			X	
C. Potential Environmental Impacts Relating to Operational Phase						
a. Physical Environment						
Impacts on Air Quality	Deterioration of air due to continuous operation of air conditioners, exhaust fans, etc. increase in the traffic volume	An air quality monitoring and improvement plan will be developed to keep the air pollution levels from generators, air conditioners etc. within the permissible limits of PEQS		X		
Noise Pollution	No as such noise levels will be increased in the society.	World Bank's Pollution Prevention and Abatement Guidelines for ambient noise for the receptors are i.e. 55 and 45 dB (A) during daytime	X			

		and night time respectively for residential, institutional and educational areas.				
Water Consumption	Insignificant impact on water table	Training or workers to conserve the water Regular inspection of water tapes, valves and water supply lines	X			
Wastewater Generation	Damage to the environment due to sewage generation	Sewage treatment plant will be installed			X	
Solid waste generation	Indiscriminate disposal may be haphazard and damage to the environment	MSW will be disposed off properly on daily basis			X	
Emergency response	Severe damage due to emergency situation	Development of comprehensive Emergency Response Plan Arrangements of firefighting equipment				X
b. Ecological Environment						
Impacts on Flora	Insignificant on Flora	Beautiful landscaping will be done	X			
Impacts on Fauna	Operation of project may not have any impact on fauna	Beautiful landscaping will be done Noise level monitoring	X			
c. Socio-economic Environment						
Health & safety of workers	Risk of safety & health of workers	Job specific training of workers Regular monitoring & inspection of health & safety measures Provision of PPEs			X	

b. Matrix

The impact evaluation matrix was developed and different environmental parameters likely to be affected by the proposed project actions grouped into categories i.e. Physical Environment, Ecological Environment and Socio-economic Environment. For the impact assessment, project impact assessment matrix is used by dividing the project action into different phases such as Design

Phase, Construction Phase and Operational Phase. Impact evaluation matrix with suitable mitigation measures is incorporated at the end of this section in the form of Table 8.2.

8.4 Impact Analysis and Prediction

In order to give correct categorization to the present project Rapid Environmental Assessment Procedure was followed. It revealed that there some major impacts of the project have identified which will be controlled by adopting proper mitigation measures. These impacts are mainly attributed to the generation of sewage/municipal wastewater and solid waste during operational phase of the proposed project but most of the impacts are projected as moderate/minor impacts although project has many positive impacts on local public and economy.

a. Meetings

For the impact analysis and predictions detailed meetings were held with the proponent/company management and with other stakeholders. Issues were discussed that may affect the environment and also the establishment of the proposed project. All possible mitigation measures were considered and incorporated in the Environmental Management Plan.

b. Consultations

Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders, inhabitants of the villages, locals and workers in the area. The purpose of such consultations is to obtain the feedback from the relevant persons. The environmental issues have been identified during literature review, consultation with stakeholders, relevant reports and visits to project site.

8.5 Characteristics of Impacts

Impacts were assessed on the basis of magnitude, immediacy, likelihood and sustainability. Evaluation criteria are as follows:

- **Nature of Impact**
  Nature of impact; Direct or Indirect

- **Magnitude or degree of impact**
  Size or Scale (whether large or small scale)

- **Extent and Location of Impact**
  Point or degree (local or widespread)
  Location (On-site or Off-site)

- **Timing of Impact**
  Timing of impact (during construction or after construction/during operational)

- **Duration of Impact**

Duration of impact (short-term, mid-term or long-term)

- **Likelihood of impact**
  Likelihood of impact occurrence (Certain, Likely, Unlikely)

- **Reversibility of Impact**
  Reversibility of impact (reversible or irreversible)
  Reversibility (Possible or How)

- **Sustainability of Impact**
  Mitigability (fully, partially)
  Monitoring (fully, partially)

- **Impact Consequence Severity**
  Impact consequence severity (severe, moderate, mild)

- **Signification of Impact**
  High, Medium, Low

8.6 Impact Significance

Impacts significance has been evaluated on the basis of none, minor, medium and major which are enlisted in project impact evaluation checklist. The impacts have been evaluated so that the nature, magnitude, extent & location, timing, duration, reversibility and risk could be clarified either some are acceptable and other might be mitigated with suitable protection measures so that those would be eliminated or minimized to an acceptable level as prescribed in PEQS.

All the impacts have been studied while different phase of the project design phase, construction stage and operational phase thoroughly and suitable mitigation measures have also been suggested.

a. Ecological Importance

The impacts relating to the ecological environment such as flora & fauna, concern & importance of these impacts and suggestion of suitable mitigation measures have been done during all three phases of the proposed project including design phase, construction stage & operational phase. However, the impacts relating to ecological environment are acceptable and the significance of these impacts is minor scale.

b. Social Importance

The impacts which are linked with socio-economic environment including employment generation, changes in land value, uplift in socio-economic conditions of the area, tax/revenue generation and health & safety of workers and importance of these impacts have also been discussed during various stages of the proposed project including design phase, construction stage & operational phase. The impacts regarding socio-economic environment are vitally important and having positive nature.

c. Environmental Standards

Environmental standards such as Punjab Environmental Quality Standards (PEQS) / Pakistan Environmental Quality Standards (NEQS) will be monitored and complied with letter & spirit. Monitoring will be done throughout project lifecycle during construction and operational phases. The monitoring of different parameters including air quality, noise levels, ground/drinking water quality and wastewater quality will be done as per requirement.

8.7 Mitigation and Impact Assessment

Mitigation and impact assessment has been done on the following criteria:

a. Impact Assessment Criteria:

The impacts were assessed in the light of criteria give as under: -

- Magnitude or degree
- Time and duration of impact
- Likelihood of impact occurrence
- Sensitivity of impact
- Risk related to impact

b. Mitigation Assessment Criteria:

The Mitigation Hierarchy establishes a structure to guide development and application of measures to mitigate impacts on environmental values and associated components. The term ‘mitigation’ applies to four steps, or level in the mitigation hierarchy:

Step 1: Avoid
Step 2: Minimize
Step 3: Restore On-Site
Step 4: Offsite

c. General Principles:

1. Maintaining the integrity and natural functions and processes of ecosystems, and the resilience of ecosystems, is prerequisite to sustainable use of natural resources and essential to maintaining ecosystem goods and services over time.
2. The mitigation hierarchy is applied in order of priority as follows:

    a. Avoid
    b. Minimize
    c. Restore On-Site
    d. Offset (Off-Site or On-Site)
3. Generally, the “higher” the priority of the environmental value and associated component, the more protective the mitigation measures.
4. For an action or measure to be considered “mitigation”, a party must accept

responsibility for implementation of appropriate mitigation measures, and there must be certainty that the mitigation measures will be carried out.
5. Implementing mitigation measures can help resolve issues that may delay or prevent a proposed project or activity.

8.8 Purpose of Mitigation Measures

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

a. What is the problem?

The proposed project is basically a housing scheme. During the construction of the project air emissions & noise from construction machinery and other equipment, dust generation from construction work may be generated. The major impacts may arise by the subject project are generation of sewage/municipal wastewater, municipal solid waste. Other impacts are of minor importance. These impacts may arise during the operational phase of the subject proposed project. During construction and operational phases of the project, EMMP will be implemented whole heartedly to avoid adverse impacts on environment.

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

The impacts from the project will occur during the construction & operation stages. These issues included; noise generation, air emissions, solid waste management, wastewater disposal, Health and Safety issues and changes in the geographic features of the area. These all problems should be addressed on-site where they are being generated, to avoid the residual or adverse impacts.

Any impact that would arise due to the subject project activity will be addressed through proper channel and on site by implementing EMMP. Trainings will be conducted regarding HSE, firefighting, best work practices etc. while other precautionary measures are also adopted to make the project safe and environment friendly.

c. Where the problem should be addressed?

The problem will be generated from site development and operation of the project. So, it should be addressed on source i.e. at site within the same timeframe. The problem should be address at the site and immediate response should be provided to address the problem which may arise.

Project proponent will be responsible for the implementation of EMP and if required he will appoint an HSE manager/environmental manager along with site manager to assess any impact that could be arisen during construction and operation of the project. He is responsible to address the problem and to mitigate it.

d. How the problem should be addressed?

Proper mitigations measures will be provided according to the nature of the impacts/problems. The main elements of mitigation in the EIA process is as; Avoidance**,** Minimization and Compensation. Avoidance aims at avoiding the adverse impacts as far as possible by using preventive measures or by not carrying out the proposed action. Minimization aims at reducing adverse impacts by scaling down the magnitude of a project, or employing technology that reduces the factors generating the undesirable environmental impacts, while compensation aims at remedying unavoidable residual adverse impacts. Compensation is the least desirable approach and should only be considered after the other elements have been completed.

8.9 Ways of Achieving Mitigation Measures

By adopting proper mitigation measures, any anticipated major or minor environmental impacts could be controlled or mitigated. The details of impacts and mitigation measures have been discussed earlier in this section. Management of company/society shall take appropriate measures to provide pollution free and safe environment during the development and operation stages of proposed project by implementing improved management practices and monitoring techniques suggested in EMP.

8.9.1 Changing in Planning & Design

Proposed design is developed considering environmental risk and hazards. The plan includes development away from hazard-prone areas, such as floodplains, to avoid putting people and property at risk. Moreover, there is no endangered and threatened species present in the project area. Any human settlement or infrastructure will not be dislocated or dismantled due to the proposed project development. Hence, there is no need to change the design of project.

8.9.2 Improved Monitoring & Management Practices

The anticipated impacts had been reduced significantly by adopting better management activities, as it will be carried out for betterment of the society. Though environmental monitoring will be conducted on the regular basis to keep the sources of the air pollution, wastewater generation, noise and public nuisances in-check.

Project proponent will take appropriate measures to provide pollution free and safe environment during the project activity by implementing improved management practices and monitoring techniques suggested in EMP. Management will further take necessary actions to mitigate any residual impacts. Project proponent will adopt such plan that will assure the minimum impact on the environment and health by implementing proper mitigation measures.

8.9.3 Compensation in Money Terms

Proposed housing project site is the property of proponent and there are not any

land ownership disputes and no any type of property, crops or other type of loss will be expected to occur due to development of the project. If in future any issue would arise regarding environmental degradation, the project proponent will compensate in money terms as he has assured to achieve PEQS and compliance to other regulations made under PEPA, 1997 (Amended 2012).

There is no protected or environmentally sensitive area present within 10.0 km vicinity of the project that could be impacted, as the project site is located within urban area / residential area. Hence, no compensation in the monetary terms will be required. However, proper tree plantation will be done as environmental enhancement measures.

8.9.4 Replacement, Relocation and Rehabilitation

As mentioned earlier the proposed project site is situated within urban area/residential and commercial area i.e. is located at Manthar Road, District Rahim Yar Khan; no any type of preserved natural resource and segment of sensitive environment are present which could be impacted due to the commencement of the proposed project. No replacement, relocation and rehabilitation will be required for the commencement of the aforesaid proposed housing project.

However, after completion of the proposed project beautiful landscaping including grown trees, ornamental / flowering plants, grassy lawns / parks, etc. will be done as per plan. Plantation will be done within the society and for the area will be reserved. Plantation will be enhanced with native species within the society, along the boundary wall and along the road side as per direction by EPA Punjab.

Table 8.2: Impact & Mitigation Matrix

Aspects	Potential Impacts / Risks	Likely Duration	Magnitude if not mitigated	Proposed Mitigation Measures	Responsibility
DESIGN STAGE					
a. Physical Environment					
Changes in Land Appearance	Construction of proposed housing project will not contradict to the nature of the surroundings	-	-	▪ Change of land appearance will be localized nature as well as housing project would not contradict to the nature of the project area too. ▪ Moreover, beautiful landscaping including green belts, grassy lawns and parks will be developed after completion of the project to correlate the surrounding.	Design consultant / proponent
Seismic Hazard	Damage due to earthquake	Permanent	Moderate Negative	▪ All the foundations of the structures e.g., electric poles, houses, commercial setups etc. will be designed with consideration of seismic hazard which can withstand even moderate to large earthquakes. ▪ For seismic hazard analysis updated structural and seismic evaluations will be consulted.	Design consultant / proponent
Emergency Response	Risk of occurrence of emergency situations by natural & anthropogenic means such as earthquakes, floods, heavy rainfall, thunderstorm, fires due to electrical short-circuiting, over heating etc.	Permanent	Minor negative	▪ An Emergency Response Plan & Preparedness Plan for emergency situation including fire emergency, earthquakes and other manmade disasters will be prepared by the project management. ▪ Emergency Response Plan & Preparedness Plan will be review or revised annually as per need. ▪ Firefighting arrangements including Fire hydrant system connected with water tank reserved for emergency situation, fire extinguishers, fire alarm system, emergency	Design consultant / proponent

				signs, first aid boxes, etc. will be placed at appropriate locations to cope with emergency situations. ▪ Sufficient / appropriate firefighting arrangements as mentioned above will be undertaken according to the requirements of Civil Defense Department, Rescue Department 1122 and international standards. ▪ All firefighting, emergency and safety equipment will be frequently inspected, checked periodically, mentioned expiry date and properly maintained.	
Traffic Congestion & Disturbance to People	Traffic due to construction / development activities may increase and vehicles may visit frequently to the proposed project site	Temporary	Moderate Negative	▪ Adequate parking facilities will be provided within the boundary of the project site ▪ Spacious area will be allocated for the parking of construction machinery and tractor-trolleys bringing the material to the Project Site.	Design consultant / contractor / proponent
b. Ecological Environment					
Impacts on Flora	No as such flora of different form or species is present at site in a true sense, however herbs, shrubs, native wild small plants in a small quantity exist.	-	-	▪ During designing of the housing scheme maximum tree cutting will be avoided. ▪ Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done in green belts and parks within the society. ▪ And maximum tree plantations will be done on available open spaces in and outside/around the project site after completion of project.	Design consultant / proponent
Impacts on Fauna	No as such significant wild fauna exist at proposed housing project site except wild birds.	-	-	▪ Construction activities for the development of proposed housing project will be done in such a way fauna (wild birds) if any within the site and outside the premises may not be disturbed or minimized the negative effects	Design consultant / proponent

				to an acceptable level. ▪ As mentioned above beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which will attract the fauna (wild birds) to nest here.	
c. Socio-economic Environment					
Economic Growth	Causing of Economic gain	Permanent	Minor positive	▪ This will be minor positive impact and not required any mitigation measure.	-
CONSTRUCTION STAGE					
a. Physical Environment					
Change in land use	The proposed project is being planned at vacant land situated in urban area though on a large scale it is agricultural area whereas there is rapid trend of urbanization in the said area. The current Project Site is a vacant piece of land with a high aptitude towards future development. The project does not contradict the status of the locality. There will be no significant change in land use.	-	-	▪ Beautiful landscaping including green belts, grassy lawns and parks will be developed after completion of the project to correlate the surrounding.	Contractor / Proponent
Change of Land Appearance / Layout	There would be no significant change in the land appearance as the housing project does not contradict to the status of the locality.	-	-	▪ Change of land appearance will be localized nature as well as housing project would not contradict to the nature of the project area too. ▪ Moreover, beautiful landscaping including green belts, grassy lawns and parks will be developed after completion of the project to correlate the surrounding.	Contractor / Proponent

Impacts on Topography	Construction of proposed housing project will not bring significant change in the topography of the site.	Temporary	Minor negative	▪ There will be no significant changes off-site the project area however resurfacing of the exposed area will be done to avoid any negative impact on site surface.	Contractor / Proponent
Impacts on Soils	The overall geology and soil quality of the project site is not expected to be adversely impacted due to the execution of the proposed project during construction period.	Temporary	Minor negative	▪ Plantation needs to take place at the project site so that soil may become stabilized.	Contractor / Proponent
Impacts on Surface & Groundwater	Surface & groundwater may disturb from sanitary water to be produced from workers camp and lubricants such as oil & grease and other chemicals to be used in construction may also cause contamination	Temporary	Moderate negative	▪ The storage of lubricant materials such as oil and grease will be confined to a specific area so that in case of any leakage or spillage, the lubricant materials do not contaminate the entire project site. ▪ Provision of temporary sanitary system at site for construction worker's camp	Contractor / Proponent
Impacts on Air Quality	Air quality may be disturbed during construction stage of the proposed project from construction activities and construction machinery.	Temporary	Minor negative	The majority of dust problems caused during the development / construction phase of the project can be effectively mitigated by the implementation of simple procedures by the Contractor including but not limited to the following: ▪ All the excavation work, access roads and construction material like sand, soil etc. will be sprinkled with water; ▪ Construction machinery will be maintained or overhauled in time to avoid any negative impact from their smoke. ▪ Regular monitoring of all vehicles, equipment, and machinery used for construction. ▪ All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition and	Contractor / Proponent

				properly tuned and maintained in order to minimize the exhaust emissions. ▪ Construction workers will be provided with masks for protection against the inhalation of dust	
Noise & Vibration	Noise levels may be increased some extent to low scale due to constant rattle / operation of heavy construction machinery	Temporary	Moderate negative	Mitigation measures mentioned below will be adopted to minimize the noise pollution. Those measures include, but are not limited to the following: ▪ Selection of up-to-date and well-maintained machinery or equipment with reduced noise levels ensured by suitable in-built dampening techniques or appropriate muffling devices. ▪ Confining of excessively noisy areas and limiting the work to normal working hours in the day; ▪ Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and train them in their use; and ▪ Regular checkups and maintenance of the construction equipment / machinery and oiling and greasing of the noise making mechanical parts.	Contractor / Proponent
Construction Solid Waste	Inevitable cut and fill earthwork operations will open up scars on the land in and around the project site. The excavated materials that are unsuitable for use need to be stored, transported and disposed off appropriately at the designated site.	Temporary	Moderate negative	▪ The construction solid waste will be carefully examined and disposed off in an environment friendly manner by transporting it in closed containers and filling at appropriate sites. ▪ It is also desirable to utilize the construction solid waste in such a way that it is consumed for the construction of any other structure within the Project Site or in the immediate vicinity. ▪ Utilization of CSW in the vicinity of the Project Site is considered as the best option for its disposal.	Contractor / Proponent

Sewage / Municipal Wastewater Generation	During construction stage of the proposed project sewage from washrooms / toilets will be produced from construction worker's camp which needs to treat and disposed of properly.	Temporary	Moderate negative	▪ Temporary sanitary system including toilets/washrooms with septic tanks will be constructed for construction workers which will be removed after completion of construction of the proposed project.	Contractor / Proponent
Traffic Congestion & Disturbance to People	Due to the construction / development activities, the traffic in the Project Area will increase.	Temporary	Minor negative	▪ Adequate parking facilities will be provided within the boundary of the project site for the construction machinery and tractor-trolleys bringing the material to the Project Area.	Contractor / Proponent
b. Ecological Environment					
Impacts on Flora	Construction activities for development of the proposed housing project may not impose any negative impact on flora.	-	-	▪ Construction activities will be done in such a way to avoid any negative impact on flora of the locality.	Contractor / Proponent
Impacts on Fauna	The construction of the said project will not affect the fauna (wild birds) if any present at site.	-	-	▪ The usual fauna found at the project locality is sparrows, crows, common mainas etc. ▪ During construction of the project it will be considered that fauna may not be disturbed.	Contractor / Proponent
c. Socio-economic Environment					
Employment Generation	Employment generation during construction stage will be minor positive change.	-	-	-	-
Health and Safety of Workers	Construction activities impose certain negative impacts on health & safety of construction workers and public.	Temporary	Moderate negative	Implementation of the following measures will ensure health and safety of the workers during the construction stage: ▪ The Contractor will ensure that the construction workers / laborers are trained in safety procedures for all relevant aspects of construction; ▪ Proponents of the Project will make regular checks to ensure that the contractor is following safety working procedures/safety	Contractor / Proponent

				measures. ▪ Construction workers will be provided with proper safety equipment such as helmets, goggles, masks, etc.; ▪ Formal emergency procedures will be developed for construction site in case of an accident. First aid kits and other necessary equipment will be kept available at site along with the list of emergency phone numbers to be contacted in case of any accident. ▪ The safety of the public at all stages of the construction will be ensured through appropriate public education and safety measures such as use of sign boards, barriers and flags; and ▪ Proper illumination will be provided at night.	
OPERATIONAL STAGE					
a. Physical Environment					
Air Quality	Risk of deterioration of ambient air from stack emissions of standby power generator, air conditioners, exhaust fans, traffic on roads, etc.	Permanent	Moderate negative	In order to minimize air pollution, following mitigation measures will be adopted: ▪ Plantation will be provided on the main entrance and open places/parks and green belts of the Housing Scheme, which will generate fresh oxygen; ▪ An air quality monitoring and improvement plan will be developed to keep the air pollution levels within the permissible limits of PEQS; ▪ Level of air pollution (as specified in the PEQS) will be monitored on regular basis and appropriate mitigation measures implemented; and ▪ Vehicles with excessive smoke emissions will not be allowed to enter the proposed Housing Scheme/Society.	Company Management / Proponent

				▪ Latest state of the art technology standby power generator(s), if needed in future during operational phase of the proposed project for society office, will be placed equipped with smoke arrestor, proper height of stack/chimney and sound proof canopy to avoid excessive smoke. ▪ Overhauling/maintenance schedule for standby power generator(s) will be developed and implemented ▪ Standby power generator(s) will be overhauled and maintained well within specific time period/overhauling schedule to avoid excessive smoke.	
Noise	No as such noise will be produced except from vehicles on roads, however it will be negligible level.	Permanent	Moderate negative	▪ World Bank's Pollution Prevention and Abatement Guidelines for ambient noise for the receptors are i.e. 55 and 45 dB (A) during daytime and night time respectively for residential, institutional and educational areas. ▪ There will be prohibition on the use of horns in the Housing Scheme. ▪ Extensive tree plantation along the boundary wall and at open places will also be done to act as sound barrier / sound absorber. ▪ Latest state of the art technology standby power generator(s), if needed during operational phase of the proposed project for society office, will be placed on concrete foundations with shock/vibration/tremor absorbing rubbers and also equipped with smoke arrestor, proper height of stack/chimney and sound proof canopy to avoid excessive noise/vibration/tremor. ▪ Overhauling/maintenance schedule for	Company Management / Proponent

				standby power generator(s) will be developed and implemented ▪ Standby power generator(s) will be overhauled and maintained well within specific time period/overhauling schedule to avoid excessive noise/vibration/tremor.	
Water Consumption	During operational stage, water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table because the proposed housing scheme is located in agricultural area where irrigation channels situated and Sadiq Canal is also located in the proposed project area. Water table will be recharged from the sources like canal water, irrigation channels and rain water through agricultural fields.	-	-	Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table as mentioned earlier Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table because the proposed housing scheme is located in agricultural area where irrigation channels situated and Sadiq Canal is also located in the proposed project area. Water table will be recharged from the sources like canal water, irrigation channels and rain water through agricultural fields. However, following mitigation measures will also be adopted: ▪ It will be made sure that all faucets, circulating pumps etc. do not leak and are in good repair; ▪ Any leaking or dripping faucet, pump or toilet will be reported immediately; and ▪ Use of water-saving equipment will be practiced both in houses and green areas; ▪ The Proponent will introduce a system for efficient use of resources and will take measures for water conservation that include advice to the residents, the installation of low-flush water closet (1.6 US gallons per flush) instead of the traditional 4-gallons water closet in all the houses.	Company Management / Proponent

				▪ Green belts, grassy lawns and parks will be developed to recharge the water table which will also help to control the surface runoff during rainy season.	
Sewage / Municipal Wastewater Generation	sewerage to be generated from proposed housing project during its operational phase would require proper treatment, if not done so, it will affect the environment negatively.	Permanent	Major negative	For the treatment and safe/environment friendly disposal of sewage / wastewater following measures will be implemented: ▪ It will make sure to construct small scale septic tanks at every household for initial treatment. ▪ Sewage Treatment Plant will also be installed in the society for the treatment of sewage/municipal wastewater to comply with PEQS limits. ▪ After proper treatment, the treated sewage will be disposed off into wastewater drain/sewer line.	Company Management / Proponent
Municipal Solid Waste Generation	MSW will be generated during operational stage of the proposed project which needs proper collection, handling and disposal on daily basis	Permanent	Moderate negative	For the proposer, safe and environment friendly disposal of municipal solid waste following measures will be adopted: ▪ Solid waste collection system will be developed for collection of municipal solid waste to be produced from the project during operational stage. ▪ Dust bins / drums / small scale containers will be placed at every street level. ▪ Area (2 numbers of plots) will be earmarked/allocated for collection MSW in the society. ▪ All the MSW from this area will be lifted on daily basis and will be disposed off in accordance with the procedure of TMA/District Govt. policies / law as well as environment friendly manners. ▪ Services of MSW contractor will be hired for	Company Management / Proponent

				lifting of MSW on daily basis ▪ And track record the MSW will be maintained	
Emergency Response	There are always chances of occurrence of emergency situations by natural and anthropogenic means such as earthquakes, floods, heavy rainfall, thunderstorm, fires due to electrical short-circuiting, over heating etc. Any emergency situation may result in loss / damage of property, asset, human life, etc. It will be a major negative impact.	Permanent	Major negative	▪ An Emergency Response Plan & Preparedness Plan for emergency situation including fire emergency, earthquakes and other manmade disasters will be prepared by the project management. ▪ Emergency Response Plan & Preparedness Plan will be review or revised annually as per need. ▪ Firefighting arrangements including Fire hydrant system connected with water tank reserved for emergency situation, fire extinguishers, fire alarm system, emergency signs, first aid boxes, etc. will be placed at appropriate locations to cop with emergency situations. ▪ Sufficient / appropriate firefighting arrangements as mentioned above will be undertaken according to the requirements of Civil Defense Department, Rescue Department 1122 and international standards. ▪ All firefighting, emergency and safety equipment will be frequently inspected, checked periodically, mentioned expiry date and properly maintained.	Company Management / Proponent
b. Ecological Environment					
Impacts on Flora	Operation of the proposed housing project will not exert any negative impact on flora	Permanent	Minor negative	▪ Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done in green belts and parks within the society. ▪ And maximum tree plantations will be done on available open spaces in and outside/around the project site after	Company Management / Proponent

				completion of project. ▪ To avoid any negative impact on flora of site in and around the site and off site, air emissions will be monitored and kept controlled within PEQS limits.	
Impacts on Fauna	Operation of the proposed housing project will not exert any negative impact on fauna	Permanent	Minor negative	▪ Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which will attract the fauna (wild birds) to nest here. ▪ Noise level monitoring plan will also be developed to control excessive noise to avoid any negative impact on fauna which may disturbed them.	Company Management / Proponent
c. Socio-economic Environment					
Employment Generation	Employment generation during operation phase of the proposed project will be positive change	Permanent	Major positive	-	-
Generation of Revenue	Generation of revenue and taxes for government will also be positive impact	Permanent	Major positive	-	-
Health and Safety of Workers	Certain types of jobs / works do have some health & occupational safety risks for the workers such as maintenance workers including infrastructure repairing; roads maintenance, sewerage system repairing, water supply system repairing, electricity repairing, etc. mechanical workers and security personals. The	permanent	Major negative	The following mitigation measures will be adopted for the safety and health of workers: ▪ No worker aged below 18 years or over 60 years shall be employed ▪ The workers will be given information, instruction, training and supervision specific to their job and / or nature / requirement of their work, in safety precautions and procedures. ▪ Complete PPEs shall also be provided to workers such as gloves, hats/helmets, face mask, safety shoes, goggles, etc. as per	Company Management / Proponent

	workers must be trained specific to their jobs and provided with complete PPEs as per nature of their jobs.			nature and requirements of their jobs. ▪ First aid medical facility equipped with required antidotes shall be available in the premises, supervised by trained staff. ▪ Medical checkup of all workers shall be carried out at the time of employment and at least once a year thereafter.	

SECTION 9: SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

9.1 General

This section identifies the potential impacts due to implementation of the proposed project activities on the physical, ecological and socioeconomic environment of the project surrounding/area. The potential environmental impacts related to the proposed project have been studied related to location, design, construction and operational phases. This section also identifies mitigation measures that will help to mitigate the project's adverse environmental effects or to reduce them to an acceptable level within the prevailing legislative and regulatory framework.

9.2 Screening of Impacts & Mitigation Measures

The subject project impacts and mitigation measures have been studied keeping in view of following parameters while its different phases:

- Project location related impacts & mitigation measures
- Design related impacts & mitigation measures
- Construction stage impacts & mitigation measures
- Operational stage impacts & mitigation measures

9.3 Project Location Related Impacts & Mitigation Measures

The subject proposed project is a housing project and the site is located within the residential/urban units though the area is agricultural in nature on a large scale. moreover, residential areas/urban units are situated within the neighboring or close vicinity of the proposed project. Hence, the proposed housing project doesn't contradict to the status of the area as well as surroundings. Normally the housing schemes are developed systematically and well planned those obviously uplift the aesthetics of the surroundings as well as positive impact on the environment. However, the impacts relating to the project location of proposed housing project has been studied and mitigation measures also suggested as follows:

9.3.1 Impacts

Anticipated impacts relating to design of the proposed project regarding physical environment, ecological environment & socio-economic environment are as under:

a. Physical Environment

Impacts on physical environment due to project location are as under:

- **Changes in Land Use**

The proposed project site is an open land and after development of the proposed housing project the land use will be changed.

- **Changes in Land Appearance**

As mentioned earlier the land is open and after development of housing project as well its basic infrastructure and houses, apartments, commercial area, etc. the land appearance will be changed.

b. Ecological Environment

Impacts related to ecological environment is as under:

- **Impacts on Flora**

The land of proposed housing project is open and located within the area having residential units, populations centers, commercial entities, urban units, etc. Moreover, no as such flora exists on the site which will need to remove for the development of the housing scheme. However, very minor level vegetation like wild bushes / plants will be removed.

- **Impacts on Fauna**

There is no any type of fauna existed on proposed housing project site which will be disturbed and forced to migrate due to project development.

c. Socio-economic Environment

Impacts related to socio-economic environment from the proposed project will be positive which are as under:

- **Jobs for Locals**

The proposed housing project will create jobs for the locals due to project location during its construction phase and operational phase as well. This will be positive impact in respect of socio-economic environment.

- **Uplift in living style**

After development of modern and state of the art society; change in the living style of the locals will also be occurred. This will also be positive change.

- **Economic Gain**

The proposed housing project will positively be impacted the prices of the lands in the surroundings as well as in the project area.

9.3.2 Mitigation Measures

Suitable mitigation measures for above mentioned anticipated impacts related to project location on environment including its different dimensions like physical, ecological and socio-economic are as under:

a. Physical Environment

Mitigation measures for above mentioned impacts of physical environment are as under:

- **Changes in Land Use**

  - Beautiful landscaping including green belts, grassy lawns and parks will be developed after completion of the project to correlate the surrounding.

- **Changes in Land Appearance**

  - Change of land appearance will be localized nature as well as housing project would not contradict to the nature of the project area too. However, beautiful landscaping including green belts, grassy lawns and parks will be developed after completion of the project to correlate the surrounding.

b. Ecological Environment

Mitigation measures related to ecological environment is as under:

- **Impacts on Flora**

  - Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done in green belts and parks within the society.
  - And maximum tree plantations will be done on available open spaces in and outside/around the project site after completion of project.

- **Impacts on Fauna**

  - As mentioned above beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which will attract the fauna (wild birds) to nest here.

c. Socio-economic Environment

Mitigation measures for impacts arising from socio-economic environment due to project location are as under:

- **Jobs for Locals**

Generation of jobs for locals will be positive impact and doesn't require any mitigation measures.

- **Uplift in living style**

This will also be positive impact and no need to implement any mitigation measures

- **Economic Gain**

Economic gain is a positive impact and doesn't require mitigation measure.

9.4 Design Related Impacts & Mitigation Measures

The negative impacts related to design of the proposed project will not be significant as the adjacent area have residential units/commercial entities/urban units however, on a large scale the nature of the area is an agricultural.

In view of these considerations no environmental problems are foreseen in the context of design of proposed housing project. However, the possible impacts of proposed project regarding physical environment, ecological environment and socio-economic environment have been considered and their mitigation measures proposed as under:

9.4.1 Impacts

Anticipated impacts relating to design of the proposed project regarding physical environment, ecological environment & socio-economic environment are as under:

a. Physical Environment

Impacts on physical environment during design stage are as under:

- **Changes in Land Appearance**

After construction or completion land appearance will be changed because currently site is a vacant land and will be changed into housing scheme.

- **Seismic Hazard**

The project is situated in minor a damage zone. In this zone distant earthquakes with fundamental periods greater than 1.0 second may cause damage to structures.

- **Emergency response**

There are always chances of occurrence of emergency situations by natural and anthropogenic means such as earthquakes, floods, heavy rainfall, thunderstorm, fires due to electrical short-circuiting, over heating etc. Any emergency situation may result in loss / damage of property, asset, human life, etc. It will be a major negative impact.

- **Traffic Congestion and Disturbance to People**

Due to the construction / development activities, the traffic in the Project Area will increase. This will be a moderate negative impact.

b. Ecological Environment

- **Impacts on Flora**

The land of proposed housing project is open and located within the area having residential units, populations centers, commercial entities, urban units, etc. Moreover, no as such flora exists on the site which will need to remove for the development of the housing scheme. However, very minor level vegetation like wild bushes / plants will be removed.

However, the site will be designed in a way maximum tree cutting will be avoided and landscaping will be done on open spaces including development of green belts, parks and grassy lawns. It will be major positive impact.

- **Impacts on Fauna**

No any significant natural fauna including natural / wild birds are present specifically at site. However, after completion of project beautiful landscaping will be done including grown trees, ornamental / flowering plants & grassy lawns which enhance the aesthetic look of the project as well as attract the birds to nest at trees. It will be major positive impact.

c. Socio-economic Environment

- **Changes in Land value**

After the development of proposed housing project, the land value of area will enhance. It will be minor positive impact.

9.4.2 Mitigation Measures

Suitable mitigation measures for above mentioned anticipated impacts are as under:

a. Physical Environment

- **Changes in Land Appearance**

- Change of land appearance will be localized nature as well as housing project would not contradict to the nature of the project area too.
- moreover, beautiful landscaping including green belts, grassy lawns and parks will be developed after completion of the project to correlate the surrounding.

- **Seismic Hazard**

- All the foundations of the structures e.g., electric poles, houses, commercial setups etc. will be designed with consideration of seismic hazard which can withstand even moderate to large earthquakes.
- For seismic hazard analysis updated structural and seismic evaluations will be consulted.

➢ **Emergency response**

- An Emergency Response Plan & Preparedness Plan for emergency situation including fire emergency, earthquakes and other manmade disasters will be prepared by the project management.
- Emergency Response Plan & Preparedness Plan will be review or revised annually as per need.
- Firefighting arrangements including Fire hydrant system connected with water tank reserved for emergency situation, fire extinguishers, fire alarm system, emergency signs, first aid boxes, etc. will be placed at appropriate locations to cope with emergency situations.
- Sufficient / appropriate firefighting arrangements as mentioned above will be undertaken according to the requirements of Civil Defense Department, Rescue Department 1122 and international standards.
- All firefighting, emergency and safety equipment will be frequently inspected, checked periodically, mentioned expiry date and properly maintained.

➢ **Traffic Congestion and Disturbance to People**

- Adequate parking facilities will be provided within the boundary of the project site
- Spacious area will be allocated for the parking of construction machinery and tractor-trolleys bringing the material to the Project Site.

b. Ecological Environment

➢ **Impacts on Flora**

- During designing of the housing scheme maximum tree cutting will be avoided.
- Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done in green belts and parks within the society.
- And maximum tree plantations will be done on available open spaces in and outside/around the project site after completion of project.

➢ **Impacts on Fauna**

- Construction activities for the development of proposed housing project will be done in such a way fauna (wild birds) if any within the site and outside the premises may not be disturbed or minimized the negative effects to an acceptable level.
- As mentioned above beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available

open spaces in and outside/around the project site after completion of project which will attract the fauna (wild birds) to nest here.

c. Socio-economic Environment

- **Changes in Land value**

- This will be minor positive impact and not required any mitigation measure.

9.5 Construction Stage Impacts & Mitigation Measures

The potential environmental impacts of the proposed project along with the mitigation measures during the construction stage of the housing project have been described as follows:

5.6.1 Impacts

Anticipated impacts during construction stage of the proposed project have been discussed in context of physical environment, ecological environment & socio-economic environment as below:

a. Physical Environment

Anticipated impacts during construction phase on physical environment are as follows:

- **Change in land use**

The proposed project is being planned at vacant land situated in urban area though on a large scale it is agricultural area whereas there is rapid trend of urbanization in the said area. The current Project Site is a vacant piece of land with a high aptitude towards future development. The project does not contradict the status of the locality. There will be no significant change in land use.

- **Change of Land Appearance/layout**

There would be no significant change in the land appearance as the housing project does not contradict to the status of the locality.

- **Impacts on Topography**

The construction of the proposed project will not bring major changes in the existing topography of the project site. The changes due to the construction of proposed project will be of a localized nature. There will be no significant changes occurred off-site the project site.

- **Impacts on Soils**

The overall geology and soil quality of the project site is not expected to be adversely impacted due to the execution of the proposed project during the construction period.

- **Impacts on Surface and Groundwater**

During the construction stage, the sanitary wastewater will be generated by the workers' camp(s) if not mitigated properly may cause unhygienic conditions. Furthermore, lubricants such as oil & grease and other chemicals to be used in construction may also cause contamination if not properly stored at specific area.

- **Impacts on Air Quality**

Substantial quantity of dust in and around the active construction area may be generated from the excavation operations, traffic/machinery movement and transportation of construction material at the project site. Prolonged exposure to dust might result in respiratory tract infections and asthmatic problems to the construction workers, the natives of the area and commuters.

During construction, the continuous operation of machinery and movement of the heavy trucks and vehicles may generate gaseous emissions. These emissions may create public health risks and nuisance on the bio-physical environment. This will be a minor negative impact.

- **Noise & Vibration**

When the construction work is undertaken, constant rattle of heavy machinery will raise the noise level in the project area though some low scale. This noise and vibration will affect directly the residents of nearby areas. Noise due to the construction will be a minor negative impact.

- **Construction Solid Waste**

Inevitable cut and fill earthwork operations will open up scars on the land in and around the project site. Proper landscaping will, therefore, be given due consideration along with re-establishment of the local/indigenous vegetation. The excavated materials that are unsuitable for use need to be stored, transported and disposed off appropriately at the designated sites.

- **Sewage / Municipal Wastewater Generation**

During construction stage of the proposed project sewage from washrooms / toilets will be produced from construction worker's camp which needs to treat and disposed of properly.

- **Traffic Congestion and Disturbance to People**

Due to the construction / development activities, the traffic in the Project Area will increase. This will be a moderate negative impact if not mitigated properly.

b. Ecological Environment

- **Impacts on Flora**

There is no any type of wild flora existed at the site. However, the site will be designed in a way maximum tree cutting will be avoided and landscaping will be done on open spaces. It will be major positive impact.

- **Impacts on Fauna**

The usual fauna found at the project locality is wild birds only sparrows, crows, common mainas etc. Construction of the project will not have any significant impact on fauna.

c. Socio-economic Environment

- **Employment Generation**

During construction stage of the proposed project, about 100 workers / laborers will be engaged. This will be positive change.

- **Health and Safety of Workers**

The construction activities impose certain negative impacts on health and safety of the workers and public in case of unsafe and/or unfavourable working conditions. Mitigation measures will be required to minimise health and safety related negative impacts of the project. This will be a minor negative impact.

5.6.2 Mitigation Measures

Following mitigation measures are suggested to eliminate or minimize to acceptable level for above mentioned impacts during construction phase of the proposed project:

a. Physical Environment

- **Change in land use**

- Beautiful landscaping including green belts, grassy lawns and parks will be developed after completion of the project to correlate the surrounding.

- **Change of Land Appearance/layout**

- Change of land appearance will be localized nature as well as housing project would not contradict to the nature of the project area too.
- Moreover, beautiful landscaping including green belts, grassy lawns and parks will be developed after completion of the project to correlate the surrounding.

- **Impacts on Topography**

- There will be no significant changes off-site the project area however resurfacing of the exposed area will be done to avoid any negative impact on site surface.

- **Impacts on Soils**

- Plantation needs to take place at the project site so that soil becomes stabilized.

- **Impacts on Surface and Groundwater**

- The storage of lubricant materials such as oil and grease will be confined to a specific area so that in case of any leakage or spillage, the lubricant materials do not contaminate the entire project site.
- Provision of temporary sanitary system at site for construction worker's camp.

- **Impacts on Air Quality**

The majority of dust problems caused during the development / construction phase of the project can be effectively mitigated by the implementation of simple procedures by the Contractor including but not limited to the following:

- All the excavation work, access roads and construction material like sand, soil etc. will be sprinkled with water;
- Construction machinery will be maintained or overhauled in time to avoid any negative impact from their smoke.
- Regular monitoring of all vehicles, equipment, and machinery used for construction.
- All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition and properly tuned and maintained in order to minimize the exhaust emissions.
- Construction workers will be provided with masks for protection against the inhalation of dust

- **Noise & Vibration**

Mitigation measures mentioned below will be adopted to minimize the noise pollution. Those measures include, but are not limited to the following:

- Selection of up-to-date and well-maintained machinery or equipment with reduced noise levels ensured by suitable in-built dampening techniques or appropriate muffling devices.
- Confining of excessively noisy areas and limiting the work to normal working hours in the day;
- Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and train them in their use; and
- Regular checkups and maintenance of the construction equipment /

machinery and oiling and greasing of the noise making mechanical parts.

- **Disposal of Construction Solid Waste**

- The construction solid waste will be carefully examined and disposed off in an environment friendly manner by transporting it in closed containers and filling at appropriate sites.
- It is also desirable to utilize the construction solid waste in such a way that it is consumed for the construction of any other structure within the Project Site or in the immediate vicinity.
- Utilization of CSW in the vicinity of the Project Site is considered as the best option for its disposal.

- **Sewage / Municipal Wastewater Generation**

- Temporary sanitary system including toilets/washrooms with septic tanks will be constructed for construction workers which will be removed after completion of construction of the proposed project.

- **Traffic Congestion and Disturbance to People**

- Adequate parking facilities will be provided within the boundary of the project site for the construction machinery and tractor-trolleys bringing the material to the Project Area.

b. Ecological Environment

- **Impacts on Flora**

- Construction activities will be done in such a way to avoid any negative impact on flora of the locality.

- **Impacts on Fauna**

- The usual fauna found at the project locality is sparrows, crows, common mainas etc.
- During construction of the project it will be considered that fauna may not be disturbed.

c. Socio-economic Environment

- **Employment Generation**

- During construction of the project people will get jobs. This will be positive change.

- **Health and Safety of Workers**

Implementation of the following measures will ensure health and safety of the workers during the construction stage:

- The Contractor will ensure that the construction workers / laborers are trained in safety procedures for all relevant aspects of construction;
- Proponents of the Project will make regular checks to ensure that the contractor is following safety working procedures/safety measures.
- Construction workers will be provided with proper safety equipment such as helmets, goggles, masks, etc.;
- Formal emergency procedures will be developed for construction site in case of an accident. First aid kits and other necessary equipment will be kept available at site along with the list of emergency phone numbers to be contacted in case of any accident.
- The safety of the public at all stages of the construction will be ensured through appropriate public education and safety measures such as use of sign boards, barriers and flags; and
- Proper illumination will be provided at night.

9.6 Operational Stage Impacts & Mitigation Measures

The anticipated environmental impacts and their suitable mitigation measures related to the proposed project during its operational phase have been studied and listed as below: -

5.7.1 Impacts

Anticipated impacts generating from operational phase of the proposed project regarding physical environment, ecological environment & socioeconomic environment have been discussed as follows:

a. Physical Environment

- **Air Quality**

During operational stage of the proposed project, the continuous operation of air conditioners, exhaust fans, negligible level stack emissions from operation of standby power generator of society office, etc. may deteriorate the quality of air if not managed properly. Increase in traffic volume during office/school starting and closing times will also deteriorate the air quality. This will be a moderate negative impact.

- **Noise**

During the operational stage, no as such noise levels are anticipated to be increased as the proposed project is a housing scheme. However, negligible levels of noise will be generated mainly due to movements of vehicles on the roads, for which proper mitigation measures will be required.

- **Water Consumption**

During operational stage of the proposed project when it will be fully occupied, approximately 594,000 gallons/day of water will be consumed by the households and commercial entities. The source of water will be groundwater; the groundwater available at proposed project site is sweet and fit for drinking purposes due to location of site near canal. Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table because the proposed housing scheme is located in agricultural area where irrigation channels situated and Sadiq Canal is also located in the proposed project area. Water table will be recharged from the sources like canal water, irrigation channels and rain water through agricultural fields.

- **Sewerage / Municipal Wastewater Generation**

During operational stage of the housing project when it will be fully occupied, approximately 594,000 gallons/day of sewerage / municipal wastewater will be generated from households and commercial entities which needs proper treatment to comply with PEQS before its final drainage outside the scheme for proper final disposal into wastewater drain/sewer line.

- **Municipal Solid Waste Generation**

Municipal solid waste in quantity of approximately 7.72 tons/day will be generated from households & commercial entities during the operational phase of the proposed housing project when it will be fully occupied, which needs proper collection, handling and disposal on daily basis otherwise it will create mess and moderate level negative impact on environment.

- **Emergency Response/Fire Fighting**

There are always chances of occurrence of emergency situations by natural and anthropogenic means such as earthquakes, floods, heavy rainfall, thunderstorm, fires due to electrical short-circuiting, over heating etc. Any emergency situation may result in loss / damage of property, asset, human life, etc. It will be a major negative impact.

b. Ecological Environment

- **Impacts on Flora**

Operation of the proposed project will not exert any negative impact on flora of site and flora of local area as well because no any emissions will be generated. Furthermore, only sewage will be generated which will be treated first and then disposed properly in environment friendly manner and to avoid any indiscrimination disposal.

- **Impacts on Fauna**

Housing project will not impose any negative impact on fauna (wild birds). Because the housing scheme doesn't have any environmental issues like

industrial entities including noisy operations, air emissions, hazardous nature wastewater generation, etc. But the beautiful landscaping in the societies would attract the fauna (wild birds) to nest here.

c. Socio-economic Environment

- **Employment Generation**

When the housing scheme will be in full operation, it will generate employment for people. This will be a major positive impact.

- **Generation of Revenue**

M/s Etihad Garden Phase-II will generate revenue for Government. This will be a major positive impact.

- **Health & Safety of Workers**

Certain types of jobs / works do have some health & occupational safety risks for the workers such as maintenance workers including infrastructure repairing; roads maintenance, sewerage system repairing, water supply system repairing, electricity repairing, etc. mechanical workers and security personals. The workers must be trained specific to their jobs and provided with complete PPEs as per nature of their jobs.

5.7.2 Mitigation Measures

Mitigation measures for operation stage of the proposed project as mentioned above are listed below:

a. Physical Environment

- **Air Quality**

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

- Plantation will be provided on the main entrance and open places/parks and green belts of the Housing Scheme, which will generate fresh oxygen;
- An air quality monitoring and improvement plan will be developed to keep the air pollution levels within the permissible limits of PEQS;
- Level of air pollution (as specified in the PEQS) will be monitored on regular basis and appropriate mitigation measures implemented; and
- Vehicles with excessive smoke emissions will not be allowed to enter the proposed Housing Scheme/Society.
- Latest state of the art technology standby power generator(s), if needed in future during operational phase of the proposed project for society office, will be placed equipped with smoke arrestor, proper height of stack/chimney and sound proof canopy to avoid excessive smoke.
- Overhauling/maintenance schedule for standby power generator(s) will be developed and implemented

- Standby power generator(s) will be overhauled and maintained well within specific time period/overhauling schedule to avoid excessive smoke.

➢ **Noise**

- World Bank's Pollution Prevention and Abatement Guidelines for ambient noise for the receptors are i.e. 55 and 45 dB (A) during daytime and night time respectively for residential, institutional and educational areas.
- There will be prohibition on the use of horns in the Housing Scheme.
- Extensive tree plantation along the boundary wall and at open places will also be done to act as sound barrier / sound absorber.
- Latest state of the art technology standby power generator(s), if needed during operational phase of the proposed project for society office, will be placed on concrete foundations with shock/vibration/tremor absorbing rubbers and also equipped with smoke arrestor, proper height of stack/chimney and sound proof canopy to avoid excessive noise/vibration/tremor.
- Overhauling/maintenance schedule for standby power generator(s) will be developed and implemented
- Standby power generator(s) will be overhauled and maintained well within specific time period/overhauling schedule to avoid excessive noise/vibration/tremor.

- **Water Consumption**

Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table as mentioned earlier Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table because the proposed housing scheme is located in agricultural area where irrigation channels situated and Sadiq Canal is also located in the proposed project area. Water table will be recharged from the sources like canal water, irrigation channels and rain water through agricultural fields. However, following mitigation measures will also be adopted:

- It will be made sure that all faucets, circulating pumps etc. do not leak and are in good repair;
- Any leaking or dripping faucet, pump or toilet will be reported immediately; and
- Use of water-saving equipment will be practiced both in houses and green areas;
- The Proponent will introduce a system for efficient use of resources and will take measures for water conservation that include advice to the residents, the installation of low-flush water closet (1.6 US gallons per flush) instead of the traditional 4-gallons water closet in all the houses.
- Green belts, grassy lawns and parks will be developed to recharge the water table which will also help to control the surface runoff during rainy season.

- **Sewage / Municipal Wastewater Generation**

For the treatment and safe/environment friendly disposal of sewage / wastewater following measures will be implemented:

- It will make sure to construct small scale septic tanks at every household for initial treatment.
- Sewage Treatment Plant will also be installed in the society for the treatment of sewage/municipal wastewater to comply with PEQS limits.
- After proper treatment, the treated sewage will be disposed off into wastewater drain/sewer line.

- **Municipal Solid Waste Generation**

For the proposer, safe and environment friendly disposal of municipal solid waste following measures will be adopted:

- Solid waste collection system will be developed for collection of municipal solid waste to be produced from the project during operational stage.
- Dust bins / drums / small scale containers will be placed at every street level.
- Area (2 numbers of plots) will be earmarked/allocated for collection MSW in the society.
- All the MSW from this area will be lifted on daily basis and will be disposed off in accordance with the procedure of TMA/District Govt. policies / law as well as environment friendly manners.
- Services of MSW contractor will be hired for lifting of MSW on daily basis
- And track record the MSW will be maintained

- **Emergency Response/Fire Fighting**

- An Emergency Response Plan & Preparedness Plan for emergency situation including fire emergency, earthquakes and other manmade disasters will be prepared by the project management.
- Emergency Response Plan & Preparedness Plan will be review or revised annually as per need.
- Firefighting arrangements including Fire hydrant system connected with water tank reserved for emergency situation, fire extinguishers, fire alarm system, emergency signs, first aid boxes, etc. will be placed at appropriate locations to cop with emergency situations.
- Sufficient / appropriate firefighting arrangements as mentioned above will be undertaken according to the requirements of Civil Defense Department, Rescue Department 1122 and international standards.
- All firefighting, emergency and safety equipment will be frequently inspected, checked periodically, mentioned expiry date and properly maintained.

b. Ecological Environment

➢ **Impacts on Flora**

- Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done in green belts and parks within the society.
- And maximum tree plantations will be done on available open spaces in and outside/around the project site after completion of project.
- To avoid any negative impact on flora of site in and around the site and off site, air emissions will be monitored and kept controlled within PEQS limits.

➢ **Impacts on Fauna**

- Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which will attract the fauna (wild birds) to nest here.
- Noise level monitoring plan will also be developed to control excessive noise to avoid any negative impact on fauna which may disturbed them.

c. Socio-economic Environment

➢ **Employment Generation**

- Employment generation will be positive impact.

➢ **Generation of Revenue**

- Generation of revenue or taxes which will be paid to Govt. will be positive impact.

➢ **Health & Safety of Workers**

The following mitigation measures will be adopted for the safety and health of workers:

- No worker aged below 18 years or over 60 years shall be employed
- The workers will be given information, instruction, training and supervision specific to their job and / or nature / requirement of their work, in safety precautions and procedures.
- Complete PPEs shall also be provided to workers such as gloves, hats/helmets, face mask, safety shoes, goggles, etc. as per nature and requirements of their jobs.
- First aid medical facility equipped with required antidotes shall be available in the premises, supervised by trained staff.
- Medical checkup of all workers shall be carried out at the time of employment and at least once a year thereafter.

5.8 POTENTIAL ENVIRONMENTAL ENHANCEMENT MEASURES

Following potential environmental enhancement measures including safety & health enhancement measures will be implemented during construction & operational stage of the proposed project:

- Environmental Management & Monitoring Plan (EMMP) suggested in EIA Report should be strictly followed, implemented with letter & spirit and operational throughout the project life. All monitored data should be reported to the EPA Punjab for scrutiny at their end.
- An air quality monitoring and improvement plan should be developed to keep the air pollution levels within the permissible limits of PEQS;
- World Bank's Pollution Prevention and Abatement Guidelines for ambient noise for the receptors are i.e. 55 and 45 dB (A) during daytime and night time respectively for residential, institutional and educational areas should be maintained.
- Noise level monitoring plan should be developed and implemented with letter & spirit to comply with PEQS limits
- It should make sure to construct small scale septic tanks for every household for initial treatment.
- Sewage Treatment Plant should also be installed in the society for the treatment of sewage/municipal wastewater to comply with PEQS limits.
- After proper treatment, the treated sewage should be disposed off into wastewater drain/sewer line.
- Solid waste collection system should be developed for collection of municipal solid waste to be produced from the project during operational stage.
- Environmental Monitoring including sewage, ground water, and noise level should be done on regular basis or on quarterly intervals.
- An Emergency Response Plan & Preparedness Plan for emergency situation including fire emergency, earthquakes and other manmade disasters will be prepared by the project management.
- Emergency Response Plan & Preparedness Plan should be review or revised annually as per need.
- Firefighting arrangements including Fire hydrant system connected with water tank reserved for emergency situation, fire extinguishers, fire alarm system, emergency signs, first aid boxes, etc. must be placed at appropriate locations to cop with emergency situations.
- Sufficient / appropriate firefighting arrangements as mentioned above should be done according to the requirements of Civil Defense Department, Rescue Department 1122 and international standards.
- All firefighting, emergency and safety equipment should be frequently inspected, checked periodically, mentioned expiry date and properly maintained.

SECTION 10: ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

10.1 Environmental Management

To implement the recommendations and suggestions for environmental protection included in Section "Screening of Potential Environmental Impacts & Mitigations Measures" of this study, a comprehensive management plan is needed.

The objective of the Environmental Management Plan (EMP) is to address all the major environmental issues and provide framework for the implementation of the proposed mitigation measures during the construction and operational stages of the proposed project. The proper implementation of the EMP will ensure that all the adverse environmental impacts identified in the EIA Study are adequately mitigated, either totally prevented or minimized to an acceptable levels as prescribed in PEQS and required actions to achieve those objectives are successfully adopted by the concerned institutions or regulatory agencies. The implementation of EMP will be carefully coordinated with design and construction program of the project to ensure that relevant mitigation measures are implemented at the most appropriate stage and those resources are properly allocated to achieve the desired results.

For effective environmental management, client will assign the necessary responsibilities to an Environmental Management Team (EMT) headed by a well-trained person in the field of environment, which will be responsible for the environmental monitoring of the project.

The contractor will be responsible for the execution of the project under supervision of the client. The contractor will be bound to follow the provisions of the contract documents especially about the environmental protection measures and apply good construction techniques and methodology without damaging the existing environment. Obligation(s) of the contractor, to safeguard and mitigate adverse impacts and rehabilitate the environment will be addressed through environmental provisions in the contract document(s) as already highlighted in this EIA Report and through adequate implementation at site. The proponent will provide copy of this EIA Report and Construction Phase Environmental Approval to the contractor for the safety of Environment and to comply with the laws.

10.2 Description of Proposed Mitigation Actions

Description of impacts & their proposed mitigation actions, have been discussed in the following table in details:

Table 10.1: Description of Impacts & Proposed Mitigation Actions

IMPACTS	MITIGATION Actions
Impacts on Air Quality During operational stage of the proposed project, the continuous operation of air conditioners, exhaust fans, negligible level stack emissions from operation of standby power generator of society office, etc. may deteriorate the quality of air if not managed properly. Increase in traffic volume during office/school starting and closing times will also deteriorate the air quality. This will be a moderate negative impact.	In order to minimize air pollution, following mitigation measures are recommended: ▪ Plantation will be provided on the main entrance and open places/parks and green belts of the Housing Scheme, which will generate fresh oxygen; ▪ An air quality monitoring and improvement plan will be developed to keep the air pollution levels within the permissible limits of PEQS; ▪ Level of air pollution (as specified in the PEQS) will be monitored on regular basis and appropriate mitigation measures implemented; and ▪ Vehicles with excessive smoke emissions will not be allowed to enter the proposed Housing Scheme/Society. ▪ Latest state of the art technology standby power generator(s), if needed in future during operational phase of the proposed project for society office, will be placed equipped with smoke arrestor, proper height of stack/chimney and sound proof canopy to avoid excessive smoke. ▪ Overhauling/maintenance schedule for standby power generator(s) will be developed and implemented ▪ Standby power generator(s) will be overhauled and maintained well within specific time period/overhauling schedule to avoid excessive smoke.
Noise During the operational stage, no as such noise levels are anticipated to be increased as the proposed project is a housing scheme. However, negligible levels of noise will be generated mainly due to movements of vehicles on the roads, for which proper mitigation measures will be required.	▪ World Bank's Pollution Prevention and Abatement Guidelines for ambient noise for the receptors are i.e. 55 and 45 dB (A) during daytime and night time respectively for residential, institutional and educational areas. ▪ There will be prohibition on the use of horns in the Housing Scheme. ▪ Extensive tree plantation along the boundary wall and at open places will also be done to act as sound barrier / sound absorber. ▪ Latest state of the art technology standby power generator(s), if needed during operational phase of the proposed project for society office, will be placed on concrete foundations with shock/vibration/tremor absorbing rubbers and also equipped with smoke arrestor,

	proper height of stack/chimney and sound proof canopy to avoid excessive noise/vibration/tremor. ▪ Overhauling/maintenance schedule for standby power generator(s) will be developed and implemented ▪ Standby power generator(s) will be overhauled and maintained well within specific time period/overhauling schedule to avoid excessive noise/vibration/tremor.
Water Consumption During operational stage of the proposed project when it will be fully occupied, approximately 594,000 gallons/day of water will be consumed by the households and commercial entities. The source of water will be groundwater; the groundwater available at proposed project site is sweet and fit for drinking purposes due to location of site near canal. Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table because the proposed housing scheme is located in agricultural area where irrigation channels situated and Sadiq Canal is also located in the proposed project area. Water table will be recharged from the sources like canal water, irrigation channels and rain water through agricultural fields.	Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table as mentioned earlier Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table because the proposed housing scheme is located in agricultural area where irrigation channels situated and Sadiq Canal is also located in the proposed project area. Water table will be recharged from the sources like canal water, irrigation channels and rain water through agricultural fields. However, following mitigation measures will also be adopted: ▪ It will be made sure that all faucets, circulating pumps etc. do not leak and are in good repair; ▪ Any leaking or dripping faucet, pump or toilet will be reported immediately; and ▪ Use of water-saving equipment will be practiced both in houses and green areas; ▪ The Proponent will introduce a system for efficient use of resources and will take measures for water conservation that include advice to the residents, the installation of low-flush water closet (1.6 US gallons per flush) instead of the traditional 4-gallons water closet in all the houses. ▪ Green belts, grassy lawns and parks will be developed to recharge the water table which will also help to control the surface runoff during rainy season.
Sewage / Municipal Wastewater Generation During operational stage of the housing project when it will be fully occupied, approximately 594,000 gallons/day of sewerage / municipal wastewater will be generated from households and commercial entities which needs proper treatment to comply with PEQS before	For the treatment and safe/environment friendly disposal of sewage / wastewater following measures will be implemented: ▪ It will make sure to construct small scale septic tanks at every household for initial treatment. ▪ Sewage Treatment Plant will also be installed in the society for the treatment of sewage/municipal wastewater to comply

its final drainage outside the scheme for proper final disposal into wastewater drain/sewer line.	with PEQS limits. ▪ After proper treatment, the treated sewage will be disposed off into wastewater drain/sewer line.
Municipal Solid Waste Generation Municipal solid waste in quantity of approximately 7.72 tons/day will be generated from households & commercial entities during the operational phase of the proposed housing project when it will be fully occupied, which needs proper collection, handling and disposal on daily basis otherwise it will create mess and moderate level negative impact on environment.	▪ Solid waste collection system will be developed for collection of municipal solid waste to be produced from the project during operational stage. ▪ Dust bins / drums / small scale containers will be placed at every street level. ▪ Area (2 numbers of plots) will be earmarked/allocated for collection MSW in the society. ▪ All the MSW from this area will be lifted on daily basis and will be disposed off in accordance with the procedure of TMA/District Govt. policies / law as well as environment friendly manners. ▪ Services of MSW contractor will be hired for lifting of MSW on daily basis ▪ And track record the MSW will be maintained
Emergency Response There are always chances of emergency situations including fire emergency, earthquakes, flood and other manmade disasters such as fires due to electrical short-circuiting, over heating etc. it will be major negative impact.	▪ An Emergency Response Plan & Preparedness Plan for emergency situation including fire emergency, earthquakes and other manmade disasters will be prepared by the project management. ▪ Emergency Response Plan & Preparedness Plan will be review or revised annually as per need. ▪ Firefighting arrangements including Fire hydrant system connected with water tank reserved for emergency situation, fire extinguishers, fire alarm system, emergency signs, first aid boxes, etc. will be placed at appropriate locations to cop with emergency situations. ▪ Sufficient / appropriate firefighting arrangements as mentioned above will be undertaken according to the requirements of Civil Defense Department, Rescue Department 1122 and international standards. ▪ All firefighting, emergency and safety equipment will be frequently inspected, checked periodically, mentioned expiry date and properly maintained.
Impacts on Flora Operation of the proposed project will not exert any negative impact on flora of site and flora of local area as well because no any emissions will be generated. Furthermore, only sewage	▪ Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done in green belts and parks within the society. ▪ And maximum tree plantations will be done on available open spaces in and

will be generated which will be treated first and then disposed properly in environment friendly manner and to avoid any indiscrimination disposal.	outside/around the project site after completion of project. ▪ To avoid any negative impact on flora of site in and around the site and off site, air emissions will be monitored and kept controlled within PEQS limits.
Impacts on Fauna Housing project will not impose any negative impact on fauna (wild birds). Because the housing scheme doesn't have any environmental issues like industrial entities including noisy operations, air emissions, hazardous nature wastewater generation, etc. But the beautiful landscaping in the societies would attract the fauna (wild birds) to nest here.	▪ Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which will attract the fauna (wild birds) to nest here. ▪ Noise level monitoring plan will also be developed to control excessive noise to avoid any negative impact on fauna which may disturbed them.
Health & Safety of Workers Certain types of jobs / works do have some health & occupational safety risks for the workers such as maintenance workers including infrastructure repairing; roads maintenance, sewerage system repairing, water supply system repairing, electricity repairing, etc. mechanical workers and security personals. The workers must be trained specific to their jobs and provided with complete PPEs as per nature of their jobs.	▪ No worker aged below 18 years or over 60 years shall be employed ▪ The workers will be given information, instruction, training and supervision specific to their job and / or nature / requirement of their work, in safety precautions and procedures. ▪ Complete PPEs shall also be provided to workers such as gloves, hats/helmets, face mask, safety shoes, goggles, etc. as per nature and requirements of their jobs. ▪ First aid medical facility equipped with required antidotes shall be available in the premises, supervised by trained staff. ▪ Medical checkup of all workers shall be carried out at the time of employment and at least once a year thereafter.

10.3 Schedule for Implementation and Environmental Budget

Currently the proponent is seeking Environmental Approval from EPA, Punjab and after obtaining of said approval construction will be started and the project will take the time period of approximately 03 years. The environmental budget will be implemented while in construction phase once in project life and during operational phase environmental budget will be allocated annually and it will be implemented throughout the project life.

The cost required to effectively implement the mitigation measures is important for the sustainability of the Project. The proponent of the subject housing project has allocated the Environmental budget as per requirements for construction phase and operational phase of the project for recover any damages done by the project activities to environment which will include Environment, Health & Safety, for restoration, rehabilitation & landscaping of the area, for installing any pollution abating technology or equipment such as septic tanks, for the implementation of Environmental Management Plan and other environment related aspects.

Environmental Budget and its breakup with Schedule for implementation is as under:

Table 10.2: Environmental Budget with Implementation Schedule

Environmental Component	Amount PKR	Schedule of Implementation
Construction Phase		
Landscaping	5,000,000	Once in project life
Environmental Monitoring	100,000	Quarterly
Operational Phase		
Environmental Monitoring	100,000	Quarterly
O & M Cost of STP	1,000,000	
Firefighting Arrangements	800,000	Yearly
PPEs	500,000	Yearly
Tree Plantation & O & M of Landscaping	1,000,000	Yearly

10.4 Environmental Management Team

Environmental management team will be made responsible for overseeing the environmental performance in the project and develop, implement and monitor environmental strategies that promote sustainability. The team will comprise Environmental Manager, Assistant Managers, inspectors; their responsibilities are as follows in the following table;

Table 10.3: Environmental Management Team their Roles & Responsibilities

Position of Team Member	Roles and Responsibilities
Environmental Manager	▪ Implementing environmental policies and practices ▪ Devising strategies to meet targets and to encourage best practice ▪ Devising the best tools and systems to monitor performance and to implement strategies ▪ Ensuring compliance with environmental legislation ▪ Assessing, analyzing and collating environmental performance data and reporting information to internal staff, clients and regulatory bodies ▪ Confirming that materials, ingredients and so on are ethically or environmentally sourced ▪ Managing environmental strategy budgets ▪ Liaising with internal staff including senior managers and directors ▪ Acting as a champion or cheerleader for environmental issues within organization ▪ Providing environmental training to staff at all levels ▪ Writing plans and reports ▪ Keeping up to date with relevant changes in environmental legislation and initiatives including international legislation where applicable

	▪ Producing educational or information resources for internal staff, clients or the general public ▪ Liaising with regulatory bodies such as the EPA
Assistant Manager Compliance	▪ Develop and oversee control systems to prevent or deal with violations of legal guidelines and internal policies ▪ Evaluate the efficiency of controls and improve them continuously ▪ Revise procedures, reports etc. periodically to identify hidden risks or non-conformity issues ▪ Draft, modify and implement company policies ▪ Collaborate with corporate counsels and HR departments to monitor enforcement of standards and regulations ▪ Review the work of colleagues when necessary to identify compliance issues and provide advice or training ▪ Keep abreast of regulatory developments within or outside of the company as well as evolving best practices in compliance control ▪ Prepare reports for senior management and external regulatory bodies as appropriate
Assistant Manager EHS	▪ Research health and safety regulations, such as OSHA laws, and create company safety protocols. ▪ Supervise safety and security staff. ▪ Look into accident and injury claims company-wide, ensuring results consistent with company goals. ▪ Educate all personnel on health and safety policies and company safety goals

10.4.1 Institutional Capacity for effective Environment Management

To maintain or enhance the institutional capacity for effective Environment Management through implementation of Environmental Management & Monitoring Plan (EMMP), implementation of mitigation measures suggested in EIA Report, etc. proponent will appoint Environmental Management Team & Horticulture Committee (HC).

10.4.2 Horticulture Committee (HC) & its Responsibilities

A team will be formed named as “Horticulture Committee” (HC) to attend the issues relating to cleanliness, up keeping, aesthetic beauty of the project site, general environment enhancement, tree plantation, vegetation’s promotion, planting of flowering and ornamental plants/trees in and outside of project site.

- To attend the issues relating to cleanliness
- To upkeep, aesthetic beauty of the project site
- To look after general environment enhancement
- Tree plantation, vegetation’s promotion, plantation of flowering and ornamental plants/trees in and outside of project site.

10.5 Proposed Monitoring Program to Assess Performance or output of EMP

Environmental monitoring is normally undertaken during both construction and operational stages of the project to ensure the effectiveness of the proposed mitigation measures. In order to respond to unexpected environmental concerns at an early stage and to determine the accuracy of impacts predictions are also required. Specific monitoring programs are outlined below as well as responsibilities for the collection and analysis of data and the reporting requirements.

The various objectives of the environmental monitoring plan are:

(a) To evaluate the effectiveness of mitigation measures,

(b) To respond to the unanticipated environmental impacts when the project is under implementation.

10.5.1 Construction Phase

During construction stage of the proposed project environmental monitoring including air quality, noise level, ground water & wastewater will be done and detail is as follows:

a. Air Quality:

An ambient air quality monitoring will be done on quarterly basis or as prescribed by the EMT, in the construction stage at the representative locations.

1. CO
2. NO
3. NO_2
4. NO_x
5. SO_2
6. PM_{10}

b. Noise Level

Noise level monitoring will be done on monthly basis or as prescribed by the EMC, in the construction stage at the representative points.

c. Ground Water Quality:

Ground water quality monitoring will be done on quarterly basis, in the construction stage at the representative locations. The following parameters will be monitored.

1. pH
2. Total Dissolved Solids
3. Turbidity

4. Taste
5. Odor
6. Total Hardness
7. Chloride
8. Sulphate
9. Sodium
10. Calcium
11. Magnesium
12. Potassium
13. Nitrate
14. E-coli

d. Wastewater Quality:

Wastewater quality will be monitored on quarterly basis in the construction stage. The following parameters will be monitored.

1. Temperature
2. pH
3. DO
4. BOD_5
5. COD
6. TDS
7. TSS
8. Grease & Oil
9. Copper
10. Iron
11. Sulphate
12. Chloride

10.5.2 Operational Phase

During operational phase of the proposed project, environmental monitoring including stack emissions, noise level, ground water & wastewater will be done and detail is as under:

a. Stack Emissions Monitoring:

Stack emissions (standby power generator) monitoring will be done on quarterly basis in the operational phase. The parameters of stack emissions prescribed in Punjab Environment Quality Standards (PEQS) approved by the Government of Punjab will be monitored as follows:

1. O_2
2. CO_2
3. CO
4. NO
5. NO_2
6. No_x
7. So_x
8. Temperature

b. Noise Levels:

Noise levels monitoring will be done on quarterly basis while operational phase of the project at different pints of / near boundary wall, outside production halls & at other representative points.

c. Groundwater Quality:

Groundwater quality will be monitored on annual basis while operational phase of the project. The following parameters will be monitored:

1. pH
2. Total Dissolved Solids
3. Turbidity
4. Taste
5. Odor
6. Total Hardness
7. Chloride
8. Sulphate
9. Sodium
10. Calcium
11. Magnesium
12. Potassium
13. Nitrate
14. E-coli

d. Wastewater Quality:

Monitoring of wastewater analysis will be done on quarterly basis during the operational stage for the parameters given below or as prescribed by the NEQS:

1. Temperature
2. pH
3. DO
4. BOD5
5. COD
6. TDS
7. TSS
8. Grease & Oil
9. Copper
10. Iron
11. Sulphate
12. Chloride

10.6 Proposed EMP Reporting and Reviewing Procedure

The Environment Management Team will be responsible for environmental monitoring and reporting to the EPA Punjab throughout the construction and operational stages and for the implementation of Environmental Management Plan.

EMP Reporting & Reviewing Procedures emphasize that the EMP should set forth in sufficient detail all the design measures, monitoring programs, best management practices, and emergency and contingency plans to assure best that all the potential impacts are methodically controlled and suitably mitigated. In addition to reviewing the EIA report's recommendations, the management of the society should compare these documents and plans to the guidelines for such housing society in its evaluation of what is applicable or otherwise should be included in the EMP. Employee educational and training materials to be submitted to best for their review 3 weeks prior to the beginning of staff training.

10.7 Training Needs

The contractor will provide proper training to the construction workers on health and safety practices and conservation of resources. During the operational stage, the project staff will be trained about the requirements of Environmental Management System, including but not limited to the environmental, health and safety, efficient use of resources, emergency response, fire protection and safety / security issues etc.

10.7.1 Technical Training Programs

In order to raise the level of professional and managerial staff, they need to upgrade their knowledge in the related areas. The EMT will play a key role in this context.

Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the contractor to implement effective environmental protection measures. A domestic training program is proposed to train the staff that will be involved in the construction and operational stage on environmental protection and management.

10.7.2 Training Schedule

One of the most important mechanisms for the enhancement of the project's overall environmental performance is to organize environmental trainings for the project personnel and the Contractor's team. Environmental training will form part of the ongoing environmental management of the project. Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the Contractor's workforce to implement effective environmental protection measures. Adoption of these measures will help Proponent and the Contractor to achieve a high level of environmental awareness in the project team, which should, in turn promote sound environmental management during project lifespan.

A training schedule will be developed by the Environmental Health & Safety Manager, organized, and maintained by the management of the project and contractors.

Following is the comprehensive form of the training schedule;

Table 10.4: Training Schedule

Provided by	Trainee	Contents	Duration	Responsible Authority
Environmental Manager & Training Assistant	All Working Personnel	▪ Environmental laws and regulations, daily monitoring and supervision ▪ Introduction to project EIA and EMMP ▪ Importance of safety practices and usage of PPEs ▪ Environmental sensitivities of the project area ▪ Communication of environmental problems to corresponding officials ▪ Waste disposal	Monthly	Project Management & Contractor
Consultants / specializing in social management	Staff dealing in social matters	▪ Short seminars and courses on social awareness ▪ Effective public speaking / dealing	Monthly	Project Manager
Drivers	As specified	▪ Follow speed limits ▪ Road safety ▪ Road restrictions ▪ Vehicle / driving restrictions ▪ Applicable rules & regulations ▪ Defensive driving	Twice a month	Project Management & Contractor
Consultants / organizations specializing in occupational, health and safety issue	As specified	▪ Short lectures relating to occupational safety and health	Twice a year	Project CEO

10.8 Equipment and Instruments Maintenance Details

The project proponent will create their own system, i.e. equipment for monitoring of air, water and noise or hire the services of a private laboratory for the monitoring and analysis. The company management will maintain the records of Environment, Health & Safety and look after the EHS issues. The company management shall maintain PPEs, emergency / firefighting arrangements, conduct trainings as mentioned above and medical / first aid.

10.9 Environmental Management Plan (EMP)

The Environmental Management Plan (EMP) provides the framework for the implementation of mitigating measures and environmental management and monitoring during the construction and operational stages of the project. This document contains all commitments made in the EIA Report and can be used as a reference document to ensure that all environmental protection measures are implemented. This annotated outline presents information, which is included in the proposed Environmental Management Plan.

The detailed Environmental Management Plan having statement of impacts, setting of targets to achieve goals to protect environment, suggestion of mitigation measures and assigning of responsibilities in the Table 10.5 at end of this section.

Table 10.5: Environmental Management Plan (EMP)

Sr. No.	Project Component or Impact	Target	Action	Responsibility
DESIGN STAGE				
d. Physical Environment				
1.	Changes in Land Appearance	To avoid any negative change	▪ Change of land appearance will be localized nature as well as housing project would not contradict to the nature of the project area too. ▪ Moreover, beautiful landscaping including green belts, grassy lawns and parks will be developed after completion of the project to correlate the surrounding.	Design Consultant / Proponent
2.	Seismic Hazard	To design in such a way to protect building / structure from seismic hazard	▪ All the foundations of the structures e.g., electric poles, houses, commercial setups etc. will be designed with consideration of seismic hazard which can withstand even moderate to large earthquakes. ▪ For seismic hazard analysis updated structural and seismic evaluations will be consulted.	Design Consultant / Proponent
3.	Emergency Response	Incorporate in design of building emergency exits and routes and to mitigate emergency conditions	▪ An Emergency Response Plan & Preparedness Plan for emergency situation including fire emergency, earthquakes and other manmade disasters will be prepared by the project management. ▪ Emergency Response Plan & Preparedness Plan will be review or revised annually as per need. ▪ Firefighting arrangements including Fire hydrant system connected with water tank reserved for emergency situation, fire extinguishers, fire alarm system, emergency signs, first aid boxes, etc. will be placed at appropriate locations to cope with emergency situations. ▪ Sufficient / appropriate firefighting arrangements as mentioned above will be undertaken according to the requirements of Civil Defense Department, Rescue Department 1122 and international standards. ▪ All firefighting, emergency and safety equipment will be frequently inspected, checked periodically, mentioned expiry	Design Consultant / Proponent

			date and properly maintained.	
4.	Traffic Congestion and Disturbance to People	To avoid traffic congestion	▪ Adequate parking facilities will be provided within the boundary of the project site ▪ Spacious area will be allocated for the parking of construction machinery and tractor-trolleys bringing the material to the Project Site.	Design consultant / contractor / proponent
e.	**Ecological Environment**			
5.	Impacts on Flora	To avoid negative impact and undertake beautiful landscaping after construction	▪ During designing of the housing scheme maximum tree cutting will be avoided. ▪ Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done in green belts and parks within the society. ▪ And maximum tree plantations will be done on available open spaces in and outside/around the project site after completion of project.	Design Consultant / Proponent
6.	Impacts on Fauna	To ensure that fauna may be affected at minimum level	▪ Construction activities for the development of proposed housing project will be done in such a way fauna (wild birds) if any within the site and outside the premises may not be disturbed or minimized the negative effects to an acceptable level. ▪ As mentioned above beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which will attract the fauna (wild birds) to nest here.	Design Consultant / Proponent
f.	**Socio-economic Environment**			
7.	Changes in Land value	Not required	▪ This will be minor positive impact and not required any mitigation measure.	-
CONSTRUCTION STAGE				
d.	**Physical Environment**			
1.	Change in land use	To avoid any negative change	▪ Beautiful landscaping including green belts, grassy lawns and parks will be developed after completion of the project to correlate the surrounding.	Contractor / Proponent
2.	Change of Land Appearance/Layout	To ensure correlation with surroundings	▪ Change of land appearance will be localized nature as well as housing project would not contradict to the nature of the	Contractor / Proponent

			project area too. ▪ Moreover, beautiful landscaping including green belts, grassy lawns and parks will be developed after completion of the project to correlate the surrounding.	
3.	Impacts on Topography	To avoid any negative impact on topography	▪ There will be no significant changes off-site the project area however resurfacing of the exposed area will be done to avoid any negative impact on site surface.	Contractor / Proponent
4.	Impacts on Soils	To ensure minimum change in soil	▪ Plantation needs to take place at the project site so that soil becomes stabilized.	Contractor / Proponent
5.	Impacts on Surface and Groundwater	To mitigate the problem of contamination of surface & ground water	▪ The storage of lubricant materials such as oil and grease will be confined to a specific area so that in case of any leakage or spillage, the lubricant materials do not contaminate the entire project site. ▪ Provision of temporary sanitary system at site for construction worker's camp	Contractor / Proponent
6.	Impacts on Air Quality	To implement mitigatory measures to avoid any negative impact on ambient air	The majority of dust problems caused during the development / construction phase of the project can be effectively mitigated by the implementation of simple procedures by the Contractor including but not limited to the following: ▪ All the excavation work, access roads and construction material like sand, soil etc. will be sprinkled with water; ▪ Construction machinery will be maintained or overhauled in time to avoid any negative impact from their smoke. ▪ Regular monitoring of all vehicles, equipment, and machinery used for construction. ▪ All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition and properly tuned and maintained in order to minimize the exhaust emissions. ▪ Construction workers will be provided with masks for protection against the inhalation of dust	Contractor / Proponent
7.	Noise & Vibration	To implement mitigation measures to minimize the impacts of noise &	Mitigation measures mentioned below will be adopted to minimize the noise pollution. Those measures include, but are not limited to the following: ▪ Selection of up-to-date and well-maintained machinery or	Contractor / Proponent

		vibration	equipment with reduced noise levels ensured by suitable in-built dampening techniques or appropriate muffling devices. ▪ Confining of excessively noisy areas and limiting the work to normal working hours in the day; ▪ Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and train them in their use; and ▪ Regular checkups and maintenance of the construction equipment / machinery and oiling and greasing of the noise making mechanical parts.	
8.	Construction Solid Waste	To avoid degradation of soil	▪ The construction solid waste will be carefully examined and disposed off in an environment friendly manner by transporting it in closed containers and filling at appropriate sites. ▪ It is also desirable to utilize the construction solid waste in such a way that it is consumed for the construction of any other structure within the Project Site or in the immediate vicinity. ▪ Utilization of CSW in the vicinity of the Project Site is considered as the best option for its disposal.	Contractor / Proponent
9.	Sewage / Wastewater Generation	To comply with PEQS / NEQS	▪ Temporary sanitary system including toilets/washrooms with septic tanks will be constructed for construction workers which will be removed after completion of construction of the proposed project.	Contractor / Proponent
10.	Traffic Congestion and Disturbance to People	To avoid traffic congestion	▪ Adequate parking facilities will be provided within the boundary of the project site for the construction machinery and tractor-trolleys bringing the material to the Project Area.	Contractor / Proponent
e. Ecological Environment				
11.	Impacts on Flora	To avoid negative impact on flora of surroundings	▪ Construction activities will be done in such a way to avoid any negative impact on flora of the locality.	Contractor / Proponent
12.	Impacts on Fauna	To ensure that fauna may be affected at minimum level	▪ The usual fauna found at the project locality is sparrows, crows, common mainas etc. ▪ During construction of the project it will be considered that fauna may not be disturbed.	Contractor / Proponent

f. Socio-economic Environment				
13.	Employment Generation	Not required	▪ During construction of the project, the people will get jobs. This will be positive change.	Contractor / Proponent
14.	Health and Safety of Workers	To ensure health & safety of construction workers, visitors and member of public	Implementation of the following measures will ensure health and safety of the workers during the construction stage: ▪ The Contractor will ensure that the construction workers / laborers are trained in safety procedures for all relevant aspects of construction; ▪ Proponents of the Project will make regular checks to ensure that the contractor is following safety working procedures/safety measures. ▪ Construction workers will be provided with proper safety equipment such as helmets, goggles, masks, etc.; ▪ Formal emergency procedures will be developed for construction site in case of an accident. First aid kits and other necessary equipment will be kept available at site along with the list of emergency phone numbers to be contacted in case of any accident. ▪ The safety of the public at all stages of the construction will be ensured through appropriate public education and safety measures such as use of sign boards, barriers and flags; and ▪ Proper illumination will be provided at night.	Contractor / Proponent
OPERATIONAL STAGE				
d. Physical Environment				
1.	Air Quality	To avoid degradation of air and comply with PEQS / NEQS	In order to minimize air pollution, following mitigation measures will be adopted: ▪ Plantation will be provided on the main entrance and open places/parks and green belts of the Housing Scheme, which will generate fresh oxygen; ▪ An air quality monitoring and improvement plan will be developed to keep the air pollution levels within the permissible limits of PEQS; ▪ Level of air pollution (as specified in the PEQS) will be	Society Management / Proponent

			monitored on regular basis and appropriate mitigation measures implemented; and ▪ Vehicles with excessive smoke emissions will not be allowed to enter the proposed Housing Scheme/Society. ▪ Latest state of the art technology standby power generator(s), if needed in future during operational phase of the proposed project for society office, will be placed equipped with smoke arrestor, proper height of stack/chimney and sound proof canopy to avoid excessive smoke. ▪ Overhauling/maintenance schedule for standby power generator(s) will be developed and implemented ▪ Standby power generator(s) will be overhauled and maintained well within specific time period/overhauling schedule to avoid excessive smoke.	
2.	Noise	To mitigate the noise problem	▪ World Bank's Pollution Prevention and Abatement Guidelines for ambient noise for the receptors are i.e. 55 and 45 dB (A) during daytime and night time respectively for residential, institutional and educational areas. ▪ There will be prohibition on the use of horns in the Housing Scheme. ▪ Extensive tree plantation along the boundary wall and at open places will also be done to act as sound barrier / sound absorber. ▪ Latest state of the art technology standby power generator(s), if needed during operational phase of the proposed project for society office, will be placed on concrete foundations with shock/vibration/tremor absorbing rubbers and also equipped with smoke arrestor, proper height of stack/chimney and sound proof canopy to avoid excessive noise/vibration/tremor. ▪ Overhauling/maintenance schedule for standby power generator(s) will be developed and implemented ▪ Standby power generator(s) will be overhauled and maintained well within specific time period/overhauling schedule to avoid excessive noise/vibration/tremor.	Society Management / Proponent

3.	Water Consumption	To ensure that project operation may not exert any negative change on water table	Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table as mentioned earlier Water consumption by the proposed project (housing society) during its operational phase will not exert any negative impact on water table because the proposed housing scheme is located in agricultural area where irrigation channels situated and Sadiq Canal is also located in the proposed project area. Water table will be recharged from the sources like canal water, irrigation channels and rain water through agricultural fields. However, following mitigation measures will also be adopted: ▪ It will be made sure that all faucets, circulating pumps etc. do not leak and are in good repair; ▪ Any leaking or dripping faucet, pump or toilet will be reported immediately; and ▪ Use of water-saving equipment will be practiced both in houses and green areas; ▪ The Proponent will introduce a system for efficient use of resources and will take measures for water conservation that include advice to the residents, the installation of low-flush water closet (1.6 US gallons per flush) instead of the traditional 4-gallons water closet in all the houses. ▪ Green belts, grassy lawns and parks will be developed to recharge the water table which will also help to control the surface runoff during rainy season.	Society Management / Proponent
4.	Sewage / Municipal Wastewater Generation	To ensure to comply with PEQS / NEQS	For the treatment and safe/environment friendly disposal of sewage / wastewater following measures will be implemented: ▪ It will make sure to construct small scale septic tanks at every household for initial treatment. ▪ Sewage Treatment Plant will also be installed in the society for the treatment of sewage/municipal wastewater to comply with PEQS limits. ▪ After proper treatment, the treated sewage will be disposed off into wastewater drain/sewer line.	Society Management / Proponent

5.	Municipal Solid Waste Generation	To establish proper management system for safe disposal of solid waste	For the proposer, safe and environment friendly disposal of municipal solid waste following measures will be adopted: ▪ Solid waste collection system will be developed for collection of municipal solid waste to be produced from the project during operational stage. ▪ Dust bins / drums / small scale containers will be placed at every street level. ▪ Area (2 numbers of plots) will be earmarked/allocated for collection MSW in the society. ▪ All the MSW from this area will be lifted on daily basis and will be disposed off in accordance with the procedure of TMA/District Govt. policies / law as well as environment friendly manners. ▪ Services of MSW contractor will be hired for lifting of MSW on daily basis ▪ And track record the MSW will be maintained	Society Management / Proponent
6.	Emergency Response / Fire Fighting	To prepare emergency plan and proper procedures to cope with emergency conditions	▪ An Emergency Response Plan & Preparedness Plan for emergency situation including fire emergency, earthquakes and other manmade disasters will be prepared by the project management. ▪ Emergency Response Plan & Preparedness Plan will be review or revised annually as per need. ▪ Firefighting arrangements including Fire hydrant system connected with water tank reserved for emergency situation, fire extinguishers, fire alarm system, emergency signs, first aid boxes, etc. will be placed at appropriate locations to cop with emergency situations. ▪ Sufficient / appropriate firefighting arrangements as mentioned above will be undertaken according to the requirements of Civil Defense Department, Rescue Department 1122 and international standards. ▪ All firefighting, emergency and safety equipment will be frequently inspected, checked periodically, mentioned expiry date and properly maintained.	Society Management / Proponent

e. Ecological Environment				
7.	Impacts on Flora	To avoid negative impact and undertake beautiful landscaping after construction	▪ Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done in green belts and parks within the society. ▪ And maximum tree plantations will be done on available open spaces in and outside/around the project site after completion of project. ▪ To avoid any negative impact on flora of site in and around the site and off site, air emissions will be monitored and kept controlled within PEQS limits.	Society Management / Proponent
8.	Impacts on Fauna	To ensure that fauna may not be affected	▪ Beautiful landscaping including grown trees, ornamental / flowering plants & grassy lawns will be done on available open spaces in and outside/around the project site after completion of project which will attract the fauna (wild birds) to nest here. ▪ Noise level monitoring plan will also be developed to control excessive noise to avoid any negative impact on fauna which may disturbed them.	Society Management / Proponent
f. Socio-economic Environment				
9.	Employment Generation	Not required	▪ Employment generation will be positive impact.	Society Management / Proponent
10.	Generation of Revenue	Not required	▪ Generation of revenue or taxes which will be paid to Govt. will be positive impact.	Society Management / Proponent
11.	Health & Safety of Workers	To avoid any negative impact on health & safety of workers	The following mitigation measures will be adopted for the safety and health of workers: ▪ No worker aged below 18 years or over 60 years shall be employed ▪ The workers will be given information, instruction, training and supervision specific to their job and / or nature / requirement of their work, in safety precautions and procedures. ▪ Complete PPEs shall also be provided to workers such as	Society Management / Proponent

			gloves, hats/helmets, face mask, safety shoes, goggles, etc. as per nature and requirements of their jobs. ▪ First aid medical facility equipped with required antidotes shall be available in the premises, supervised by trained staff. ▪ Medical checkup of all workers shall be carried out at the time of employment and at least once a year thereafter.	

SECTION 11: STAKEHOLDER'S CONSULTATION

11.1 General

Consultation with the stakeholders is a tool for managing two-way communication between the project sponsor and the affected public. Its goal is to improve decision-making and build understanding by actively involving individuals, groups and organizations, which have a stake in the project. This involvement increases project's long-term viability and enhances its benefits to locally affected people and other stakeholders.

In order to evaluate the socioeconomic and environmental impacts, field surveys are extremely essential. In addition to the surveys at the preliminary stage, consultation with the community and their active participation plays a vital role in successful implementation of the project. To identify the different types of stakeholders and ascertain their perceptions about the construction of the proposed housing project, an Impact assessment survey was conducted. Informal group discussions were also held as an additional tool for obtaining feedback from the stakeholders that are being discussed in the following pages.

11.2 Objectives of Consultation

Public consultation plays a vital role in studying the effects of the Project on the stakeholders and in the successful implementation and execution of the proposed projects. Public involvement is a compulsory feature of environmental assessment, which leads to better and more acceptable decision-making. The objective of the consultation with stakeholders is to help verify the environmental and social issues that have been presumed to arise and to identify those which are not known or are unique to the construction of the proposed housing project.

Public Consultation is a mandatory part of the EIA process for developmental projects. It is a tool used for communication with a diverse group of stakeholders having multifarious aims such as information dissemination, exchanging views, soliciting feedback and suggestions on issues pertaining to the project, plan future actions. The adequacy of the public consultation and information disclosure is one of the basic criteria used to determine the project compliance with the national / international safeguard policies.

The consultation process was carried out in accordance with the requirements of Pakistan Environmental Procedures. The objectives of this process were to:

- Inform the public about what is proposed project
- Identify and involve all stakeholders, especially local residents, in the consultative and participation process
- Share information with stakeholders on the development of the proposed housing project and anticipated impacts on the physical, biological and socioeconomic environment of the project area
- Understand stakeholder's concerns regarding various aspects of the proposed project, including the existing available facilities and problems,

construction of the proposed project and the likely impacts (positive or negative) of construction and operation related activities
- Understand the perceptions, assessment of social impacts and concerns of the communities in the vicinity of the proposed project
- Provide an opportunity to the public in the public consultation session to provide valuable suggestions for the project design in a positive manner
- Reduce the chances of conflict through the early identification of controversial issues and consult them to find acceptable solutions.
- This section describes the outcome of the public consultation sessions held with different stakeholders that may be directly or indirectly affected by the proposed project.
- Information dissemination, education and liaison
- Identification of problems and needs
- Collaborative problem solving
- Reaction, comment and feedback on proposed project
- Documenting mitigation measures proposed by the stakeholders

11.3 Methodology

The EIA Team carried out public consultations at various locations around the proposed project area. For ascertaining the perceptions of different stakeholders about the proposed project (during construction/operation) consultation meetings were held with them in the vicinity of the proposed project. Consultation was carried out in order to establish stakeholder's opinion regarding project implementation. The methods used for public consultation with project stakeholders include Scoping Sessions, Formal Meetings, Informal Meetings and Individual Interview. All the stakeholders were briefed about the project verbally. Their feedback was noted, and all the concerns voiced in the discussion were relayed to the management team of the project.

The stakeholder's consultation during this phase of the work targeted the project area, administrative and private offices, Government offices, shops, etc. near the Project area:

- Selection of the stakeholders for consultation, reconnaissance of the proposed project site and initial discussions with the locals, villagers, shopkeepers, drivers etc.
- Appraising the targeted stakeholders initially for the purpose of consultation and working out a schedule for holding regular consultation meetings;
- Meetings with the stakeholders through the participation of environmental consultants and social specialists and documenting the opinions of the stakeholders expressed during the meetings etc.

11.4 Categories of Stakeholders Consulted

The stakeholders contacted during the survey belonged to different categories of people are as under:

11.4.1 Proponent's Environment Management Team

Possible potential impacts and mitigation measures related to the proposed housing project during its construction / developmental and operational phases were discussed in detail with the project proponent / company management. They assured to undertake all suggested mitigation measures to control or eliminate or minimize to an acceptable level any anticipated potential impact generated by the proposed project and to make the subject proposed housing project environment friendly. The environmental management team of the proponent was made aware of their responsibilities which include;

- Oversee daily activities of team members to maintain Environmental Management System (EMS)
- Ensure that proposed project both construction phase & operational phase attentivities are in compliance with local / provincial and federal environmental laws
- Follow and enforce environmental policies and procedures.

11.4.2 The Responsible Authority

The Proponent or its management is the responsible authority to take all mitigation measures to safe guard the environment before or prior to commence the project. The mitigation measures suggested in the EIA Study will be implemented with letter & spirit by the proponent / society management during the various phases of the proposed project such as Design, Construction and Operation Phases.

11.4.3 Other Departments and Agencies

For the analysis of anticipated potential impacts detailed meetings were held with the management of company, local community surrounding of the site, etc. Issues were discussed that might affect the environment and also the implementation of proposed project. All possible mitigation measures were considered and incorporated in the Environmental Management Plan (EMP).

Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders in the area. The purpose of such consultation is to obtain feedback from relevant person.

11.4.4 Environmental Practitioners and Experts

Environmental expert's team of M/s Sustainable Environmental Solutions visited the proposed housing project site & project area, had discussions with stakeholders and consulted the locals of nearby and other villages to evaluate the project socio-economic impacts. People of the area belong to different professions like mostly belong to agriculture, employment, own business, doctors, lawyers, some in abroad, government employees, teachers, etc. People provide the massive information about the proposed project and have positive remarks regarding the project development.

11.4.5 Affected & Wider Community

There is no affected community present in the radius of the study area. SES team has consulted the people of surrounding the project site especially surroundings. The people provided positive remarks regarding the proposed project. Stakeholder's participation and feedback by the people to evaluate the project impacts especially socio-economic impacts. Stakeholder's feedback attached as appendices with this EIA Study.

11.5 Consultation Meetings and Formal & Informal Group Discussions

Among all stakeholders, some major stakeholders were identified in the proposed project area. Consultation meetings regarding project impacts, their magnitude and mitigation measures were held with the Management of company, environmental practitioners, local residents around the project or in close vicinity of the project site or project area, general public, customers and pedestrians to know their concerns regarding proposed housing project. Scoping sessions and meeting were conducted with these stakeholders. Generally, it was found that people were already aware of the proposed project because the project is to be located in the area where various urban entities like residential areas/community centers & commercial entities already exist and are being established there time to time. Majority of the stakeholders showed their full support for the proposed housing project.

Following are the other concerns/ suggestions of the stakeholders;

- Exposure of noise and dust pollution will cause disturbance and health & safety issues to the local residents and other stakeholders throughout the construction stage due to the movement of construction machinery and transportation of construction materials. The effects of noise and dust pollution on the local residents should be minimized by making necessary arrangements. Dust pollution should be controlled by water sprinkling on regular basis.
- Moreover, the site is located within the urban area however proposed project area is agricultural in nature on the large scale and construction activities will be confined within the premises and would not create nuisance for the public.
- Due to the movement of loaded trucks during the construction period of proposed housing project, congestion on the access road will increase.
- Proper diversion route rather than access road should be clearly defined to avoid traffic blockage during the entire construction period.
- Local residents should be given priority for jobs during construction as well as operational phases of the housing project
- Public utilities should not be disturbed. Arrangements should be made to minimize the disruption of public utilities or should be rehabilitated on priority basis to reduce the impacts.
- A detailed health and safety plan must be developed to mitigate the construction and operational risks of the proposed project
- Swage / Municipal Wastewater and Construction / Municipal Solid waste to be produced during construction and operational phases should be disposed of timely and appropriately.

- Overall activities of the project;
- Possible impacts on natural vegetation, land and properties;
- Possible mitigation measures;
- Benefits of the project specifically for the local people.

Mitigation measures proposed by EIA consultants for addressing the stakeholder's concerns are as follows;

- Significant efforts including change in design should be adopted to minimize the physical and economical disturbance of the local residents.
- Local residents should be given priority through hiring manpower during construction and operational phases of the proposed project.
- Construction machinery should be placed within the project site premises or at adequate locations away from the sensitive areas to minimize the impacts related to the noise.
- Project facilities should be located within the project site premises or outside the existing residential areas. In order to avoid restricting the daily movement of the local stakeholders; construction vehicles should remain confined within their designated areas of movement
- The utilities to be shifted due to the implementation of the proposed project should be rehabilitated on priority basis to minimize the impacts on the stakeholders.
- Landscaping must be done including development of grassy lawns, green belts, parks, etc. after completion of construction phase.
- Construction Solid waste and sewage to be generated during construction at site should be disposed of safely and in an appropriate manner to not impact the environment.
- Temporary sanitary system should be provided.
- Swage / Municipal Wastewater to be produced during operational phase must be treated to comply with PEQS and disposed off properly.
- Municipal Solid waste will be produced during operational phase should be lifted and handled on daily basis in an appropriate manner.
- All necessary measures should be taken to ensure the safety of traffic during construction, including barricades (including signs boards, pavement markings, flags, and lights).
- Dust and noise levels should be kept to minimum employing the best suitable and effective mitigation measure
- The construction activities must be confined within the project site boundary

11.6 Findings of the Overall Discussion

- After the completion of the proposed project the site will be used for housing society.
- The proposed project will help to fulfill the increasing demand of modern, clean & green and environment friendly life style by providing state of the art design housing project
- It will enhance the socioeconomic conditions/values of the area
- Project will increase revenue generation for the Government
- It will create employment opportunities
- Local people should be given preference for employment in the proposed

housing project
- Construction of the proposed project should be completed in the designated timeframe to limit adverse impacts of construction.
- There will be additional load on the existing infrastructure i.e. utilities of water, telephone, electricity etc. due to the development of the proposed project which matter should be resolved with WAPDA / MEPCO & other utility agencies.
- It will provide the employment to the people
- It will give a lift to national economy in due course

Majority of people favored the proposed housing project in a sense that the construction of the proposed housing scheme will fulfill the vital need of increasing demand of modern, clean & green and environmental friendly life style by providing state of the art design housing project, generate employment opportunities and revenue for the government and enhance the socioeconomic conditions of the area.

SECTION 12: CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

There are many concerns i.e. environmental techno-legal including its dimension like physical environment, ecological environment & socio-economic environment on the proposed plan for establishment of housing project namely “Etihad Garden Phase-II by M/s Punjnad Real Estates (Pvt.) Ltd. Located at Manthar Road, Mouza Bindoor, Tehsil & District Rahim Yar Khan.

The impacts during all of three stages design, construction and operation of the proposed project such as impacts on physical environments including changes in land use/appearance, seismic hazard, soils/geology, impacts on topography, impacts on air quality, noise pollution, impacts on groundwater, water consumption, sewage / municipal wastewater generation, municipal solid wastes, emergency conditions; ecological environment including impacts on flora & fauna and socio-economic environment including health and safety of workers, etc. have been considered and estimated/assessed in the light of nature of project, visit of project site & area and stakeholders / public consultation including interviews, comments & feedback.

Information regarding Description of Environment including baseline physical environment, baseline ecological environment & baseline socio-economic environment has been collected from a variety of sources including survey of the project area, private offices, Government departments and published literature. Collected information has been used to compose the environmental profile likely to be affected by the project. Details of these impacts have been discussed in Section 9.

The impact of the planned activities in the project area will be insignificant. Necessary mitigation measures proposed in the report have been made part of the project activities. After the:

- Survey of the project site & area;
- Collection of baseline environmental data,
- Study of impacts during design, construction and operational phases and their mitigation measures.
- The intellectual expertise and experiences have been incorporated in preparation and suggesting mitigation measures by the EIA Study preparation team.
- The mitigation measures suggested in the EIA Report is sufficient to complete and run the project in an environment friendly manner.
- Sustainability has also been ensured by recommending extensive plantation / landscaping after completion of proposed project.

It has been concluded that the proposed housing project is feasible at the proposed site from physical, ecological & socio-economic environmental point of view after implementation of mitigation measures suggested in Section 9 & EMP of this EIA Study. The mitigation measures are sufficient to ensure the sustainable development.

8.2 Recommendations

Following recommendations are suggested to protect the environment and for the safe development and operation of the proposed housing project during its construction & operational phases:

- Environmental Management & Monitoring Plan (EMMP) suggested in EIA Report should be strictly followed, implemented with letter & spirit and operational throughout the project life. All monitored data should be reported to the EPA Punjab for scrutiny at their end.
- An air quality monitoring and improvement plan should be developed to keep the air pollution levels within the permissible limits of PEQS;
- World Bank's Pollution Prevention and Abatement Guidelines for ambient noise for the receptors are i.e. 55 and 45 dB (A) during daytime and night time respectively for residential, institutional and educational areas should be maintained.
- Noise level monitoring plan should be developed and implemented with letter & spirit to comply with PEQS limits
- It should make sure to construct small scale septic tanks for every household for initial treatment.
- Sewage Treatment Plant should also be installed in the society for the treatment of sewage/municipal wastewater to comply with PEQS limits.
- After proper treatment, the treated sewage should be disposed off into wastewater drain/sewer line.
- Solid waste collection system should be developed for collection of municipal solid waste to be produced from the project during operational stage.
- Environmental Monitoring including sewage, ground water, and noise level should be done on regular basis or on quarterly intervals.
- An Emergency Response Plan & Preparedness Plan for emergency situation including fire emergency, earthquakes and other manmade disasters will be prepared by the project management.
- Emergency Response Plan & Preparedness Plan should be review or revised annually as per need.
- Firefighting arrangements including Fire hydrant system connected with water tank reserved for emergency situation, fire extinguishers, fire alarm system, emergency signs, first aid boxes, etc. must be placed at appropriate locations to cope with emergency situations.
- Sufficient / appropriate firefighting arrangements as mentioned above should be done according to the requirements of Civil Defense Department, Rescue Department 1122 and international standards.
- All firefighting, emergency and safety equipment should be frequently inspected, checked periodically, mentioned expiry date and properly maintained.